著者名	題名	誌名	年	巻	号	初頁	終頁	分類1	分類2	分類3	抄録
Simpson WM Jr. Schuman SH	Recognition and management of acute pesticide poisoning	American Family Physician	2002	65	8	1599	1604	消化管除洗／活性炭	総説		Most poisonings from pesticides do not have a specific antidote, making decontamination the most important intervention. For maximal benefit to the patient, skin, eye, and gastric decontamination should be undertaken while specifics of the poisoning are being determined. As in most illnesses and injuries, the history of the poisoning is of great importance and will determine specific needs for decontamination and therapy, if any exist. Protection of health care workers during the decontamination process is important and frequently overlooked. Skin decontamination is primarily accomplished with large volumes of water, soap, and shampoo. Gastric decontamination by lavage is indicated if ingestion of the poisoning has occurred within 60 minutes of patient presentation. Activated charcoal, combined with a cathartic, is also indicated in most poisonings presenting within 60 minutes of ingestion. With large volume ingestion poisonings, activated charcoal may be used after 60 minutes, but little data exist to support this practice. Syrup of ipecac is no
Bond GR	The role of activated charcoal and gastric emptying in gastrointestinal decontamination: a state-of-the-art review	Ann Emerg Med	2002	39	3	273	86	活性炭／胃洗浄	総説		Gastrointestinal decontamination has been practiced for hundreds of years; however, only in the past few years have data emerged that demonstrate a clinical benefit in some patients. Because most potentially toxic ingestions involve agents that are not toxic in the quantity consumed, the exact circumstances in which decontamination is beneficial and which methods are most beneficial in those circumstances remain important topics of research.Maximum benefit from decontamination is expected in patients who present soon after the ingestion. Unfortunately, many overdose patients present at least 2 hours after taking a medication, when most of the toxin has been absorbed or has moved well into the intestine, beyond the expected reach of gastrointestinal decontamination. Decontamination probably does not contribute to the outcome of many such patients, especially those without symptoms. However, if absorption has been delayed or gastrointestinal motility has been slowed, activated charcoal may reduce the final amount absorbed.
Ly BT, Williams SR, Clark RF	Mercuric oxide poisoning treated with whole-bowel irrigation and chelation therapy	Ann Emerg Med	2002	39	3	312	5	腸洗浄	症例報告		Most reported cases of inorganic mercury poisoning are from mercuric chloride. We report a case of mercuric oxide (HgO) powder ingestion. A 31-year-old man presented to an emergency department after ingestion of approximately 40 g of HgO. Soon after ingestion, he developed nausea, vomiting, and abdominal cramping. Abdominal radiograph revealed densely radiopaque material in the stomach. Gastrointestinal decontamination was accomplished with activated charcoal and whole-bowel irrigation with polyethylene glycol solution (Golytely) for 24 hours until repeat abdominal radiographs no longer demonstrated the substance in the gastrointestinal tract. He was also chelated with British anti-Lewisite for 5 days, followed by succimer for 10 days. He had markedly elevated urine and blood mercury levels after ingestion, but except for a mildly depressed serum bicarbonate (19 mEq/L), his chemistry results remained normal including blood urea nitrogen and creatinine. He had an uncomplicated hospital course and remained
Christophersen AB, Levin D, Hoegberg LC, Angelo HR, Kampmann JP	Activated charcoal alone or after gastric lavage: a simulated large paracetamol intoxication	Br J Clin Pharmacol	2002	53	3	312	7	活性炭／胃洗浄	ヒトモデル実験		AIMS: Activated charcoal is now being recommended for patients who have ingested potentially toxic amounts of a poison, where the ingested substance adsorbs to charcoal. Combination therapy with gastric lavage and activated charcoal is widely used, although clinical studies to date have not provided evidence of additional efficacy compared with the use of activated charcoal alone. There are also doubts regarding the efficacy of activated charcoal, when administered more than 1 h after the overdose. The aim of this study was to examine if there was a difference in the effect of the two interventions 1 h post ingestion, and to determine if activated charcoal was effective in reducing the systemic absorption of a drug, when administered 2 h post ingestion. METHODS: We performed a four-limbed randomized cross-over study in 12 volunteers, who 1 h after a standard meal ingested paracetamol 50 mg kgminus sign1 in 125 mg tablets to mimic real-life, where several factors, such as food, interfere with gastric emptying and thus treatment. The interventions were
Graudins A, Peden G, Dowsett RP	Massive overdose with controlled-release carbamazepine resulting in delayed peak serum concentrations and life-threatening toxicity	Emerg Med (Fremantle)	2002	14	1	89	94	血液浄化／活性炭／腸洗浄	症例報告		INTRODUCTION: Peak serum levels following overdose with immediate-release formulations of carbamazepine have been reported to occur up to 2 days postingestion. We report a case of poisoning with carbamazepine controlled-release resulting in peak levels 96 h postingestion. CASE REPORTS: A 31-year-old female presented following a suspected polypharmacy overdose. She was haemodynamically stable with a Glasgow Coma Scale score of 3 and was endotracheally intubated in the emergency department. A single-dose of activated charcoal was administered on admission and her neurological status improved gradually. Results of qualitative urine drug screen available 24 h postadmission to the intensive care department revealed benzodiazepines and carbamazepine. The serum carbamazepine concentration at this time was 66 micromol/L (therapeutic 17-42 micromol/L). A history of therapy with controlled-release carbamazepine was discovered. Repeat-dose activated charcoal and whole-bowel irrigation were commenced, but poorly tolerated.
Teece S, Crawford I	Gastric lavage in iron overdose	Emerg Med J	2002	19	3	251	2	胃洗浄			A short cut review was carried out to establish whether gastric lavage is of use after an overdose of ionic compounds. Altogether 74 papers were found using the reported search but none answered the question posed.
Thakore S. Murphy N.	The potential role of prehospital administration of activated charcoal	Emergency Medicine Journal	2002	19	1	63	65	活性炭	臨床研究		OBJECTIVES: Activated charcoal is now the mainstay of non-specific treatment for self poisoning in accident and emergency (A&E) departments and should be administered within one hour of ingestion of an overdose. This study aimed to investigate if compliance with treatment guidelines may be improved by the prehospital administration of activated charcoal. METHOD: Ambulance report forms and case notes were reviewed in all patients presenting to A&E by ambulance after self poisoning. Information was gathered using a standardised abstraction form. The times collected were: time of ingestion, time of call to ambulance control, time picked up, time of arrival in A&E and time seen by doctor. RESULTS: 201 patient records were reviewed. Twenty six were excluded because of incomplete data on report forms or case notes. The median time between ingestion and pick up by an ambulance crew was 77 minutes. This compares with a median of 140 minutes for the time to assessment by medical staff. Seventy three patients were picked up by an
Jones S. Ali B	Towards evidence based emergency medicine: best BETs from the Manchester Royal Infirmary. Activated charcoal and gastric absorption of iron compounds	Emergency Medicine Journal	2002	19	1	49	49	活性炭	疫学調査？		A short cut review was carried out to establish whether activated charcoal is effective in iron overdose. Altogether 17 papers were found using the reported search, of which only one was relevant. The author, date and country of publication, patient group studied, study type, relevant outcomes, results and study weaknesses of this paper are shown in table 4. A clinical bottom line is stated.
Hoegberg LC, Angelo HR, Christophersen AB, Christensen HR	Effect of ethanol and pH on the adsorption of acetaminophen (paracetamol) to high surface activated charcoal, in vitro studies	J Toxicol Clin Toxicol	2002	40	1	59	67	活性炭	in vitro		BACKGROUND: Paracetamol (acetaminophen) intoxication often in combination with ethanol, is seen commonly in overdose cases. Doses of several grams might be close to the maximum adsorption capacity of the standard treatment dose (50g) of activated charcoal. The aim of this study was to determine the maximum adsorption capacity for paracetamol for two types of high surface-activated charcoal [Carbomix and Norit Ready-To-Use (not yet registered trademark in Denmark) both from Norit Cosmara, Amersfoort, The Netherlands] in simulated in vivo environments: At pH 1.2 (gastric environment), at pH 7.2 (intestinal environment), and with and without 10% ethanol. METHODS: Activated charcoal, at both gastric or intestinal pHs, and paracetamol were mixed, resulting in activated charcoal-paracetamol ratios from 10:] to 1:1. In trials with ethanol, some of the gastric or intestinal fluid was replaced with an equivalent volume of ethanol, resulting in an ethanol concentration of 10% v/v. After incubation, the concentration of unabsorbed

Hoegberg LC. Angelo HR. Christophersen AB. Christensen HR	Effect of ethanol and pH on the adsorption of acetaminophen (paracetamol) to high surface activated charcoal, in vitro studies.	Journal of Toxicology - Clinical Toxicology	2002	40	1	59	67	活性炭／スーパー活性炭	in vitro		BACKGROUND: Paracetamol (acetaminophen) intoxication often in combination with ethanol, is seen commonly in overdose cases. Doses of several grams might be close to the maximum adsorption capacity of the standard treatment dose (50g) of activated charcoal. The aim of this study was to determine the maximum adsorption capacity for paracetamol for two types of high surface-activated charcoal [Carbomix and Norit Ready-To-Use (not yet registered trademark in Denmark) both from Norit Cosmara, Amersfoort, The Netherlands] in simulated in vivo environments: At pH 1.2 (gastric environment), at pH 7.2 (intestinal environment), and with and without 10% ethanol. METHODS: Activated charcoal, at both gastric or intestinal pHs, and paracetamol were mixed, resulting in activated charcoal-paracetamol ratios from 10:] to 1:1. In trials with ethanol, some of the gastric or intestinal fluid was replaced with an equivalent volume of ethanol, resulting in an ethanol concentration of 10% v/v. After incubation, the concentration of unabsorbed
Green R. Grierson R. Sitar DS. Tenenbein M	How long after drug ingestion is activated charcoal still effective?	Journal of Toxicology - Clinical Toxicology	2002	39	6	601	605	活性炭	ヒトモデル実験		OBJECTIVE: The recent American Academy of Clinical Toxicology/European Association of Poisons Centres and Clinical Toxicologists position statement on activated charcoal stated "there are insufficient data to support or exclude its use after 1 hour of ingestion." The purpose of this study was to determine the effectiveness of activated charcoal administered 1, 2, and 3 hours after drug ingestion. METHODS: This was a human volunteer, randomized crossover study. Ten volunteers ingested 4 g of acetaminophen on four occasions at least 1 week apart. One ingestion served as a control and the other three as experimental ingestions with charcoal being administered at 1, 2, and 3 hours after acetaminophen dosing. Eight blood specimens were obtained over the initial 8 hours for serum acetaminophen concentrations that were used for calculation of routine pharmacokinetic parameters. Repeated measures of ANOVA and Tukey's HSD test were used for statistical analysis. RESULTS: Pharmacokinetic parameters for acetaminophen in our volunteers were
Clifton Ii JC, Sigg T, Burda AM, Leikin JB, Smith CJ, Sandler RH	Acute pediatric lead poisoning: Combined whole bowel irrigation, succimer therapy, and endoscopic removal of ingested	Pediatr Emerg Care	2002	18	3	200	202	腸洗浄	症例報告		
Dagnone D. Matsui D. Rieder MJ	Assessment of the palatability of vehicles for activated charcoal in pediatric volunteers	Pediatric Emergency Care	2002	18	1	19	21	活性炭	臨床研究		OBJECTIVE: To evaluate the palatability of 4 common flavoring vehicles (water, chocolate milk [CM], orange juice [OJ], and cola) combined with activated charcoal (AC) in pediatric volunteers. DESIGN: A single-blind taste test of 4 different vehicles (water, OJ, a cola drink, and CM) was conducted in healthy volunteer children. Each child tasted 1.25 mL of Charcodote (0.2g/mL) mixed with 1.25 mL of each vehicle. SETTING: Palatability testing was conducted at the office of 1 of the authors. PARTICIPANTS: Thirty children (16 male, 14 female), aged 6.5 +/- 1.4 years (range 5-9 years). OUTCOME MEASURES: After each test dose, each child rated its taste on a modified 10 cm visual analog scale incorporating a facial-hedonic scale. Each child was also asked for his/her overall preference. RESULTS: Taste scores (cm) were as follows: water 5.6 +/- 1.8, OJ 5.4 +/- 1.0, cola 7.6 +/- 0.7, and CM 5.6 +/- 0.8. There was a significant difference in the taste scores between the cola drink (P = 0.01) and the other 3 vehicles. The cola drink was also selected as the
G. Randall Bond	Activated Charcoal in the Home: Helpful and Important or Simply a Distraction?	Pediatrics	2002	109	1	145	146	活性炭	レタ／コメント		
Gavin R. Graff, James Stark, John W. Berkenbosch, George W. Holcomb, III, and Robert E. Garola	Chronic Lung Disease After Activated Charcoal Aspiration	Pediatrics	2002	109	5	959	961	活性炭	症例報告		The ingestion of toxic substances is a common pediatric emergency. Activated charcoal is part of the standard treatment for most toxic ingestions and is considered a benign therapy. We report a case of inadvertent administration of activated charcoal into the trachea that resulted in the development of chronic lung disease.
Krenzelok EP	New developments in the therapy of intoxications	Toxicol Lett	2002	127		299	305	胃洗浄／活性炭／催吐／腸洗浄	総説		There has been a significant evolution in the clinical management of the poisoned patient over the last decade. Interventions that were once the cornerstone of treating the poisoned patient have become passe or have come under intense scrutiny. The advent of evidence-based medicine has forced clinical scientists to re-evaluate standard therapies. Gastrointestinal decontamination with either emesis or gastric lavage was the foundation of the initial management of most poisoned patients. Examination of the published literature demonstrated that neither emesis nor lavage changed the ultimate outcome of poisoned patients, and most poison centers have abandoned their use. Even the use of activated charcoal has been questioned. A multitude of studies demonstrated that the effectiveness of activated charcoal diminished significantly 30-60 min after the ingestion of a poison. No study has demonstrated that charcoal changed patient outcome. Cathartics have been deemed to be ineffective and potentially dangerous and are never indicated.
Olmedo R, Nelson L, Chu J, Hoffman RS	Is surgical decontamination definitive treatment of "body-packers"?	Am J Emerg Med	2001	19	7	593	6	活性炭／腸洗浄	症例報告		The current recommendations for body-packers are based on packet content, the presence of drug toxicity, or of bowel obstruction. Asymptomatic patients are usually treated with activated charcoal and whole bowel irrigation (WBI). Surgical removal of packets is advocated in symptomatic cocaine body-packers and in those with bowel obstruction. Currently, surgery is regarded as definitive. However, we report 2 body-packers who show the limitations of this technique. These cases show the importance of confirming the absence of drug packets in the gastrointestinal (GI) tract as the definitive end-point in the treatment of body-packers.
Rangan C. Nordt SP. Hamilton R. Ingels M. Clark RF	Treatment of acetaminophen ingestion with a superactivated charcoal-cola mixture.	Annals of Emergency Medicine	2001	37	1	55	58	活性炭／スーパー活性炭	ヒトモデル実験		STUDY OBJECTIVE: We evaluate the adsorptive capacity of a superactivated charcoal-cola mixture to acetaminophen compared with superactivated charcoal alone. METHODS: This was a triple-arm, prospective, unblinded study of 8 healthy adult human volunteers who ingested 80 mg/kg of acetaminophen. In the control arm of the study, participants ingested acetaminophen alone. In the next arm, acetaminophen was followed by 1 g/kg of superactivated charcoal mixed with water. In the final arm, acetaminophen was followed by 1 g/kg of superactivated charcoal mixed with caffeine-free diet cola. Serum acetaminophen concentrations over 6 hours for each arm were analyzed for area under the time-concentration curve (AUC), peak concentrations, and time to peak concentrations. RESULTS: AUCs were 298.5+/-82.5 mg-h/L (control), 77.1+/-85.2 mg-h/L (superactivated charcoal), and 81.3 +/- 71.8 mg-h/L (superactivated charcoal-cola). Comparison of AUCs by analysis of variance revealed mean square of 128,315.1 between treatments, and residual mean
Orisakwe OE. Afonne OJ. Agbasi PU. Ilondu NA. Ofoefule SI. Obi E	Adsorptive capacity of activated charcoal for rifampicin with and without sodium chloride and sodium citrate.	Biological & Pharmaceutical Bulletin	2001	24	6	724	726	活性炭／下剤	in vitor		The effects of two saline cathartics (sodium chloride and sodium citrate) on the adsorptive capacity of activated charcoal (AC) for rifampicin were studied. Solutions of rifampicin alone and rifampicin with 7.5 mg/ml cathartic solution were vortex-mixed for 30 s with different quantities of AC. These were incubated for 30 min at 37 degrees C and analyzed for free rifampicin spectrophotometrically at 320 nm. The addition of sodium citrate significantly increased ($p<0.05$) the adsorptive capacity of AC for rifampicin with a resulting decrease in B-50 values at both the therapeutic and simulated toxic doses. Sodium chloride addition reduced the binding of rifampicin to AC at the toxic doses. The adsorption of rifampicin to activated charcoal, both alone and with the two saline cathartics, obeyed quantity-dependent kinetics. AC may be co-administered with sodium citrate in the management of rifampicin overdose.

O'Connor A	Absence of ice-cream interference with the adsorption of paracetamol onto activated charcoal	Emergency Medicine	2001	13	2	260	260	活性炭	レター		We refer to the paper by Teubner, 1 showing that the use of ice-cream does not interfere with the capacity of charcoal to absorb paracetamol in vitro. We would like to comment on the basic premise of the research, namely that the management of paediatric paracetamol poisoning commonly involves the use of activated charcoal. Whereas the use of charcoal was commonly used routinely in all poisonings, this is no longer the case, especially in paediatric poisoning. 2 There are many studies showing that the toxic dose of paracetamol is higher in children than that in adults, and that gastrointestinal decontamination is rarely required. 3,4 Also, one must bear in mind that the use of this drug is not without its own inherent dangers aspiration of charcoal can have disastrous consequences, even death. 5,6 Thus, before we sweeten the pill, we need to ask ourselves, Is the pill necessary in the first place?
Lapatto-Reiniluoto O. Kivisto KT. Neuvonen PJ	Activated charcoal alone and followed by whole-bowel irrigation in preventing the absorption of sustained-release drugs.	Emergency Medicine Journal	2001	70	3	255	260	活性炭／腸洗浄	ヒトモデル実験		OBJECTIVE: Our objective was to study the effect of activated charcoal on the absorption of sustained-release drugs ingested 1 hour earlier and to examine whether whole-bowel irrigation affects the efficacy of charcoal. METHODS: In this randomized, 3-phase crossover study, 9 healthy subjects received, at the same time, 200 mg carbamazepine, 200 mg theophylline, and 120 mg verapamil. All drugs were given as sustained-release tablets. One hour after taking the tablets, the subjects were assigned to one of the following treatments: 25 g activated charcoal as a suspension, 25 g activated charcoal as a suspension followed by whole-bowel irrigation with polyethylene glycol (PEG) electrolyte lavage solution, or 200 mL water (control). The absorption of the drugs was characterized by using the area under the plasma drug concentration-time curve from time zero to 24 hours [AUC(0-24)], peak plasma concentration (C(max)), C(max) minus the plasma concentration at 1 hour (C(Delta)), and time to peak (t(max)). RESULTS: Activated charcoal alone
Karim A. Ivatts S. Dargan P. Jones A	How feasible is it to conform to the European guidelines on administration of activated charcoal within one hour of an overdose?	Emergency Medicine Journal.	2001	18	5	390	392	活性炭	臨床研究		OBJECTIVES:The European and American position statement on the use of activated charcoal recommends its administration within an hour of ingestion of a charcoal binding poison. But in reality, this time limit is difficult to follow for the majority of poisoned patients. This study aimed to examine the treatment of acutely poisoned patients with activated charcoal in an accident and emergency (A&E) department. METHODS:63 patients who had taken potentially serious overdoses and required hospital admission from a London teaching hospital A&E department were identified over a six month period. The patients' case notes were analysed for age, sex, substances taken, and the timing of their management within the A&E department. RESULTS:Median time of arrival after overdose was 136 minutes, and only 15 patients presented within an hour. Ten of these 15 patients were given activated charcoal, and only four of the 10 received it within the one hour limit. Sixteen patients received charcoal outside the time limit. Subanalysis of the individual cases given charcoal shows that
Su M, Stork C, Ravuri S, Lavoie T, Anguish D, Nelson LS, Hoffman RS	Sustained-release potassium chloride overdose	J Toxicol Clin Toxicol	2001	39	6	641	8	腸洗浄	症例報告		BACKGROUND: Although ingestion of sustained-release potassium supplements can cause life-threatening hyperkalemia in patients with abnormal renal function, only a few previous reports suggest that this may occur in patients with normal renal function. We report 2 cases of hyperkalemia in patients with normal renal function who developed hyperkalemia after ingesting sustained-release potassium preparations and describe the use of radiography and whole-bowel irrigation in their care. CASE REPORTS: The first patient is a 50-year-old woman who ingested 100 K-Dur tablets (each tablet containing 750 mg KCl or 10 mEq potassium) in a suicide attempt 1 hour prior to presenting to the emergency department. She developed a peak serum potassium level of 9.7 mEq/L and had transient, potentially life-threatening electrocardiographic changes. The second patient was a 17-year-old man who ingested 20 to 30 Klor-Con tablets (each tablet containing 750 mg KCl or 10 mEq potassium) in a suicide attempt 10 hours prior to presentation. Although
Narsinghani U, Chadha M, Farrar HC, Anand KS	Life-threatening respiratory failure following accidental infusion of polyethylene glycol electrolyte solution into the lung.	J Toxicol Clin Toxicol	2001	39	1	105	107	腸洗浄	症例報告		Functional fecal retention is the most common cause of encopresis in children. Hospitalization may be required to clear the bowel following failure of outpatient management. Although the safety and efficacy of polyethylene glycol electrolyte solution is well established in children older than 6 months (1), its use should be carefully monitored in patients with altered mental status or impaired airway protective reflexes. We report the accidental infusion of NuLytely into the lungs of an 11-year-old female patient who consequently developed life-threatening acute lung injury. She rapidly developed respiratory failure requiring emergent tracheal intubation and suctioning, followed by mechanical ventilation. Careful monitoring is needed to avoid this potential complication if polyethylene glycol solution is infused via a nasogastric tube.
Green R, Grierson R, Sitar DS, Tenenbein M	How long after drug ingestion is activated charcoal still effective?	J Toxicol Clin Toxicol	2001	39	6	601	5	活性炭	ヒトモデル実験		OBJECTIVE: The recent American Academy of Clinical Toxicology/European Association of Poisons Centres and Clinical Toxicologists position statement on activated charcoal stated "there are insufficient data to support or exclude its use after 1 hour of ingestion." The purpose of this study was to determine the effectiveness of activated charcoal administered 1, 2, and 3 hours after drug ingestion. METHODS: This was a human volunteer, randomized crossover study. Ten volunteers ingested 4 g of acetaminophen on four occasions at least 1 week apart. One ingestion served as a control and the other three as experimental ingestions with charcoal being administered at 1, 2, and 3 hours after acetaminophen dosing. Eight blood specimens were obtained over the initial 8 hours for serum acetaminophen concentrations that were used for calculation of routine pharmacokinetic parameters. Repeated measures of ANOVA and Tukey's HSD test were used for statistical analysis. RESULTS: Pharmacokinetic parameters for acetaminophen in our volunteers were
Ardagh M, Flood D, Tait C	Limiting the use of gastrointestinal decontamination does not worsen the outcome from deliberate self-poisoning	N Z Med J	2001	114	1140	423	5	胃洗浄／活性炭／催吐／腸洗浄	症例シリーズ		AIM: To review the current epidemiology of patients with deliberate self-poisoning presenting to Christchurch Emergency Department, and to compare this with 1996, 1992, and 1989 data. METHODS: A retrospective analysis of computer and case records over the twelve-month period of 1999 was conducted and compared with published data from 1996,1992 and 1989. RESULTS: There were 561 presentations of deliberate self-poisoning to Christchurch Hospital, representing 0.87% of total presentations (compared with 1.1% in 1996, 1.2% in 1992, and 1.0% in 1989). The female to male ratio was 2.2:1.0 (compared with 1.9:1.0, 1.5:1.0, and 2.1:1.0). The principal drugs ingested were antidepressants 30.8% (compared with 20.1%, 24.4%,15.7%), paracetamol 23.5% (compared with 16.7%, 16.9%, 10.6%), benzodiazepines 23.0% (compared with 11.1%, 23.6% 22.8%) and antipsychotics 17.8% (compared with 10.7%, 16.1%, not reported). Gastrointestinal decontamination was performed in only 14.4% of patients (compared with 61%, 73%, 61%). Activated charcoal was given alone in
Spiller HA, Rodgers GC Jr	Evaluation of administration of activated charcoal in the home	Pediatrics	2001	108	6	E100		活性炭	疫学調査		OBJECTIVE: Activated charcoal (AC) is recognized as the treatment of choice for gastrointestinal decontamination after many ingestions. AC use in the home has been limited by concerns that parents would not administer it properly and that children would refuse to take AC. Previous descriptions of home administration have reported mixed results. METHODS: This was an 18-month consecutive case series of all patients for whom AC administration was recommended in the home. Data collected included AC availability in the home and/or a local pharmacy, success in administration, amount administered, time after ingestion to AC administration, difficulties in administration, adverse effects, age and gender of patient, substance involved in poisoning, and medical outcome. All cases were followed for at least 3 days after the ingestion. Patients who initially had home AC recommendation but who ultimately were treated in the emergency department (ED) served as a comparison group. RESULTS: Home administration of AC was recommended in 138 cases. A total
Tenenbein PK. Sitar DS. Tenenbein M	Interaction between N-acetylcysteine and activated charcoal: implications for the treatment of acetaminophen poisoning	Pharmacotherapy	2001	21	11	1331	1336	活性炭	in vitro		STUDY OBJECTIVE: To determine if the presence of N-acetyl

McNutt TK, Chambers-Emerson J, Dethlefsen M, Shah R	Bite the bullet: lead poisoning after ingestion of 206 lead bullets	Vet Hum Toxicol	2001	43	5	288	9	腸洗浄	症例報告		A 45-y-o male with a history of schizophrenia was admitted to a local VA psychiatric unit. Five days later, endoscopy due to abdominal pain, gastrointestinal bleeding and blood hemoglobin of 5.6 g/dL revealed bullets in the stomach. On subsequent radiograph, > 50 bullets were visualized in the stomach and intestines. Poison Center recommendations included whole bowel irrigation and a blood lead level. After poor results with gastrointestinal decontamination and a repeat radiograph showing > 100 cartridges, surgical intervention was considered but not performed due to perceived risk of bullet detonation from electrocautery. The blood lead was reported as 391 mcg/dL. Calcium EDTA therapy was initiated, followed by aggressive gastrointestinal decontamination. Four days of whole bowel irrigation facilitated passage of 206 cartridges over the next 10 days. The patient was discharged on a 14-day course of 600 mg Succimer tid to treat the bone lead deposits and blood lead
Wolsey BA, McKinney PE	Does transportation by ambulance decrease time to gastrointestinal decontamination after overdose?	Ann Emerg Med	2000	35	6	579	84	胃洗浄／活性炭	疫学調査		STUDY OBJECTIVE: Because the ability of gastrointestinal decontamination to alter drug absorption varies inversely with time, we compared the time from arrival in the emergency department to gastrointestinal decontamination (gastric lavage or activated charcoal) for patients transported by ambulance with patients transported by other means after overdose. METHODS: A retrospective chart review was conducted in an academic university ED with an annual volume of 56,000 visits. Consecutive cases of oral overdose treated by gastrointestinal decontamination between December 1, 1995, and May 31, 1996, were identified from International Classification of Diseases, ninth revision, billing codes. ED charts were reviewed to determine the patient's age, sex, mode of transportation, disposition, and time interval to gastrointestinal decontamination with either gastric lavage or activated charcoal. RESULTS: Two hundred eighty-one patient visits were identified. Complete data were available for 173 visits. Six patients were excluded because the diagnosis of
Yeates PJ, Thomas SH	Effectiveness of delayed activated charcoal administration in simulated paracetamol (acetaminophen) overdose	Br J Clin Pharmacol	2000	49	1	11	14	活性炭	ヒトモデル実験		AIMS: Oral activated charcoal is used to treat drug overdose and is effective at reducing drug absorption when administered within 1 h of drug ingestion. There are fewer data on efficacy when the delay is longer, as is the case in most drug overdoses. This study investigated the efficacy of activated charcoal at preventing paracetamol (acetaminophen) absorption after simulated overdose when administration was delayed between 1 and 4 h. METHODS: An open randomized-order four-way crossover study was performed in healthy volunteers comparing the effect of activated charcoal 50 g on the absorption of 3 g paracetamol tablets when administered after an interval of 1, 2 or 4 h or not at all. Plasma paracetamol concentrations were measured over 9 h after paracetamol ingestion using h.p.l.c. and areas under the curve between 4 and 9 h (AUC(4,9 h)) calculated as a measure of paracetamol absorption. RESULTS: Activated charcoal significantly reduced paracetamol AUC(4,9 h) when administered after 1 h (mean reduction 56%; 95% Confidence intervals 34, 78;
Trimble M	Managing self poisoning. Indications for the use of whole bowel irrigation are weak.	Br Med J	2000	11;320(7236)		712	713	腸洗浄	レタ／コメント		Comment on: BMJ. 1999 Nov 27;319(7222):1414-7.
Chaudhry M, Khanna R	Managing self poisoning. Guidelines for accident and emergency departments are	Br Med J	2000	11;320(7236)		711	713	胃洗浄／活性炭／催吐／腸洗浄	レタ／コメント		Comment on: BMJ. 1999 Nov 27;319(7222):1414-7.
DaCruz D	Managing self poisoning. Common sense makes no sense.	Br Med J	2000	11;320(7236)		711	713	胃洗浄／活性炭／催吐／腸洗浄	レタ／コメント		Comment on: BMJ. 1999 Nov 27;319(7222):1414-7.
Tucker JR	Indications for, techniques of, complications of, and efficacy of gastric lavage in the treatment of the poisoned child	Curr Opin Pediatr	2000	12	2	163	5	胃洗浄	総説		Gastrointestinal decontamination is central to the care of poisoned patients, and gastric lavage is one common method for gastrointestinal decontamination. Gastric lavage in pediatric patients should be limited to children who present shortly after a potentially life-threatening ingestion. The routine use of gastric lavage has recently been questioned because of limited outcome data and increased morbidity. If gastric lavage is deemed necessary, proper positioning of the patient and strict attention to appropriate technique are essential to avert complications.
Burns MM	Activated charcoal as the sole intervention for treatment after childhood poisoning	Curr Opin Pediatr	2000	12	2	166	71	活性炭	総説		Childhood poisonings account for approximately two thirds of all human toxic exposures reported annually to the American Association of Poison Control Centers. Activated charcoal (AC) is the mainstay of decontamination in the emergency department setting. This review focuses on six concepts: 1) description of AC and its method of action, 2) evolution of AC in the gastrointestinal decontamination process, 3) prehospital use of AC, 4) superactivated charcoal, 5) multiple-dose AC, and 6) complications of AC administration. The most recent evolving trends in decontamination of the pediatric patient include trends toward earlier decontamination, either in the home or by paramedics in the field. The newer, "super" activated charcoals, with their greater surface area, may improve compliance of oral administration of AC. Finally, guidelines have been set to limit use of multiple-dose activated charcoal regimens to certain pharmaceuticals only, as well as discouraging cathartic use with charcoal dosing.
Tempowski J	Gut decontamination and poisoning	Emerg Nurse	2000	8	6	22	28	胃洗浄／活性炭／催吐／腸洗浄	総説		
Lapatto-Reiniluoto O. Kivisto KT. Neuvonen PJ	Efficacy of activated charcoal versus gastric lavage half an hour after ingestion of moclobemide, temazepam, and verapamil	European Journal of Clinical Pharmacology	2000	56	4	285	288	活性炭/胃洗浄	ヒトモデル実験		OBJECTIVE: To compare the efficacy of activated charcoal and gastric lavage in preventing the absorption of moclobemide, temazepam, and verapamil 30 min after drug ingestion. METHODS: In this randomized cross-over study with three phases, nine healthy volunteers received a single oral dose of 150 mg moclobemide, 10 mg temazepam, and 80 mg verapamil after an overnight fast. Thirty minutes later, they were assigned to one of the following treatments: 25 g activated charcoal as a suspension in 200 ml water, gastric lavage (10x200 ml), or 200 ml water (control). Plasma concentrations of moclobemide, temazepam, and verapamil were determined up to 24 h. RESULTS: Activated charcoal reduced the area under the plasma concentration time curve from 0 h to 24 h (AUC0-24 h) of moclobemide and temazepam by 55% (P<0.05) and by 45% (P<0.05), respectively. The AUC0-24 h of verapamil was not significantly reduced by charcoal. Gastric lavage decreased the AUC0-24 h of moclobemide
Bingol-Kologlu M, Senocak ME, Talim B, Kale G, Ocal T, Buyukpamukcu N	A comparative histopathologic evaluation of the effects of three different solutions used for whole bowel irrigation: an experimental study	J Pediatr Surg	2000	35	4	564	8	腸洗浄	動物実験		PURPOSE: Although whole bowel irrigation (WBI) is a widely used method of bowel preparation in daily surgical practice, almost nothing is known about the histopathologic alterations caused by WBI and whether these differences have any detrimental effect on· the outcome of gastrointestinal surgical procedures. Therefore, an experimental study has been conducted to evaluate and compare the effects of WBI with various solutions on the histology of gastrointestinal tract. METHODS: During the experimental procedures animals were divided into 4 groups consisting of 8 animals each as follows: group A, WBI performed by using isotonic saline solution; group B, WBI performed by using an isoosmolar solution containing polyethylene glycol (PEG); group C, WBI performed by using Lactated Ringer's solution; group D, Animals that were not irrigated but sham operations that were performed served as controls. Four hours after WBI the animals underwent laparotomy and a segment of transverse colon with intact vascular peduncle was prepared. After waiting for
Juurlink DN, McGuigan MA	Gastrointestinal decontamination for enteric-coated aspirin overdose: what to do depends on who you ask	J Toxicol Clin Toxicol	2000	38	5	465	70	胃洗浄／活性炭／腸洗浄	疫学調査		CONTEXT: Overdoses with enteric-coated preparation are common. The optimal means by which to limit drug absorption in such cases is controversial. OBJECTIVE: To describe the recommendations for gastrointestinal decontamination issued by North American poison control centers for a hypothetical patient, (an adult male with normal vital signs), presenting 1 hour after ingesting 500 mg/kg of enteric-coated aspirin. DESIGN: Telephone survey of 76 poison control centers in North America. Seven toxicologists who contributed to the American Academy of Clinical Toxicology/European Association of Poison Centres and Clinical Toxicologists position statements on gastrointestinal decontamination were also surveyed for informal comparison. RESULTS: Most poison control centers (99%) and all of the toxicologists (100%) participated in the survey. Four centers (5 %) recommended syrup of ipecac and 38 (51%) recommended gastric lavage, compared with 0% and 0% of toxicologists, respectively. Seventy-three centers

Lapostolle F, Finot MA, Adnet F, Borron SW, Baud FJ, Bismuth C	Radiopacity of clomipramine conglomerations and unsuccessful endoscopy: report of 4 cases	J Toxicol Clin Toxicol	2000	38	5	477	482	胃洗浄／活性炭／腸洗浄	レタ／コメント		BACKGROUND: The radiopacity of ingested substances may serve as a clue to the presence of particular compounds, as this characteristic varies considerably among medications and household products. Tablet conglomerations are also variably radiopaque. We report 4 cases of clomipramine poisoning associated with formation of radiopaque masses, believed to be clomipramine, in the area of the stomach. CASE REPORTS: Four patients were admitted to the Toxicological Intensive Care Unit after ingestions of, respectively, 8.5 g (180 tablets of mixed strength), 7.5 g (100 tablets), 10.5 g (140 tablets), and 4.5 g (60 tablets) of clomipramine, along with other sedatives and antipsychotics. In each case, a rounded density was observed in the gastric area on plain chest radiograph. The hospital courses of each patient were marked by tachycardia, hypotension, QRS and QT prolongation, seizures, and decreased mental status. Three of 4 patients underwent unsuccessful endoscopy to remove tablet fragments and
Nelson L	As if there weren't enough controversies in gastrointestinal decontamination	J Toxicol Clin Toxicol	2000	38	5	483	4	胃洗浄／活性炭／腸洗浄	レタ／コメント		
Hoffman RS	Does consensus equal correctness?	J Toxicol Clin Toxicol	2000	38	7	689	690	胃洗浄／活性炭／催吐／腸洗浄	レタ／コメント		Comment on: J Toxicol Clin Toxicol. 1997;35(7):699-709. J Toxicol Clin Toxicol. 1997;35(7):711-9. J Toxicol Clin Toxicol. 1997;35(7):721-41. J Toxicol Clin Toxicol. 1997;35(7):753-62. J Toxicol Clin Toxicol. 1999;37(6):731-51. J Toxicol Clin Toxicol. 2000;38(5):465-70.
Tominack R	Gastrointestinal decontamination: maybe we're both right (commentary).	J Toxicol Clin Toxicol	2000	38	7	691	2	胃洗浄／活性炭／催吐／腸洗浄	レタ／コメント		Comment on: J Toxicol Clin Toxicol. 2000;38(5):465-70.
Michaux I, Haufroid V, Dive A, Buchet JP, Bulpa P, Mahieu P, Installe E	Repetitive endoscopy and continuous alkaline gastric irrigation in a case of arsenic poisoning	J Toxicol Clin Toxicol	2000	38	5	471	6	胃洗浄	症例報告		BACKGROUND: The poor prognosis of patients with persistent gastrointestinal radio-opacities after oral arsenic poisoning supports efficient gastrointestinal decontamination as critical for survival. In a case of massive arsenic ingestion, we performed repetitive gastric endoscopy and a continuous alkaline irrigation of the stomach over several days. CASE REPORT: A 41-year-old woman was admitted 4 hours after intentional ingestion of trivalent arsenic powder 5 g. The admission abdominal X-ray confirmed the presence of multiple gastric opacities. Initial treatment was gastric lavage with normal saline, dimercaprol chelation, and supportive therapy. Since gastric opacities persisted on the abdominal X-ray at 34 hours despite repeated gastric lavage, a gastroscopy was performed showing nonremovable agglomerates. In an attempt to achieve further gastric decontamination, we performed a continuous gastric alkaline irrigation. After 3 days of alkaline irrigation, the abdomen was normal on X-ray but the gastroscopy still showed arsenic concretions. Alkaline irrigation was
Shannon, M	Ingestion of toxic substances by children	N Engl J Med	2000	342	3	186	191	胃洗浄／活性炭／催吐／腸洗浄／	総説		
McGuffie AC, Wilkie SC, Kerr GW	The treatment of overdose--time for a change?	Scott Med J	2000	45	3	75	6	胃洗浄／活性炭／催吐	レタ／コメント		To determine emergency management of overdose relating to gastrointestinal decontamination procedures in Scottish Accident & Emergency (A & E) Departments. A postal questionnaire was sent to the 28 main A & E Departments in Scotland. There was a 75% response rate. Nineteen departments(90%) continue to perform gastric lavage, with the majority carrying out this procedure more than one hour post-ingestion of commonly presenting overdoses. Sixteen departments (76%) regularly administer activated charcoal and four (19%) use syrup of ipecacuanha. Twenty departments (95%) had access to Toxbase. The majority of respondents (86%) feel there is a need for standardisation of treatment in acute overdose. Despite the availability of guidelines provided by the UK National Poisons Information Service and the Position Statements, there is no consensus in the actual management of acute
Norris WR, Temple WA, Eason CT, Wright GR, Ataria J, Wickstrom ML	Sorption of fluoroacetate (compound 1080) by Colestipol, activated charcoal and anion-exchange in resins in vitro and gastrointestinal decontamination in rats	Vet Hum Toxicol	2000	42	5	269	75	活性炭	動物実験		The sorption of sodium fluoroacetate (FA) by activated charcoal (AC) and 5 anion exchange resins (AERs) was tested in 2 simulated gastrointestinal (GI) fluids. Each sorbent was incubated with FA in a shaker-water-bath at 37 C for 24 h. Supernatant was removed and filtered, and the concentration of FA was determined by gas chromatographic detection of the dichloroaniline derivative. Under simulated gastric conditions (0.1 M HCl at approximately pH 1.5), the sorbents removed the following proportions of FA from solution: Carbosorb AC, 87 +/- 2%; cholestyramine, 28 +/- 7%; colestipol, 96 +/- 0%; Amberlite IRA-96, 70 +/- 2%; DEAE-Sephadex, 7 +/- 4%; Chitosan, 66 +/- 2%. Under simulated intestinal conditions (0.05 M sodium phosphate at approximately pH 7.4), binding was as follows: Carbosorb AC, 68 +/- 4%; cholestyramine, 53 +/- 5%; colestipol, 46 +/- 2%; AmberliteIRA-96, 10 +/- 20%; DEAE-Sephadex, 64 +/- 7%; Chitosan, 5 +/- 2%. All findings differed significantly from control, with the exception of Amberlite IRA-96 and Chitosan in phosphate buffer, and
Johnson SB, Robertson WO	Gastrointestinal decontamination	Am J Emerg Med	1999	17	5	494	5	活性炭／催吐	レタ／コメント		Letter on; Am J Emerg Med 16(2);1998:114-116
Lapatto-Reiniluoto O, Kivisto KT, Neuvonen PJ	Effect of activated charcoal alone or given after gastric lavage in reducing the absorption of diazepam, ibuprofen and citalopram"	Br J Clin Pharmacol	1999	48	2	148	153	胃洗浄／活性炭／活性炭	ヒトモデル実験		Aims Aims The efficacy of activated charcoal alone, and gastric lavage followed by charcoal in reducing the absorption of diazepam, ibuprofen and citalopram was studied in healthy volunteers. Methods Methods In a randomized cross-over study with three phases, nine healthy volunteers were administered single oral doses of 5 mg diazepam, 400 mg ibuprofen and 20 mg citalopram, taken simultaneously after an overnight fast. Thirty minutes later, the subjects were assigned to one of the following treatments: 200 ml water (control), 25 g activated charcoal as a suspension in 200 ml water or gastric lavage followed by 25 g charcoal in suspension given through the lavage tube. Plasma concentrations of diazepam, ibuprofen and citalopram were determined up to 10 h. Results Results The AUC(0,10 h) of diazepam was reduced by 27% (P<0.05) by both charcoal alone and charcoal combined with lavage. The increase in plasma diazepam concentration from 0.5 h onwards was prevented by both interventions (P」0.05), whereas the Cmax of diazepam was not significantly affected by either treatment. The
Alison L Jones, Glyn Volans	Recent advances: Management of self poisoning	Br Med J	1999	319	27	1414	1417	中毒治療	総説		Introduction･Around 15%-20% of the workload of medical units and 10% of the workload of accident and emergency departments in the United Kingdom are due to self poisoning. 1 2 Episodes of self poisoning in the United Kingdom continue to rise, particularly in young men, and alcohol is often taken with the overdose.2 In general the severity of poisoning has diminished over the past 10 years with the introduction of safer drugs, such as newer serotonin reuptake inhibitors, but the total number of deaths from poisoning in the United Kingdom remains steady at 4000 per year, and the commonest cause of death by poisoning is carbon monoxide. 2 3 This article highlights several specific advances in the management of poisoning over the past two or three years.
Olson KR	Gastric lavage	In : Olson KR ed. Poisoning & Drug Overdose. 3rd ed, Appleton & Lange, Connecticut	1999			47	48	胃洗浄			
Bateman DN	Gastric decontamination--a view for the millennium.	J Accid Emerg Med	1999	16	2	84	86	胃洗浄／活性炭／催吐	総説		The management of acute poisoning remains an important part of accident and emergency (A&E) care. Three gastric decontamination procedures have been widely used: gastric lavage, ipecac, and activated charcoal. Their role has recently been reviewed and position statements developed by working groups of the American Academy of Clinical Toxicology and the European Association of Poisons Centres and Clinical Toxicologists. These have important implications for A&E, as they indicate that activated charcoal is now the agent of choice for most poisons, but than in most situations it is probably only effective if given within an hour of overdose. Ipecac is effectively obsolete and gastric lavage has a narrow range of indications, principally for potentially serious amounts of agents not adsorbed by charcoal. Protocols for care of overdose patients should be modified accordingly.

Clegg T, Hope K	The first line of response for people who self-poison: exploring the options for gut decontamination	J Adv Nurs	1999	30	6	1360	7	胃洗浄／活性炭／催吐／腸洗浄	総説		The trend for increasing numbers of self-poisoning incidents has been noted and a variety of policy initiatives have been launched. Nurses, particularly in emergency room environments occupy a pivotal place in the chain of response to such acts. Any such response needs to be firmly rooted in evidence-based practice yet the initial management of self-poisoning often involves a consideration of procedures, the application of which can vary enormously. This paper offers some contextual information prior to a critical perspective of management modes, namely emesis, lavage, the use of activated charcoal and whole bowel irrigation. A comparison of the relative advantages and disadvantages of each mode precedes suggestions for nursing practice.
Moll J, Kerns W 2nd, Tomaszewski C, Rose R	Incidence of aspiration pneumonia in intubated patients receiving activated charcoal.	J Emerg Med	1999	17	2	279	283	活性炭	症例シリーズ		Several case reports and animal studies raise concerns over the risk of aspiration pneumonia when administering activated charcoal (AC) to intubated patients. Therefore, we sought to determine the incidence of aspiration pneumonia in intubated overdose patients who then received AC. We conducted a retrospective review from January 1994 to April 1997 of intubated patients who then received AC. Patients were transferred to, or primarily treated at, an 843-bed tertiary medical center with an annual emergency department volume of 100,000 patients. Objective evidence of infiltrate on chest radiograph during initial 48 h of hospitalization was used to determine the incidence of aspiration pneumonia. Patients with known preexisting pneumonia or with administration of AC before intubation were excluded. There were 64 patients identified. Fourteen were excluded for clinical aspiration before intubation, receiving activated charcoal before intubation, or abnormal immediate post-intubation chest radiographs. The remaining 50
Karim RM, Momin IA, Lalani II, Merchant SS, Sewani AA, Hassan BS, Mahmood N	Aspiration pneumonia in pediatric age group: etiology, predisposing factors and clinical outcome.	J Pak Med Assoc	1999	49	4	105	108	活性炭	症例シリーズ		INTRODUCTION: Aspiration pneumonia in children is an important disease in terms of the morbidity and mortality associated with it. The objective of this study is to characterize the cases of aspiration pneumonia on the basis of the predisposing factors, types of aspiration syndromes, materials aspirated and their clinical outcome. METHODS: A total of 107 patients diagnosed as having aspiration pneumonia, were included in this study. Cases were between 0-15 years of age, admitted to the Aga Khan University Hospital (AKUH) over five years. RESULTS: The most common form of aspiration syndrome seen was chemical pneumonitis (52.1%). The three most common factors predisposing to pulmonary aspiration were accidental ingestion (37.4%), altered consciousness (34.6%) and neurologic disorders (29%). Children who aspirated oropharyngeal flora were at higher odds to require mechanical ventilation than those aspirating inert fluids and particulate matter (OR = 6.4, 95% CI: 1.5-29.2, p = 0.003). Milk (31.8%), kerosene (21.5%) and oral secretions (19.6%) were the most
Tomaszewski C	Activated charcoal--treatment or toxin?	J Toxicol Clin Toxicol	1999	37	1	17	18	活性炭	レタ／コメント		Comment on: J Toxicol Clin Toxicol. 1999 ;37(1):9-16
van Heijst A	Ecstasy intoxication and gastric lavage.	J Toxicol Clin Toxicol	1999	37	3	345		胃洗浄	レタ／コメント		Comment on: J Toxicol Clin Toxicol. 1997;35(7):711-9. J Toxicol Clin Toxicol. 1998;36(7):727-31. ・To the Editor: ・The publication of Ramcharan et al.] is of eminent importance. The danger of overdose of Ecstasy has been elucidated, and what may be of even greater interest, the importance of gastric lavage was demonstrated. By means of gastric lavage, 4 hours after ingestion, 2800 mg of 3,4-methylenedioxymethamphetamine (Ecstasy) has been removed from a patient who ingested 50 tablets of Ecstasy, 10 tablets of oxazepam 10 mg, and 5 units of alcohol over a period of 4 to 5 hours. The 30-year-old patient arrived in the hospital unconscious, apneic, convulsive, and recovered within 2 days. In the abstract of the American Academy of Clinica] Toxicologists and European Association of Poisons Centres and Clinical Toxicologists' Position Statement: Gastric lavage,2 it was stated: "Gastric lavage should not be considered unless a patient has ingested a potential life-threatening amount of a poison and the procedure can be undertaken within 60
Buckley NA, Whyte IM, O'Connell DL, Dawson AH	Activated charcoal reduces the need for N-acetylcysteine treatment after acetaminophen (paracetamol) overdose	J Toxicol Clin Toxicol	1999	37	6	753	7	活性炭／胃洗浄	臨床研究		BACKGROUND: The evidence for efficacy of gastric lavage and activated charcoal for gastrointestinal decontamination in poisoning has relied entirely on volunteer studies and/or pharmacokinetic studies and evidence for any clinical benefits or resource savings is lacking. AIM OF STUDY: To investigate the value of gastrointestinal decontamination using gastric lavage and/or activated charcoal in acetaminophen (paracetamol) poisoning. PATIENTS AND METHODS: We analyzed a series of 981 consecutive acetaminophen poisonings. These patients were treated with gastric lavage and activated charcoal, activated charcoal alone, or no gastrointestinal decontamination. The decision as to which treatment was received was determined by patient cooperation, the treating physician, coingested drugs, and time to presentation after the overdose. RESULTS: Of 981 patients admitted over 10 years, 10% (100) had serum concentrations of acetaminophen that indicated a probable or high risk of hepatotoxicity. The risk of toxic concentrations for patients
Arnold TC, Willis BH, Xiao F, Conrad SA, Carden DL	Aspiration of activated charcoal elicits an increase in lung microvascular permeability.	J Toxicol Clin Toxicol	1999	37	1	9	16	活性炭	動物実験		BACKGROUND: Gastric decontamination with orally administered activated charcoal is the recommended treatment for many poisonings. However, ingestion of central nervous system depressants resulting in loss of protective airway reflexes may result in pulmonary aspiration of activated charcoal. Although activated charcoal has been reported to be an inert substance, evidence suggests that pulmonary aspiration of charcoal is associated with lung edema formation and pulmonary compromise. This study tested the hypothesis that intratracheal instillation of activated charcoal disrupts the integrity of the lung microvascular barrier. METHODS: The capillary filtration coefficient (Kf,c), a sensitive measure of lung microvascular permeability, was determined isogravimetrically prior to and after intratracheal instillation of activated charcoal 0.04 g/kg (12% weight/vol solution, pH 7.4) or an equal volume of sterile water in isolated, perfused rat lungs. Arterial blood gas
Olson KR	Gastric lavage	Olson KR ed. Poisoning & Drug Overdose 3rd ed.	1999			47	48	胃洗浄	＊単行本など		
Tenenbein M	Recent advancements in pediatric toxicology	Pediatr Clin North Am	1999	46	6	1179	88	胃洗浄／活性炭／催吐／腸洗浄	総説		Ingestion of potentially poisonous agents is a common reason for children to present to an emergency department. The clinician must decide whether gastrointestinal decontamination is indicated for these patients. The controversy over the type of gastrointestinal decontamination is resolving and recent recommendations are reviewed. Also two new antidotes, fomepizole for toxic alcohols and octreotide for sulfonylureas, are reviewed.
Lheureux P, Askenasi R, Paciorkowski F	Gastrointestinal decontamination in acute toxic ingestions.	Acta Gastroenterol Belg	1998	61	4	461	467	胃洗浄／活性炭／催吐／腸洗浄	総説		消化管除染の全般についてposition statementをふまえた詳細な総説･胃洗浄液は、成人では体温の湯、小児では生理食塩液か半生食
Larsen LC, Cummings DM	Oral poisonings: guidelines for initial evaluation and treatment	Am Fam Physician	1998	57	1	85	92	胃洗浄／活性炭／催吐／腸洗浄	総説		The initial evaluation and management of poisoned patients should be comprehensive and include an accurate history whenever possible, stabilization of the patient's condition, a physical assessment to evaluate the extent of poisoning and the presence of concurrent conditions, decontamination of the gastrointestinal tract using activated charcoal, gastric lavage, administration of ipecac or irrigation, poison-specific treatment with administration of antidotes when indicated and proper disposition. Consultation with a poison control center is often helpful in assessing and treating these patients.

Wax PM, Cobaugh DJ	Prehospital gastrointestinal decontamination of toxic ingestions: a missed opportunity	Am J Emerg Med	1998	16	2	114	6	活性炭／催吐／催吐	疫学調査		The purpose of this study was to determine if emergency medical services (EMS) providers routinely initiate field gastrointestinal decontamination of adult drug overdose patients transported to the emergency department (ED). A retrospective prehospital chart review was performed on adult patients identified as drug overdose who were transported by EMS. ED charts on patients transported to a university hospital were reviewed for follow-up data. Prehospital care records showed that gastrointestinal decontamination was initiated in only 6 of 361 (2%) patients, all of whom received ipecac. No patient received activated charcoal. The median transport time was 25 minutes (range, 5 to 66 minutes). Follow-up data on patients transported to the university hospital revealed that 30 of 43 (70%) patients who might have been suitable candidates for prehospital activated charcoal actually received activated charcoal in the ED. Median time to activated charcoal in the ED was 82 minutes (range, 32 to 329 min). Use of activated charcoal in the field appears
Gordon RA, Roberts G, Amin Z, Williams RH, Paloucek FP	Aggressive approach in the treatment of acute lead encephalopathy with an extraordinarily high concentration of lead	Arch Pediatr Adolesc Med	1998	152	11	1100	4	腸洗浄	症例報告		OBJECTIVE: To report a case of a 3-year-old child with an extraordinarily massive lead concentration, 26.4 micromol/L (550 microg/dL), following environmental exposure to lead paint in the home. LITERATURE REVIEW: The relevant literature concerning the treatment of lead encephalopathy was reviewed during the treatment of this child and preparation of the manuscript. To our knowledge, the landmark article written by Julian Chisolm in 1968 is the only recent article that reported similarly high levels of lead concentration. This case, however, is the first in which 3 chelating agents were used for the treatment of lead encephalopathy. We also reviewed the literature on the use of whole bowel irrigation in heavy metal intoxications. CONCLUSIONS: In this case, aggressive gut decontamination with whole bowel irrigation and triple chelation therapy with British anti-Lewisite, EDTA, and oral succimer was well tolerated and seemed effective for rapidly deleading the child. The extent to which her lead concentration increased while being treated with oral succimer
Smiikstein MJ	Techniques Used to Prevent Gastrointestinal Absorption of Toxic Compounds	Goldfrank LR ed. Goldfrank's Toxicologic Emergencies. 6th	1998			35	51	胃洗浄	＊単行本など		
Lee AG, Wagner FM, Chen Mĩ:, Serrick C, Giaid A, Shennib H	A novel charcoal-induced model of obliterative bronchiolitis-like lesions: implications of chronic nonspecific airway inflammation in the development of post transplantation obliterative bronchiolitis	J Thorac Cardiovasc Surg	1998	115		822	7	活性炭	動物実験		
Atta-Politou J, Kolioliou M, Havariotou M, Koutselinis A, Koupparis MA	An in vitro evaluation of fluoxetine adsorption by activated charcoal and desorption upon addition of polyethylene glycol-electrolyte lavage solution	J Toxicol Clin Toxicol	1998	36		117	24	腸洗浄／活性炭	in vitro		BACKGROUND: In drug overdoses, treatment with activated charcoal is frequently used because of its adsorptive properties. Recently, whole-bowel irrigation with polyethylene glycol-electrolyte lavage solution has been used as a gastrointestinal decontamination procedure for ingestions of toxins not well adsorbed to activated charcoal and for toxins with a delayed absorption phase, although well adsorbed to activated charcoal. While a combined approach using activated charcoal and whole-bowel irrigation could theoretically enhance the efficacy of both modalities, this improvement remains speculative, since data demonstrating its clinical advantage in overdose treatment are lacking. Fluoxetine, a selective serotonin uptake inhibitor, is one of the most frequently prescribed antidepressants. Fluoxetine is well adsorbed onto activated charcoal. This in vitro investigation was undertaken to study: a) the effect of polyethylene glycol, as well as polyethylene glycol-electrolyte lavage solution, on the adsorption of fluoxetine to laboratory grade-activated charcoal and a
Ramcharan S, Meenhorst PL, Otten JMMB, Koks CHW, Boer D, Maes RAA, Beijnen JH	Survival after massive Ecstasy overdose	J Toxicol Clin Toxicol	1998	36	7	727	731	胃洗浄	症例報告		
Henry JA, Hoffman JR	Continuing controversy on gut decontamination.	Lancet	1998	352	9126	420	421	胃洗浄／活性炭／催吐／腸洗浄	総説		
Ardagh MW	Gastrointestinal decontamination after poisoning.	N Z Med J	1998	111	1076	397	399	胃洗浄／活性炭／催吐／腸洗浄	総説		
Tenenbein M, Shannon M	The poisoned patient: Is gastrointestinal decontamination all washed up? Two responses	Pediatr Emerg Care	1998	14	5	380	1	胃洗浄／活性炭／催吐／腸洗浄	レタ／コメント		
McKinney PE	Decontamination of the poisoned patient	Roberts JR and Hedges JR ed.: Clinical procedures in emergency medicine 3rd ed.	1998			719	733	胃洗浄	＊単行本など		
Homan CS, Singer AJ, Henry MC, Thode HC Jr	Thermal effects of neutralization therapy and water dilusion for acute alkali exposure in canines	Acad Emerg Med	1997	4		27	32	胃洗浄			OBJECTIVE: To evaluate the change in temperature of the gastric mucosa and lumen contents when a weak acid or water is used to manage acute alkali exposure. METHODS: A prospective in-vivo canine model was used in a university-based animal laboratory setting. Eighteen adult canines weighing 20-25 kg were placed under a surgical plane of anesthesia and a laparotomy was performed. A gastrotomy was then made later ligation of the distal esophagus and proximal duodenum. Separate mucosa and lumen temperature probes were placed. Then 25 mL of room-temperature (24-26 degrees C) 50% sodium hydroxide (NaOH) was instilled in the gastric lumen. After 5 minutes, each canine was given treatment. Group 1 (n = 10) was treated with 75 mL of room-temperature orange juice. Group 2 (n = 8) was treated with 75 mL of room-temperature water. Continuous mucosa and lumen
Roberts JR, Gracely EJ, Schoffstall JM	Advantage of high-surface-area charcoal for gastrointestinal decontamination in a human acetaminophen ingestion model	Acad Emerg Med	1997	4	3	167	74	活性炭	ヒトモデル実験		OBJECTIVE: To compare the abilities of low-surface-area (LSA) vs 2 types of high-surface-area (HSA) activated charcoal given orally to adsorb acetaminophen in the gastrointestinal (GI) tract, as demonstrated by the impact of these agents on the serum levels and area under the curve (AUC) in a simulated human overdose model. METHODS: The main arm of the study was a prospective double-blind crossover trial in which 6 volunteers, serving as their own controls, ingested acetaminophen (50 mg/kg), followed randomly in 10 minutes by either powdered LSA charcoal (950 m2/g) or powdered HSA charcoal (2,000 m2/g) in a charcoal:drug ratio of 8:1. In a second arm of the study, 3 subjects additionally ingested an equal dose of a granular preparation of the HSA charcoal. Serial serum acetaminophen levels were analyzed at various intervals (30, 60, 90, 120, 180, 240, and 300 minutes postingestion), and a 5-hour AUC was calculated. The subjects also rated the charcoal preparations for palatability. RESULTS: Serum acetaminophen levels were

Merigian KS, Blaho K	DIAGNOSIS AND MANAGEMENT OF THE DRUG OVERDOSE PATIENT.	Am J Ther	1997	4		99	113	胃洗浄／活性炭／催吐／腸洗浄	総説		The manifestations of drug overdose can be complex and result in a variety of physiological effects. Drug overdose situations involving multiple agents further confuse the clinical picture. The clinician must be able to diagnose and treat the patient to prevent unnecessary morbidity or mortality. Often the risk of treating drug overdose with an additional pharmacological agent outweighs the potential benefit. In these cases, the best treatment may involve observation alone. This review describes the current diagnostic and management techniques for the drug overdose patient. Specific drug groups that are commonly used for overdose are discussed with emphasis on physiological manifestations of intoxication and poisoning and the potential for delayed effects. Treatment options for various groups are also discussed. It appears that invasive procedures such as gastric lavage and whole-bowel irrigation are not appropriate for the majority of overdose situations. The use of oral
Manoguerra AS	Gastrointestinal decontamination after poisoning. Where is the science?	Crit Care Clin N Am	1997	13	4	709	725	胃洗浄／活性炭／催吐／腸洗浄	総説		The approach to the use of gastrointestinal decontamination procedures in the treatment of ingested toxins has changed in recent years. Many toxicologists and physicians have taken strong positions either for or against the use of emesis, gastric lavage, activated charcoal, or other procedures. What is the scientific basis for these positions? This article reviews and comments on the published studies comparing the effectiveness of these widely used
Byson PD	Methods for Preventing Absorption	In: Comprehensive Review in Toxicology for Emergency Physicians 3rd ed.	1997			20	35	胃洗浄	＊単行本など		
Ellenhorn MJ	Gut Decontamination	In: ELLENHORN'S MEDICAL TOXICOLOGY :Diagnosis and Treatment of Human Poisoning. 2nd ed.	1997			electric version		胃洗浄	＊単行本など		
Saincher A, Sitar DS, Tenenbein M	Efficacy of ipecac during the first hour after drug ingestion in human volunteers	J Toxicol Clin Toxicol	1997	35		609	15	催吐	ヒトモデル実験		OBJECTIVE: To determine the decrease of drug absorption when syrup of ipecac is administered at various times within one hour of drug ingestion. METHODS: Ten healthy human volunteers were recruited for a four-limbed randomized crossover study. The three experimental limbs consisted of administration of 30 mL syrup of ipecac, at 5, 30, or 60 minutes after ingestion of 3900 mg acetaminophen as 12 x 325 mg tablets with 250 mL room temperature water. The fourth limb served as control. Blood samples were drawn at 0, 0.5, 1.0, 2.0, 3.0, 4.0, 6.0, and 8.0 hours after analgesic ingestion for serum acetaminophen concentration determination by high-performance liquid chromatography. Repeated measures ANOVA and Tukey's HSD tests were used for group comparisons. RESULTS: The area under the serum concentration vs time curve was (mean +/- SD) 206 +/- 48, 67 +/- 37, 183 +/- 78, and 162 +/- 47 mg/L for control, 5, 30, and 60 minutes, respectively. This corresponds to decreases in bioavailability of 67, 11, and 21%. Only the 5-
American Academy of Clinical Toxicology, European Association of Poisons Centers and Clinical Toxicologists	Position statement: gut decontamination	J Toxicol Clin Toxicol	1997	35		695	7	胃洗浄／活性炭／催吐／腸洗浄／下剤	総説		
Chyka PA, Seger D	Position statement: single-dose activated charcoal. American Academy of Clinical Toxicology, European Association of Poisons Centres and Clinical Toxicologists	J Toxicol Clin Toxicol	1997	35	7	721	741	活性炭	総説		In preparing this Position Statement, all relevant scientific literature was identified and reviewed critically by acknowledged experts using agreed criteria. Well-conducted clinical and experimental studies were given precedence over anecdotal case reports and abstracts were not usually considered. A draft Position Statement was then produced and subjected to detailed peer review by an international group of clinical toxicologists chosen by the American Academy of Clinical Toxicology and the European Association of Poisons Centers and Clinical Toxicologists. The Position Statement went through multiple drafts before being approved by the boards of the two societies and being endorsed by other societies. The Position Statement includes a summary statement for ease of use and is supported by detailed documentation which describes the scientific evidence on which the Statement is based. Single-dose activated charcoal should not be administered routinely in the management of poisoned patients. Based on volunteer studies, the
Vale JA	Position statement: gastric lavage. American Academy of Clinical Toxicology, European Association of Poisons Centres and Clinical Toxicologists	J Toxicol Clin Toxicol	1997	35	7	711	719	胃洗浄	総説		In preparing this Position Statement, all relevant scientific literature was identified and reviewed critically by acknowledged experts using agreed criteria. Well−conducted clinical and experimental studies were given precedence over anecdotal case reports and abstracts were not usually considered. A draft Position Statement was then produced and subjected to detailed peer review by an international group of clinical toxicologists chosen by the American Academy of Clinical Toxicology and the European Association of Poisons Centers and Clinical Toxicologists. The Position Statement went through multiple drafts before being approved by the boards of the two societies and being endorsed by other societies. The Position Statement includes a summary statement for ease of use and is supported by detailed documentation which describes the scientific evidence on which the Statement is based. Gastric lavage should not be employed routinely in the management of poisoned patients. In experimental studies, the amount of marker removed by gastric
Tenenbein M	Position statement: Whole bowel irrigation. American Academy of Clinical Toxicology and European Association of Poisons Centres and Clinical Toxicologists	J Toxicol Clin Toxicol	1997	35	7	753	762	腸洗浄	総説		In preparing this Position Statement, all relevant scientific literature was identified and reviewed critically by acknowledged experts using agreed criteria. Well-conducted clinical and experimental studies were given precedence over anecdotal case reports and abstracts were not usually considered. A draft Position Statement was then produced and subjected to detailed peer review by an international group of clinical toxicologists chosen by the American Academy of Clinical Toxicology and the European Association of Poisons Centres and Clinical Toxicologists. The Position Statement went through multiple drafts before being approved by the boards of the two societies and being endorsed by other societies. ・The Position Statement includes a summary statement for ease of use and is supported by detailed documentation which describes the scientific evidence on which the Statement is based. ・Whole bowel irrigation（WBI） should not be used routinely in the management of the poisoned patient. Although some volunteer studies have

Krenzelok EP, McGuigan M, Lheur P	Position statement: ipecac syrup. American Academy of Clinical Toxicology, European Association of Poisons Centres and Clinical Toxicologists	J Toxicol Clin Toxicol	1997	35	7	699	709	催吐	総説		In preparing this Position Statement, all relevant scientific literature was identified and reviewed critically by acknowledged experts using agreed criteria. Well-conducted clinical and experimental studies were given precedence over anecdotal case reports and abstracts were not usually considered. A draft Position Statement was then produced and subjected to detailed peer review by an international group of clinical toxicologists chosen b the American Academy of Clinical Toxicology and the European Association of Poisons Centers and Clinical Toxicologists. The Position Statement went through multiple drafts before being approved by the boards of the two ' ties and being endorsed by other societies. socre The Position Statement includes a summary statement for ease of use and is supported by detailed documentation which describes the scientific evidence on which the Statement is based. Syrup of ipecac should not be administered routinely in the management of poisoned patients. In experimental studies the amount of
Barceloux D, McGuigan M, Hartigan-Go K	Position statement: cathartics. American Academy of Clinical Toxicology, European Association of Poisons Centers and Clinical Toxicologists	J Toxicol Clin Toxicol	1997	35		743	752	下剤	総説		In preparing this Position Statement, all relevant scientific literature was identified and reviewed critically by acknowledged experts using agreed criteria. Well-conducted clinical and experimental studies were given precedence over anecdotal case reports and abstracts were not usually considered. A draft Position Statement was then produced and subjected to detailed peer review by an international group of clinical toxicologists chosen by the American Academy of Clinical Toxicology and the European Association of Poisons Centres and Clinical Toxicologists. The Position Statement went through multiple drafts before being approved by the Boards of the two societies and being endorsed by other societies. The Position Statement includes a summary statement for ease of use and is supported by detailed documentation which describes the scientific evidence on which the Statement is based. The administration of a cathartic alone has no role in the management of the poisoned patient and is not recommended as a method of gut decontamination.
West L	Innovative approaches to the administration of activated charcoal in pediatric toxic ingestions	Pediatr Nurs	1997	23	6	616	9	活性炭	総説		Toxic ingestions (accidental or intentional) continue to occur within the pediatric population. Activated charcoal has replaced syrup of ipecac as the gastrointestinal decontamination method of choice. Activated charcoal has poor palatability and poses acceptability and administration problems with children. This article proposes innovative approaches to the administration of activated charcoal as an antidote for pediatric toxic ingestions.
Allison T.B., Gough J.E., Brown L.H., Thomas S.H	Potential time savings by pre-hospital administration of activated charcoal	Prehospital Emergency Care	1997	1		73	75	活性炭			
Kaczorowski JM, Wax PM	Five days of whole-bowel irrigation in a case of pediatric iron ingestion	Ann Emerg Med	1996	27	2	258	263	腸洗浄	症例報告		The maximum duration and volume of polyethylene glycol electrolyte solution (PEG-ELS) that can be safely administered during whole-bowel irrigation of the poisoned patient are poorly defined. We present a case of a 33-month-old boy who ingested at least 160 mg/kg elemental iron and received 44.3 L of PEG-ELS (2,953 ml/kg) over 5 days because of the persistence of iron tablets in the gastrointestinal tract. The child remained clinically well after initiation of PEG-ELS therapy, and further significant iron absorption did not appear to occur. The rectal effluent cleared within 2 days of the start of PEG-ELS therapy despite the persistence of iron in the gastrointestinal tract as shown on radiography. No adverse effects resulted from teh large volume or duration of the PEG-ELS therapy. This is the greatest reported volume of PEG-ELS to be used for whole-bowel irrigation in the treatment of a toxic ingestion.
Greaves I, Goodacre S, Grout P	Management of drug overdoses in accident and emergency departments in the United Kingdom.	J Accid Emerg Med	1996	13	1	46	48	胃洗浄／活性炭／催吐	疫学調査		A questionnaire consisting of 10 overdose scenarios was sent to 190 career accident and emergency staff in the United Kingdom, asking in each case how the respondents would treat a patient to prevent drug absorption. The responses showed lack of consensus in treatment methods. There was extensive use of both ipecacuanha induced emesis and gastric lavage despite a lack of experimental evidence to support these techniques.･･Comment in: J Accid Emerg Med 1996 Jul;13(4):301･Comment in: J Accid Emerg Med 1996 Jul;13(4):301-2･Comment in: J Accid Emerg Med 1996 Sep;13(5):366
Hardern R	Management of poisoning	J Accid Emerg Med	1996	13	4	301		胃洗浄／活性炭／催吐／腸洗浄	レタ／コメント		Comment on: J Accid Emerg Med 1996 Jan;13(1):46
Crockett R, Krishel SJ, Manoguerra AS, Williams SR, Clark RF	Prehospital use of activated charcoal; a pilot study	J Emerg Med	1996	14	3	335	338	活性炭			Activated charcoal (AC) is most effective when administered soon after the ingestion of certain substances. Delays are recognized to occur at times in the administration of AC after arrival of poisoned patients in the emergency department (ED). In addition, it has been recognized that these delays may be avoided if AC administration is begun in selected patients by paramedics while en route to the ED. We present a pilot study evaluating the administration of AC to poisoned patients in the ambulance prior to arrival in the ED. We performed a retrospective review of Emergency Medical System (EMS) run sheets and ED records of poisoned patients during a 6-month period from two area hospitals. Cases were identified that met criteria for the prehospital administration of AC. Cases were divided into two groups: those who received prehospital AC, and those who did not. Groups were compared for ambulance transport time, time from first paramedic contact to AC administration, and whether AC was tolerated by the patient. A total of 14 patients received
Cohen V, Howland MA, Hoffman RS	Palatability of instacharcoal with cherry flavoring : A human volunteer study	J Toxicol Clin Toxicol	1996	34		635		活性炭			
Atta-Politou J, Macheras PE, Koupparis MA	The effect of polyethylene glycol on the charcoal adsorption of chlorpromazine studied by ion selective electrode potentiometry	J Toxicol Clin Toxicol	1996	34	3	307	316	腸洗浄／活性炭	in vitro		BACKGROUND: This investigation was undertaken to study: a) the adsorption characteristics of chlorpromazine to activated charcoal and its formulations Carbomix powder and Ultracarbon tablets at gastric pH; b) the effect on chlorpromazine adsorption of polyethylene glycol and its combination with electrolyte lavage solution; c) the effect of the order of addition of polyethylene glycol-electrolyte lavage solution. METHOD: Ion selective electrode potentiometry, based on the selective, direct and continuous response of a chlorpromazine-ion selective electrode to the concentration of the free drug, was used. Successive additions of microvolumes of a chlorpromazine solution were made into a charcoal slurry in acidic medium of pH 1.2 with measurement of the chlorpromazine-ion selective electrode potential at equilibrium. RESULTS: The maximum adsorption capacity values of activated charcoal, Carbomix and Ultracarbon, were 297, 563, and 382 mg/g respectively, while the affinity constant values were 40.2, 70.4, and 40.5 L/g,
Ardagh M, Balasingam A	Trends in gastrointestinal decontamination for deliberate self poisoning in Christchurch.	N Z Med J	1996	109	1035	462	463	胃洗浄／活性炭／催吐	疫学調査		AIM: To examine changes in the choice of gastrointestinal decontamination for deliberate self poisoning in Christchurch. METHOD: A review of adult deliberate self poisoning cases for 9 months from July 1 1995 to March 31 1996 and a comparison with previously published figures from 1989 and 1992. RESULTS: Only 5% of patients received gastric lavage (compared with 26% in 1992 and 78% in 1989) and 52% received activated charcoal (compared with 46% in 1992 and 0.4% in 1989). No patients received syrup of ipecacuanha (compared with 1% in 1992 and 25% in 1989) and 43% had no gastrointestinal decontamination at all. CONCLUSION: The trend towards the use of activated charcoal and away from gastric lavage is consistent with sentiments expressed
Thoma ME, Glauser JM	Use of glucagon for removal of an orogastric lavage tube	Am J Emerg Med	1995	13	2	219	222	胃洗浄	症例報告		This report presents the first case in which glucagon administration enabled the removal of an impacted orogastric tube in a patient with distal esophageal spasm. For patients in whom the removal of a gastric tube is impeded, we suggest initially determining tube position and checking for any knotting or kinking of the tube using fluoroscopy. Provided that the gastric tube is distal to the mid-esophagus and is not kinked or knotted, we suggest that glucagon can be used as an adjunctive modality for gastric tube removal. This care provides an additional and previously unreported use for glucagon in emergency
Lee DC, Roberts JR, Kelly JJ, Fishman SM	Whole-bowel irrigation as an adjunct in the treatment of radiopaque arsenic	Am J Emerg Med	1995	13	2	244	245	腸洗浄	症例報告		
American College of Emergency Physicians	Clinical policy for the initial approach to patients presenting with acute toxic ingestion or dermal or inhalation exposure	Ann Emerg Med	1995	25		570	85	胃洗浄／活性炭／催吐／腸洗浄	総説		Guideline

Bond GR	Home use of syrup of ipecac is associated with a reduction in pediatric emergency department visits	Ann Emerg Med	1995	25		338	343	催吐	臨床研究		STUDY OBJECTIVE: To determine whether home use of syrup of ipecac is safe and effective in reducing pediatric emergency department visits. DESIGN: Retrospective, multicenter comparison based on secondary use of a large database. PARTICIPANTS: Children younger than 6 years after acute, accidental ingestion of a pharmaceutical product. INTERVENTIONS: 1990 Data corresponding to the study patients from seven regional poison centers were obtained from the American Association of Poison Control Centers. Poison center management choices (particularly use of syrup of ipecac for home decontamination) and characteristics (distribution of pharmaceutical ingestions managed, work volume per staff, staff experience, and training of decision-making director) were analyzed for their impact on the decision to refer a patient to a health care facility or to manage the patient at home. Statistical techniques included weighted least-squares regression analysis using logistic transformation of dependent variables and the forward selection procedure.
Granberry MC, White LM, Gardner SF	Exacerbation of congestive heart failure after administration of polyethylene glycol-electrolyte lavage solution.	Ann Pharmacother	1995	29	12	1232	1235	腸洗浄	症例報告		OBJECTIVE: To report a patient with exacerbation of congestive heart failure after administration of polyethylene glycol-electrolyte lavage solution (PEG-ELS). METHODS: A MEDLINE search was performed, using the terms congestive heart failure (CHF), gastric lavage, colonoscopy, irrigation, and gastroparesis, of English-language articles published from January 1980 through January 1995, as well as review of pertinent articles' bibliographies. CASE SUMMARY: A 45-year-old white woman with left ventricular systolic dysfunction and diabetic gastroparesis received 4 L of a PEG-ELS as preparation for colonoscopy. Within 24 hours she presented to the emergency department with shortness of breath and increased bilateral lower extremity edema. She was admitted and treated with intravenous furosemide therapy. After aggressive diuresis her symptoms returned to baseline and she was discharged. DISCUSSION: The literature search revealed no report of a patient
Wedderburn A, Rutter D, Royle G	A better gastric lavage tube: a new use for an 'old' drain.	Ann R Coll Surg Engl	1995	77	4	314		胃洗浄	レタ／コメント		
Robins JB	Monitoring during endoscopy. Gastric lavage poses risks to patient.	Br Med J	1995	311	7002	452		胃洗浄	レタ／コメント		Comment on: BMJ 1995 Apr 8;310(6984):886-7
Buckley NA, Dawson AH, Reith DA	Controlled release drugs in overdose. Clinical considerations	Drug Saf	1995	12	1	73	84	腸洗浄	総説		The main characteristic of overdose with controlled release formulations is the delay in presentation and onset of clinical effects. There is a prolonged absorption phase which leads to a delayed time to maximum plasma concentration and usually a prolonged time with levels close to the peak concentration. Absorption may continue for more than 24 hours. Overdose with controlled release formulations of toxic drugs therefore requires a longer period of observation as the onset of symptoms may be as late as 16 to 20 hours after ingestion. Treatment nomograms calculated for standard formulations are not appropriate for controlled release formulations. The optimal gastrointestinal decontamination method is controversial, but in serious overdoses it should include gastric lavage and activated charcoal followed by whole bowel irrigation as a means of clearing whole tablets from the gastrointestinal tract. Pharmacobezoar formation should be suspected if,
Bond GR	The poisoned child. Evolving concepts in care	Emerg Med Clin North Am	1995	13	2	343	55	胃洗浄／活性炭／催吐／腸洗浄	総説		More than 1 million children in the United States ingest poisons each year. The vast majority of these exposures result in no harm to the child. The task of the emergency physician is to discern which children are at risk and treat those children with appropriately aggressive therapy while minimizing intervention for the rest. In pediatric exposure cases, the toxin is usually identified. A careful toxic differential diagnosis will lead to a list of likely poisons in symptomatic patients without an identified exposure. The cornerstone of treatment remains the evaluation of the ingestion episode, careful assessment of the patient, and the application of basic supportive medical care. In the ED, when it has been determined that gastrointestinal decontamination is indicated on the basis of the substance and quantity ingested, activated charcoal is the decontamination agent of choice if the substance ingested is absorbed by activated charcoal. Gastric emptying should be restricted to those circumstances when the
Minton NA, Glucksman E, Henry JA	Prevention of drug absorption in simulated theophylline overdose	Hum Exp Toxicol	1995	14	2	170	174	胃洗浄／催吐／活性炭	ヒトモデル実験		1. The effects of emesis, gastric lavage and oral activated charcoal on theophylline absorption were compared in healthy volunteers. 2. One of four regimes (ipecacuanha-induced emesis, gastric lavage, oral activated charcoal and no treatment) was randomly chosen one hour after a simulated overdose with sustained-release theophylline on four separate occasions in twelve healthy volunteers. 3. Syrup of ipecacuanha produced emesis in all twelve volunteers but only seven vomited any tablets. Gastric lavage yielded tablets in only one volunteer. 4. The mean systemic availabilities (areas under the concentration-time curves relative to control) of theophylline for ipecacuanha-induced emesis, gastric lavage and charcoal, were 107.1%, 101.1% and 16.9%, respectively. 5. Oral activated charcoal was thus highly effective, while gastric lavage and emesis were ineffective in preventing theophylline absorption. Activated charcoal is potentially the most effective first-line treatment for
Bosse GM, Barefoot JA, Pfeifer MP, Rodgers GC	Comparison of three methods of gut decontamination in tricyclic antidepressant overdose	J Emerg Med	1995	13	2	203	209	胃洗浄／活性炭	臨床研究		The purpose of this study was to prospectively compare the effectiveness of three different gut decontamination methods in 51 patients presenting to an emergency department with tricyclic antidepressant overdose. Patients were randomized to three treatments; Group 1 received activated charcoal, Group 2 received saline lavage followed by activated charcoal, and Group 3 received activated charcoal followed by saline lavage followed by activated charcoal. Baseline characteristics of the three groups did not differ, including Glasgow Coma Scores, age, and mean tricyclic antidepressant levels. Average length of stay in admitted patients was 93.3 hours in Group 1, 107.2 hours in Group 2, and 66.7 hours in Group 3. Of those admitted to an ICU, average ICU time was 66.9 hours in Group 1, 54.1 hours in Group 2, and 34.4 hours in Group 3. Average duration of sinus tachycardia was 20.8 hours in Group 1, 30.8 hours in Group 2, and 32.2 hours in Group 3. Of those requiring mechanical ventilation, average ventilator time was 43.4 hours in Group 1, 24.1 hours in Group 2, and
Chyka PA	Multiple-dose activated charcoal and enhancement of systemic drug clearance: summary of studies in animals and human volunteers.	J Toxicol Clin Toxicol	1995	33	5	399	405	活性炭	総説		Multiple-dose activated charcoal therapy can enhance the systemic elimination of many drugs. Studies in animals and human volunteers provide a framework for understanding the indications and limitations of multiple-dose activated charcoal therapy. Enterocapillary exsorption creates a compartment for diffusion drugs out of the bloodstream and activated charcoal can augment this process to enhance drug clearance. Once charcoal reaches the intestine, there is a rapid onset of action. Clearance at exsorption sites is limited by blood flow; moreover, the rate of exsorption is related to the dose of charcoal up to a ceiling dose. Drug absorption, distribution, metabolism and elimination dynamically interact with multiple-dose activated charcoal therapy making it difficult to identify a single variable that may predict the success or failure with this therapy. Drug characteristics associated with enhanced systemic clearance with multiple-dose activated charcoal include a low intrinsic
Bradberry SM, Vale JA	Multiple-dose activated charcoal: a review of relevant clinical studies.	J Toxicol Clin Toxicol	1995	33	5	407	416	活性炭	レタ／コメント		Although many studies in animals and volunteers have demonstrated that multiple-dose activated charcoal increases drug elimination significantly, this therapy has not been shown in a controlled study in poisoned patients to reduce morbidity and mortality. Further clinical studies are required to establish its role and the optimum dosage regimen of charcoal to be administered. Based on current evidence, multiple-dose activated charcoal should only be considered if a patient has ingested a life-threatening amount of phenobarbital (phenobarbitone), carbamazepine, theophylline, quinine, dapsone or salicylate. In all of these cases there are data to confirm enhanced elimination, though no controlled studies have demonstrated clinical benefit.
Melandri R, Re G, Morigi A, Lanzarini C, Vaona I, Miglioli M	Whole bowel irrigation after delayed release fenfluramine overdose	J Toxicol Clin Toxicol	1995	33	2	161	163	腸洗浄	症例報告		We report a patient who intentionally ingested a large amount of delayed release fenfluramine and was successfully treated with whole bowel irrigation. To our knowledge this is the first case of this kind to be reported in the literature. This therapeutic method, commonly used for acute poisonings with enteric coated and other modified release pharmaceuticals appears effective and risk-free in the treatment of delayed release fenfluramine overdose.

Minton NA, Henry JA	Prevention of drug absorption in simulated theophylline overdose	J Toxicol Clin Toxicol	1995	33	1	43	49	活性炭／下剤	ヒトモデル実験		To assess the effectiveness of oral activated charcoal and catharsis in preventing theophylline absorption, 12 healthy subjects, aged 20-35 years, received 3 x 200 mg sustained-release theophylline tablets and 16 radio-opaque placebo tablets on six occasions. On each occasion, they received either no treatment (control) or one of five treatments. Treatments were a) oral activated charcoal (Carbomix): 50 g at 1 h, 25 g at 5 h and 9 h; b) sorbitol 70%: 150 mL at 1 h; c) activated charcoal: 50 g at 6 h, 25 g at 10 h and 14 h; d) sorbitol 70%: 150 mL at 6 h; e) charcoal commencing at 6 h plus sorbitol at 6 h (i.e. a combination of treatments c and d). Plasma theophylline concentrations were measured and all stools collected over 36 h to assess placebo tablet recovery by radiography. Charcoal administration at 1 h was 91.2% effective in preventing theophylline absorption and at 6 h was 57.3% effective, while combined charcoal and catharsis at 6 h was 63.3% effective. Sorbitol-induced
Cooney DO	In vitro adsorption of phenobarbital, chlorpheniramine maleate, and theophylline by four commercially available activated charcoal suspensions	J Toxicol Clin Toxicol	1995	33	3	213	217	活性炭	in vitro		Four commercially available antidotal activated charcoal suspensions (Actidose Aqua, InstaChar, LiquiChar, and CharcoAid 2000) were evaluated with respect to their abilities to adsorb three test drugs in vitro from simulated gastric fluid. Different volumes of each suspension were added to glass vials containing 20 mL of stock solutions of each drug. The vials were shaken for a time more than sufficient to ensure adsorption equilibrium, then the charcoal was removed from the samples by filtration. The filtrates were analyzed by ultraviolet spectroscopy to determine the residual drug concentrations. The product containing a 2000 m2/g charcoal (CharcoAid 2000) adsorbed more drug per unit volume of suspension than did the other three products, which contained 900 m2/g charcoal and which were all similar in performance.
Pond SM, Lewis-Driver DJ, Williams GM, Green AC, Stevenson NW	Gastric emptying in acute overdose: a prospective randomised controlled trial.	Med J Aust	1995	163	7	345	349	胃洗浄／活性炭／催吐	臨床研究		OBJECTIVE: To test the hypothesis that administration of activated charcoal is as efficacious and safe as the combination regimen of gastric emptying plus charcoal in adults after acute oral overdose. ·DESIGN: Prospective randomised controlled trial, with subjects presenting on odd-numbered dates allocated to the emptied group (E), and those on even-numbered dates to the not-emptied group (NE). ·SETTING: Princess Alexandra Hospital, Brisbane (a tertiary referral hospital), which serves an adult urban community, between 4 January 1988 and 11 June 1990. ·SUBJECTS: Consecutive patients (13 years or older) who presented to the Emergency Department after ingesting an overdose of one or more compounds able to be adsorbed by activated charcoal. INTERVENTIONS: All patients received charcoal by the oral or nasogastric route. Those in the E group also had gastric emptying by ipecac-induced emesis or gastric lavage. ·OUTCOME MEASURES: Clinical course during the first six hours after treatment began, length of hospital stay, complications.
James LP, Nichols MH, King WD	A comparison of cathartics in pediatric ingestions	Pediatrics	1995	96	2	235	238	下剤／活性炭	臨床研究		OBJECTIVE. To compare the mean time to first stool, number of stools, and side effects of three commonly used cathartics in pediatric ingestions. DESIGN. This prospective clinical trial was a randomized, double-blinded comparison of sorbitol, magnesium citrate, magnesium sulfate, and water, administered with activated charcoal in the treatment of pediatric patients 1 to 5 years of age with acute ingestions. Outcome parameters were mean time to first stool, mean number of stools during 24 hours, and side effects. RESULTS. One hundred sixteen patients completed the study. Significant differences in mean time to the first stool were detected among cathartic agents (F = 9.29), with sorbitol-treated patients having a shortest mean time to the first stool (mean, 8.48 hours). Sorbitol produced a significantly higher number of stools (mean, 2.79) in the 24-hour follow-up period than other cathartics (F = 3.49). The most common side effect of cathartic administration was emesis, which
Cooney DO	Evaluation of the US pharmacopeia adsorption tests for activated charcoals and proposals for changes	Vet Hum Toxicol	1995	37	4	371	377	活性炭	in vitro		The current USP adsorption tests for activated charcoals, involving methylene blue (MB) and strychnine sulfate (SS), were conducted for 6 activated charcoals having surface areas ranging from 600 to 2000 m2/g. The MB test is relatively complex and tedious, and uses a pass/fail criterion which is of such small magnitude that substantial uncertainties are likely. The SS test is only qualitative. Modification, using quantification of the turbidities, permitted quantitative interpretation. The test was failed by 2 charcoals of surface area 660 m2/g or less, and was passed by 4 charcoals of 720 m2/g surface area or higher. Neither test was able to reflect the substantial drug adsorption differences which exist for charcoals of average, above average, and high surface areas. Alternative tests for MB and SS were developed and evaluated using 6 charcoals. These tests, which are proposed for consideration by the US Pharmacopeial Convention, are simpler and faster than the current tests
Scharman EJ, Lembersky R, Krenzelok EP	Efficiency of whole bowel irrigation with and without metoclopramide pretreamtent	Am J Emerg Med	1994	12	3	302	305	腸洗浄	ヒトモデル実験		Whole bowel irrigation (WBI) with a polyethylene glycol electrolyte lavage solution (PEG-ELS) is a gastrointestinal (GI) decontamination procedure used after selected ingestions of toxic substances. The purpose of this study was to evaluate the ability· of WBI, with and without metoclopramide pretreatment, to clear the GI tract of foreign bodies using previously established WBI end points, ie, the presence of a clear effluent or the administration of 2 L/h PEG-ELS for 5 hours. Eleven healthy, adult, male volunteers participated in this controlled, two-phase, blinded, crossover study. Ten fluorescent coffee beans were ingested after an overnight fast followed 1 hour later by 10 mg of metoclopramide syrup or an equivalent volume of placebo; 30 minutes later, WBI with PEG-ELS was begun at 2 L/h. All volunteers received 10 L of PEG-ELS during a 5-hour period. No statistically significant difference (P > .05) was found between the two pretreatments. For the metoclopramide group, the mean number of beans passed was equal to 3.8 (+/- 2.5 standard deviation
Goulbourne KB, Cisek JE	Small-bowel obstruction secondary to activated charcoal and adhesions	Ann Emerg Med	1994	24	1	108	110	活性炭	症例報告		Gastrointestinal obstruction is a rare complication of multiple-dose administration of activated charcoal. Previous reports deal only with obstruction after ingestion of drugs that impair gastrointestinal motility. This patient developed a small-bowel obstruction associated with the administration of multiple doses of activated charcoal (350 g, total) for treatment of theophylline toxicity. This patient also had low-grade, previously asymptomatic adhesions at the ileocecal valve. A 4.5 x 5 x 3-cm aggregate of charcoal was surgically removed from the distal ileum.
Sue YJ, Woolf A, Shannon M	Efficacy of magnesium citrate cathartic in pediatric toxic ingestions	Ann Emerg Med	1994	24	4	709	12	下剤	臨床研究		STUDY OBJECTIVE: To investigate the efficacy of magnesium citrate in reducing gastrointestinal transit time of activated charcoal in children. DESIGN: A prospective, randomized, clinical comparison of four magnesium doses. SETTING: Urban children's hospital emergency department. PARTICIPANTS: Children aged 1 month to 6 years who presented for management of an acute toxic ingestion. INTERVENTION: Each child received 1 g/kg activated charcoal combined with a randomly assigned dose of a 6% solution of magnesium citrate: 0 mL/kg, 4 mL/kg (standard recommended dose), 6 mL/kg, or 8 mL/kg. The primary outcome measure was the interval to first activated charcoal-containing stool, which was determined by follow-up telephone call or review of the medical record. RESULTS: Sixty-four children were enrolled. Median times to first charcoal stool were 19.5 hours (0 mL/kg), 13.0 hours (4 mL/kg), 14.0 hours (6 mL/kg), and 12.0 hours (8 mL/kg). Intergroup differences were significant by Kruskal-Wallis analysis of variance (P = .0035). CONCLUSION:
Mauro, L S; Nawarskas, J J; Mauro, V F	Misadventures with activated charcoal and recommendations for safe use	Ann Pharmacother	1994	28	7and 8	915	24	活性炭	総説		OBJECTIVE: To review published reports of adverse effects associated with single- and multiple-dose activated charcoal therapy, and to formulate recommendations for safe use of activated charcoal therapy. DATA SOURCES: A manual search of Index Medicus from 1970 to December 1993 was conducted for English language articles; bibliographies of the resultant articles were also scanned. STUDY SELECTION: Cases were included if they were described in full detail, resulted in significant morbidity or mortality, and uniquely contributed to the formulation of recommendations for safe use of activated charcoal therapy. DATA SYNTHESIS: The major causes of morbidity and mortality secondary to activated charcoal therapy are aspiration of charcoal, gastrointestinal obstruction, and fluid and electrolyte abnormalities. Aspirations have occurred as a result of a number of circumstances that may be avoided. These include use in patients with unprotected airways, use of excessive charcoal dose, administration of inappropriately diluted charcoal, and

Perrone J, Hoffman RS, Goldfrank LR	Special considerations in gastrointestinal decontamination	Emerg Med Clin North Am	1994	12		285	299	胃洗浄／活性炭／催吐／腸洗浄／下剤	総説		Many considerations factor into selecting the most appropriate method of gastrointestinal decontamination used in the poisoned patient. A thorough knowledge of the indications and efficacy as well as contraindications and complications of each modality is critical to the clinician's assessment. This article examines the current utility of syrup of ipecac-induced emesis, orogastric lavage, activated charcoal, cathartics, and whole bowel irrigation. In addition, the role of multiple dose activated charcoal and the controversial issue of the N-acetylcysteine and activated charcoal interaction are discussed.
Vale A	Gastric lavage : Draft of position paper	In: Proceedings, Meeting of American Academy of Clinical Toxicology; European Association of Poison Centres and Clinical Toxicologists; and American Academy of Poison Control Centers	1994	Apr				胃洗浄	＊単行本など	会議録	
Mariani PJ, Pook N	Gastrointestinal tract perforation with charcoal peritoneum complicating orogastric intubation and lavage	Ann Emerg Med	1993	22	3	606	609	胃洗浄	症例報告		A rare complication of gastric decontamination occurred in a young woman undergoing treatment for tricyclic ingestion. After orogastric intubation and lavage, she developed an acute abdomen and underwent laparotomy. Charcoal was discovered throughout the peritoneum, but concurrent and subsequent efforts failed to localize a specific perforation site. Her hospital course was protracted and complicated by tenacious peritoneal charcoal deposition, persistent peritonitis, and adhesion and abscess formation. She underwent both percutaneous and open abscess drainage, oophorectomy, and small-bowel resection. She required total parenteral nutrition in addition to feeding jejunostomy. This present case constitutes the first report of the clinical consequences of charcoal peritoneum. Outright viscus perforation should be considered among potential complications of orogastric intubation and lavage in the poisoned patient. Methods to minimize risks of its occurrence are
Wax PM, Wang RY, Hoffman RS, Mercurio M, Howland MA, Goldfrank LR	Prevalence of sorbitol in multiple-dose activated charcoal regimens in emergency departments.	Ann Emerg Med	1993	22	12	1807	1812	活性炭／下剤	疫学調査		STUDY OBJECTIVES: To determine the availability and use of premixed activated charcoal in sorbitol preparations during multiple-dose activated charcoal therapy in the emergency department. DESIGN AND SETTING: A prospective telephone survey of all 911 receiving hospitals within the catchment area of one poison center. TYPE OF PARTICIPANTS: Hospital pharmacy supervisors and ED charge nurses. INTERVENTION: Hospital pharmacy supervisors were surveyed about the available preparations of activated charcoal on their hospital's formulary, and ED charge nurses in these same hospitals were surveyed about the prevalence of sorbitol use in multiple-dose activated charcoal regimens. MEASUREMENTS AND MAIN RESULTS: Eleven hospitals (16%) stocked only activated charcoal in sorbitol preparations. Twenty-one hospitals (31%) had both activated charcoal in sorbitol preparations and activated charcoal without sorbitol preparations, and 35
Buckley N, Dawson A	Whole-bowel irrigation for theophylline overdose	Ann Emerg Med	1993	22	11	1775	1776	腸洗浄	レタ／コメント		
Palatnick W, Tenenbein M.	Whole-bowel irrigation for theophylline overdose	Ann Emerg Med	1993	22	11	1774	1775	腸洗浄	レタ／コメント		
Harris CR, Filandrinos D	Accidental administration of activated charcoal into the lung; Aspiration by proxy	Ann Emerg Med	1993	22	9	1470	1473	活性炭	症例報告		We report a case of accidental activated charcoal instillation into the lung of a 30-year-old man being managed for a cyclic antidepressant overdose. The patient was treated with multidose activated charcoal, and between his first and second doses, he pulled his nasogastric tube out of position. The tube was reinserted past the endotracheal tube into the right mainstem bronchus, and a dose of activated charcoal with sorbitol was administered into the lung. He subsequently developed an adult respiratory distress syndrome but gradually improved after bronchoscopic removal of charcoal and supportive care. He was discharged 14 days later.
Young WF, Bivins HG	Evaluation of gastric emptying using radionuclides; Gastric lavage versus ipecac-induced emesis	Ann Emerg Med	1993	22	9	1423	1427	胃洗浄／催吐	ヒトモデル実験		STUDY OBJECTIVES: To compare the efficacy of gastric lavage and ipecac-induced emesis by using a radionuclide marker in a simulated overdose and to determine the amount of material recoverable after lavage fluid appears clear. DESIGN: Case-control,· prospective cross-over study. SETTING: Nuclear medicine department of Valley Medical Center, Fresno, California. TYPE OF PARTICIPANTS: Fourteen male and five nonpregnant female adult volunteers with no pre-existing gastrointestinal disease and no medication use. INTERVENTIONS AND MEASUREMENTS: In phase 1, each volunteer ingested 30 capsules labeled with a measured amount of Tc99m with 75 mL H2O followed in five minutes by ipecac-induced emesis. In phase 2, two to four weeks later, each subject was lavaged after ingesting 30 labeled capsules. After lavage appeared clear, a 1,000-mL supplemental lavage was done and analyzed separately. All emesis or gastric lavage fluid was collected and measured for tracer activity. RESULTS: All subjects in the ipecac group
Wrenn K, Rodewald L, Dockstader L	Potential misuse of ipecac	Ann Emerg Med	1993	22		1408	1412	催吐	臨床研究		TUDY OBJECTIVE: To evaluate the use of ipecac by health care professionals. DESIGN: A descriptive case series based on a one-year review of all calls to a poison center. SETTING: A university hospital-affiliated regional poison center. INTERVENTIONS: The use of ipecac was judged appropriate or inappropriate based on the consensus of three professionals associated with the poison center using predetermined contraindications. MEASUREMENTS AND MAIN RESULTS: In 20% of cases in which ipecac was used, its use was inappropriate. The most common inappropriate situation was that too much time had elapsed from the time of ingestion. Among adults the most common contraindication was the ingestion of a substance known to cause altered mental status. Among children, the most common contraindication was the ingestion of a nontoxic substance or amount of substance. The poison center recommended ipecac inappropriately less often than emergency departments and usually in children ingesting a nontoxic substance. EDs recommended ipecac inappropriately with
Bond GR, Requa RK, Krenzelok EP, Normann SA, Tendler JD, Morris CL, McCoy DJ, Thompson MW, McCarthy T, Roblez J, et al.	Influence of time until emesis on the efficacy of decontamination using acetaminophen as a marker in a pediatric population	Ann Emerg Med	1993	22		1403	1407	催吐	臨床研究		STUDY OBJECTIVE: To determine the extent of drug removal by emesis at different times after the ingestion of a toxic substance. DESIGN: Multicenter retrospective chart review. METHODS: Using the American Association of Poison Control Centers' aggregate data base, children who had ingested acetaminophen and who were referred to a health care facility by one of 11 poison centers during a two-year period were identified. Charts of these patients were reviewed to determine the quantity ingested per kilogram of body weight, method of decontamination used, the timing of decontamination, and the serum acetaminophen concentration obtained four hours after ingestion. RESULT: Charts of 455 patients met all requirements for inclusion. When emesis occurred within one-half hour after ingestion, mean serum acetaminophen concentration drawn four hours after ingestion was approximately half that in a control group that received no decontamination. Emesis had less impact when it was delayed further and had no demonstrable

McFarland AK 3rd, Chyka PA	Selection of activated charcoal products for the treatment of poisonings	Ann Pharmacother	1993	27	3	358	361	活性炭	総説		OBJECTIVE: To determine if differences exist among currently available activated charcoal products, and if an evaluation of risk versus benefit provides a guide to product selection. DESIGN: National survey by mail. PARTICIPANTS: US manufacturers of activated charcoal products. RESULTS: Six companies market activated charcoal products in ready-to-use containers. The products differ in surface area of charcoal, sorbitol content, and packaging (aqueous or powdered form). No significant differences were noted in the cost of 25- to 30-g units or efficacy based on surface area of activated charcoal. The addition of sorbitol to activated charcoal, particularly at high concentrations, increases the incidence of adverse effects, especially in children. CONCLUSIONS: Although differences do exist among currently marketed activated charcoal products, the clinical significance of these variations is unknown. Based on an evaluation of risks and benefits, any
Mushambi MC, Bailey SM, Trotter TN, Chadd GD, Rowbotham DJ.	Effect of alcohol on gastric emptying in volunteers	Br J Anaesth	1993	71	5	674	6	胃洗浄／催吐	ヒトモデル実験		Erratum in: Br J Anaesth 1994 Feb;72(2):253·We have examined the effect of alcohol on the gastric emptying rate of a liquid meal in 10 volunteers. Each volunteer was allocated randomly to receive, on three occasions, no alcohol, 3 units or 6 units of alcohol. Gastric emptying was measured using applied potential tomography. The rate of gastric emptying as measured by the time to 50% emptying (T50) was delayed significantly (P < 0.01) after alcohol 6 units (median 45.0 min (range 19-90 min)) compared with control (23.0 min (13-36 min)) and there was little change after alcohol 3 units (25.5 min (10-65 min))
Vale JA, Proudfoot AT	How useful is activated charcoal?	Br Med J	1993	306	6870	78	79	活性炭	レタ／コメント		
Arimori K, Deshimaru M, Furukawa E, Nakano M	Adsorption of mexiletine onto activated charcoal in macrogol-electrolyte solution	Chem Pharm Bull	1993	41	4	766	768	腸洗浄／活性炭	in vitro		Adsorption studies in vitro of mexiletine onto activated charcoal were performed in macrogol (polyethylene glycol)-electrolyte solution (PEG-ELS) and JP XII disintegration medium No. 2 (second medium). Mexiletine was adsorbed more extensively onto activated charcoal in PEG-ELS than that in JP XII second medium. The maximum adsorptive capacity of activated charcoal for the drug was 328 and 284 mg per gram of charcoal in PEG-ELS and JP XII second medium, respectively. In addition, the equilibrium constant of activated charcoal estimated according to the Langmuir equation was 0.079 and 0.034 l per gram of charcoal in PEG-ELS and JP XII second medium, respectively. Adsorption of mexiletine onto activated charcoal was decreased by omitting macrogol, sodium sulfate or sodium bicarbonate from a standard PEG-ELS formulation. Oral activated charcoal will be useful in combination with whole bowel irrigation with PEG-ELS in mexiletine overdose because of its excellent
Lamminpaa A, Vilska J, Hoppu K	Medical charcoal for a child's poisoning at home: availability and success of administration in Finland	Hum Exp Toxicol	1993	12	1	29	32	活性炭	疫学調査		In a prospective study, 174 families were interviewed over the telephone to find out whether the treatment of their child's poisoning with medical charcoal was successfully completed. The majority (103; 59.2%) of the families had no charcoal at home. The mean delay in administration for those who had to obtain charcoal was 41.6 min; significantly longer than the 24.5 min taken for those who had charcoal at home (P < 0.001). The treatment succeeded in all but five of the 102 patients given charcoal at home. Thus for mild poisoning in young children, the administration of activated charcoal at home, under the guidance of a Poison Information Centre, could be a rapid and safe first-aid treatment. Presently the widespread unavailability of charcoal in the home in Finland causes an unnecessary delay in treatment that could be of clinical
Orisakwe OE, Ogbonna E	Effect of saline cathartics on gastrointestinal transit time of activated charcoal	Hum Exp Toxicol	1993	12	5	403	405	下剤／活性炭	ヒトモデル実験		The effects of saline cathartics on the gastrointestinal transit time of activated charcoal were investigated in six healthy volunteers. The study shows that the mean gastrointestinal transit times of charcoal alone were 29.3 h and 24.4, 15.4, 17.3 and 17.5 h with sodium chloride, sodium sulphate, magnesium sulphate alone and Andrew's Liver Salt respectively. Some volunteers complained of slight abdominal discomfort in all the phases except the
Saetta JP	Gastric decontaminating procedures: Is it time to call a stop?	J R Soc Med	1993	86	7	396	399	胃洗浄／活性炭／催吐	総説		
Makosiej FJ, Hoffman RS, Howland MA, Goldfrank LR	An in vitro evaluation of cocaine hydrochloride adsorption by activated charcoal and desorption upon addition of polyethylene glycol electrolyte lavage solution	J Toxicol Clin Toxicol	1993	31	3	381	395	腸洗浄／活性炭	in vitro		Cocaine body-packers and body-stuffers have become a common medical problem. Significant morbidity and mortality result when cocaine is absorbed from the gastrointestinal tract due to cocaine package compromise. The clinical prevention of gastrointestinal absorption of cocaine includes oral activated charcoal and/or whole bowel irrigation with polyethylene glycol--electrolyte lavage solution. This in vitro study investigates the maximal adsorptive capacity of activated charcoal for cocaine at varying activated charcoal:cocaine ratios, at pH 1.2 and pH 7.0, and the effect of polyethylene glycol--electrolyte lavage solution upon this binding. The percent adsorption of cocaine to activated charcoal was significantly better at pH 7.0 for all ratios of activated charcoal:cocaine tested and the maximal adsorptive capacity was 29% greater at pH 7.0 (273 micrograms/mg) than at pH 1.2 (212 micrograms/mg) (p < 0.05). Addition of polyethylene glycol--electrolyte lavage solution to the cocaine-activated charcoal slurry caused significant desorption
Buckley N, Dawson AH, Howarth D, Whyte IM	Slow-release verapamil poisoning; Use of polyethylene glycol whole-bowel irrigation lavage and high-dose calcium	Med J Aust	1993	158	3	202	204	腸洗浄	症例報告		OBJECTIVE: To present three cases of slow-release verapamil poisoning that demonstrate the prolonged absorption of the drug and the role of polyethylene glycol and high-dose calcium in management. CLINICAL FEATURES: Three patients with slow-release verapamil poisoning are presented. An 18-year-old woman took 2.3 g and developed hypotension and bradyarrhythmias 18 hours after ingestion, despite gastric lavage and administration of charcoal at three hours. A 23-year-old woman took 4.8 g and presented two hours later clinically unaffected. A 44-year-old woman presented 24 hours after taking 15-20 g. She had a systolic blood pressure of 50 mmHg, no measurable diastolic blood pressure and bradyarrhythmias. INTERVENTION AND OUTCOME: Case 1 responded to administration of 30 g of calcium and fluids intravenously. Case 2 was given polyethylene glycol on admission which resulted in passage of a tablet bezoar and no toxicity. Polyethylene glycol was ineffective in Case 3. She responded initially to high doses of calcium and other treatments, but
Olsen KM, Ma FH, Ackerman BH, Stall RE	Low-volume whole bowel irrigation and salicylate absorption ; A comparison with ipecac-charcoal	Pharmacotherapy	1993	13	3	229	232	腸洗浄／活性炭／下剤	ヒトモデル実験		STUDY OBJECTIVE. To evaluate two methods of gastrointestinal decontamination, low-volume whole bowel irrigation (WBI) and activated charcoal, for their ability to prevent absorption of salicylate. DESIGN. Randomized, two-phase crossover study. SETTING. A clinical research unit in a university-based teaching hospital. PATIENTS. Six healthy, volunteer men. INTERVENTIONS. Subjects were assigned to receive 3000 ml WBI or syrup of ipecac 30 ml followed by activated charcoal 50 g in sorbitol, and were crossed over to the other treatment phase after 1 week. All treatments began 30 minutes after ingestion of 3.25 g aspirin. Urine was collected over 24 hours for analysis of total urinary excretion of salicylate. Serial blood samples were collected for salicylate determination and were subjected to pharmacokinetic analysis. MEASUREMENTS AND MAIN RESULTS. Mean +/- SD recovery of salicylate were WBI 48.6 +/- 5.4% and ipecac-charcoal 37.0 +/- 2.6% from urine (p < 0.01). CONCLUSION. Ipecac-charcoal produced a significantly lower
Turk J, Aks SE, Hryhorczuk DO	Constraints on the enhancement of elimination of drugs with activated charcoal	Vet Hum Toxicol	1993	35	6	489	495	活性炭	症例報告		Both extracorporeal hemoperfusion through charcoal-containing columns and repeated oral administration of charcoal can accelerate clearance of some drugs or toxins from the systemic circulation. The efficacy of these 2 interventions is limited by a variety of factors, and the complex kinetic equations describing charcoal-induced clearance provide little practical clinical guidance about the potential efficacy of charcoal in accelerating clearance of a specific drug or toxin without previous empiric data. We derive here simple rules that place an upper limit on the maximal fraction of an absorbed dose of drug that can be removed (FRmax) by charcoal in terms of the volume of distribution (Vd), a parameter which is known for most drugs. For 4 h of hemoperfusion, a theoretical upper limit of FRmax is (1/Vd), where Vd is expressed in L/kg of body weight, and actual fractional removal (FR) will not exceed [1/(2 x Vd)]. Drug removal by 24 h of repeated po administration of
Turk J, Aks S, Ampuero F, Hryhorczuk DO	Successful therapy of iron intoxication in pregnancy with intravenous deferoxamine and whole bowel irrigation	Vet Hum Toxicol	1993	35	5	441	444	腸洗浄	症例報告		We describe the successful treatment of a severely iron-poisoned adult patient in week 26 of gestation with 10.2 g deferoxamine administered iv over 14 h and whole bowel irrigation (2 L/h of polyethylene glycol-electrolyte solution/nasogastric tube for 12 h) with a good maternal outcome and no adverse effects on the fetus.

Frenia ML, Schauben JS, Tucker C, Wears R, Kunisaki T	Multiple dose activated charcoal compared to urinary alkalization for the enhancement of phenobarbital elimination	Vet Hum Toxicol	1993	35	4	367		活性炭	ヒトモデル実験	会議録	
Roberge RJ, Martin TG	Whole bowel irrigation in an acute oral lead intoxication	Am J Emerg Med	1992	10	6	577	583	腸洗浄	症例報告		An 89-year-old man acutely ingested approximately three ounces of a ceramic glaze preparation with a 30% lead oxide content. A blood lead level of 18 micrograms/mL was reported from a sample drawn within 1 hour of ingestion and just prior to gastric· lavage. Following lavage, an abdominal radiograph demonstrated lead throughout the small intestine. Whole bowel irrigation was then undertaken and subsequent x-rays demonstrated clearing of all lead in the small bowel. At 16 and 24 hours post-ingestion, blood lead levels rose to 39 micrograms/dL and 42 micrograms/dL, respectively, and the patient then underwent a 5-day course of chelation therapy. This is the first reported case of the use of whole bowel irrigation in an acute lead ingestion. The use of decontamination techniques in acute lead ingestions is reviewed.
Mofenson HC, Caraccio TR	Is activated charcoal useful for acetaminophen overdose beyond two hours after ingestion?	Ann Emerg Med	1992	21	7	894		活性炭	レタ／コメント		Comment on: Ann Emerg Med. 1991 Oct;20(10):1064-8
Vance MV, Selden BS, Clark RF	Optimal patient position for transport and initial management of toxic ingestions	Ann Emerg Med	1992	21	3	243	246	胃洗浄／活性炭／催吐	ヒトモデル実験		STUDY OBJECTIVES: Many factors influence the rate of gastric emptying and therefore the rate of drug absorption in the orally poisoned patient. Limited studies have evaluated the effect of body position on the rate of gastric emptying of radiographically marked foods and contrast media, but effects on drug absorption have not been studied previously. Our hypothesis was that body position would have an effect on the rate of drug absorption in an oral overdose model. DESIGN: A blinded, within-subjects (crossover) design. PARTICIPANTS: Six male and six female healthy, adult volunteer subjects with no concurrent drug use or medications affecting gastrointestinal function. INTERVENTIONS: Five body positions commonly used in prehospital and emergency department settings were examined: left lateral decubitus, right lateral decubitus, supine, prone, and sitting. All were performed by all subjects in random order with a three-day washout phase between trials. To simulate an
Burkhart KK, Wuerz RC, Donovan JW	Whole-bowel irrigation as adjunctive treatment for sustained-release theophylline overdose	Ann Emerg Med	1992	21	11	1316	1320	腸洗浄／活性炭	動物実験		STUDY OBJECTIVE: To determine a therapeutic benefit for whole-bowel irrigation (with polyethylene glycol-electrolyte lavage solution) as adjunctive treatment to multiple doses of activated charcoal following an overdose of sustained-release theophylline. DESIGN: Randomized crossover study. Three treatment arms were separated by one-week intervals. SETTING: Animal care facility housing. TYPE OF PARTICIPANTS: Eight female mongrel dogs. INTERVENTIONS: Unanesthetized dogs were given approximately 75 mg/kg of sustained-release theophylline. In treatment arm 1, 1 g/kg activated charcoal was administered by nasogastric tube at two hours after ingestion followed by 0.5-g/kg doses at five and eight hours. During treatment arm 2, beginning two hours after theophylline ingestion, 25 mL/kg whole-bowel irrigation solution was administered every 45 minutes for four doses followed by activated charcoal. In treatment arm 3, the first dose of activated charcoal was given ten minutes before beginning the whole-bowel irrigation protocol.
Torres A, Serra-Batlles J, Ros E, et al	Pulmonary aspiration of gastric contents in patients receeving mechanical venti- lation: the effort of body position	Ann Intern Med	1992	116		540	543	胃洗浄	Clinical Trial/Randomized Controlled Trial		OBJECTIVE: To determine if the semirecumbent position (45-degree angle) decreases aspiration of gastric contents to the airways in intubated and mechanically ventilated patients. DESIGN: A randomized, two-period crossover trial. SETTING: Respiratory intensive care unit. PATIENTS: Nineteen patients requiring intubation and mechanical ventilation. INTERVENTIONS: Patients were studied in the supine and semirecumbent positions on two separate days. MEASUREMENTS: After technetium (Tc)-99m sulphur colloid labeling of gastric contents, sequential radioactive counts in endobronchial secretions were measured at 30-minute intervals over a 5-hour period. Samples of endobronchial secretions, gastric juice, and pharyngeal contents were obtained for qualitative bacterial cultures. RESULTS: Mean radioactive counts in endobronchial secretions
Mayer AL, Sitar DS, Tenenbein M	Multiple-dose charcoal and whole-bowel irrigation do not increase clearance of absorbed salicylate	Arch Intern Med	1992	152	2	393	396	活性炭／腸洗浄	ヒトモデル実験		BACKGROUND--This study assesses whether oral multiple-dose charcoal therapy (MDC) or whole-bowel irrigation (WBI) enhances the excretion of previously absorbed salicylate. METHODS--A controlled, randomized, three-limbed crossover protocol was used in nine humans who ingested aspirin. Salicylate levels were measured in serial serum specimens and 32-hour urine collections and kinetic parameters were calculated. RESULTS--There were no differences among the control (CTL), MDC, or WBI groups for area under the serum concentration vs time curve (CTL, 2320 +/- 501 mg/L.h MDC, 2040 +/- 454 mg/L.h; WBI, 2093 +/- 418 mg/L.h) or for urinary salicylates (CTL, 54.9% +/- 9.4%; MDC, 50.9% +/- 8.0%, WBI, 52.4% +/- 13.7% of ingested dose). CONCLUSIONS--Our data do not support the use of either MDC or WBI to enhance the excretion of previously absorbed salicylate in poisoned patients. In patients with drug overdoses, a clear rectal effluent remains as the endpoint for WBI.·Randomized Controlled Trial
Atkinson SW, Young Y, Trotter GA	Treatment with activated charcoal complicated by gastrointestinal obstruction	Br Med J	1992	305	6853	563		活性炭	症例報告		
Lovejoy FH Jr, Shannon M, Woolf AD	Recent advances in clinical toxicology	Curr Problems Pediatr	1992	22	3	119	129	胃洗浄／活性炭／催吐	総説		The Boston group (Lovejoy, Shannon, Woolf) has proposed suggestions for general treatment of overdose in children in busy emergency departments:·1) In the symptomatic but alert child with a minor ingestion presenting to the emergency department, activated charcoal alone (for drugs absorbed by activated charcoal) by mouth appears to be sufficient for gastrointestinal decontamination.·2) For the obtunded or comatose child with a potentially serious overdose, lavage followed by activated charcoal via an orogastric or nasogastric tube should be instituted within 1 to 2 hours of ingestion (or longer in the case of sustained-release drugs, gastric concretions, or delayed gastric emptying). 毒物によっては活性炭の反復投与も考慮·3) 情報が不十分な初療時には2時間の観察を·4) No study has compared ipecac-induced emesis to observation alone in the home setting. 決着がつくまで ipecac, as recommended by poison centers or pediatricians, is the logical approach.·5) The use of repetitive doses of activated charcoal depends on specific and
Palatnick W, Tenenbein M	Activated charcoal in the treatment of drug overdose: An update	Drug Saf	1992	7	1	3	7	胃洗浄／活性炭／催吐	総説		
Mizutani T, Yamashita M, Okubo N, Tanaka M, Naito H	Efficacy of whole bowel irrigation using solutions with or without adsorbent in the removal of paraquat in dogs	Hum Exp Toxicol	1992	11	6	495	504	腸洗浄／活性炭	動物実験		1. The efficacy of whole bowel irrigation with a solution containing either polyethylene glycol (PEG) with electrolyte or an adsorbent (Kayexalate with a cathartic (sorbitol) was investigated in 18 dogs who had been given 250 mg kg-1 paraquat dichloride via a jejunal tube to eliminate the influence of gastric absorption. 2. Plasma paraquat concentrations 2 and 3 h after the initiation of bowel irrigation and at the end of the study (5 h later) were significantly lower in the bowel irrigation groups than in the control (no bowel irrigation) group. 3. The total body clearances of paraquat in the bowel irrigation groups were significantly greater than in the control group. 4. There were no significant differences between the two different irrigation solution groups in plasma paraquat concentration, the area under the plasma concentration time curve and the total body clearance. 5. In the PEG with electrolyte group, about 70% of the administered dose of paraquat was removed by means of bowel
Laine K, Kivisto KT, Neuvonen PJ	Failure of oral activated charcoal to accelerate the elimination of amiodarone and chloroquine	Hum Exp Toxicol	1992	11	6	491	494	活性炭	動物実験		1. The effect of activated charcoal on the elimination of amiodarone and chloroquine was studied in the rat. 2. The study consisted of two separate experiments. Amiodarone and chloroquine were injected subcutaneously at doses of 200 mg kg-1 and 100 mg kg-1, respectively. Six rats in both experiments were put on a charcoal-containing diet 48 h after drug administration, while the control groups remained on a normal diet. 3. Treatment with repeated oral activated charcoal had no effect on the true elimination of amiodarone and chloroquine. 4. These results suggest that, after the distribution of amiodarone and chloroquine into peripheral compartments, their rate of elimination cannot be significantly accelerated with multiple oral

Neuvonen PJ, Kivisto KT, Laine K, Pyykko K	Prevention of chloroquine absorption by activated charcoal	Hum Exp Toxicol	1992	11		117	120	活性炭	ヒトモデル実験		1. The ability of activated charcoal to prevent the absorption of chloroquine was investigated in healthy volunteers, and the effect of the charcoal-chloroquine ratio on the completeness of binding was studied in vitro. 2. After an overnight fast, six subjects ingested 500 mg of chloroquine phosphate with water, and another group of six subjects ingested 25 g of charcoal suspension within 5 min of chloroquine intake. The concentrations of chloroquine in plasma and whole blood were measured by high-performance liquid chromatography for 192 h. 3. Activated charcoal reduced the areas under the plasma and whole blood chloroquine concentration-time curves (AUC) from 0 to 192 h, the total AUCs, and the peak concentrations by 99% (P less than 0.001). 4. Chloroquine was very effectively bound by activated charcoal in vitro, even at low charcoal-chloroquine ratios. For example, at a ratio of 5:1, about 98% of chloroquine was bound. 5. Activated charcoal should be very effective in reducing the absorption of that fraction of chloroquine dose which is in the
Tomaszewski C, Voorhees S, Wathen J, Brent J, Kulig K	Cocaine adsorption to activated charcoal in vitro	J Emerg Med	1992	10	1	59	62	活性炭	in vitro		Although activated charcoal (AC) is commonly used after ingestions of cocaine, the ability of AC to bind with this drug is unknown. We studied binding of cocaine to AC in vitro. Cocaine adsorption to charcoal for AC:drug ratios of 1:1, 2.5:1, and 5:1 at pH 1.2 was 40%, 92%, and 99%, respectively; at pH 8.0, it was 78%, 98%, and 99%, respectively. All means were significantly different (P less than 0.05) versus the control (no AC) at each pH. At the AC:drug ratio of 1:1, there was also significantly greater adsorption of cocaine at pH 8.0 than at pH 1.2. This study shows that AC strongly adsorbs cocaine under both acidic
Scalzo AJ, Tominack RL, Thompsor MW	Malposition of pediatric gastric lavage tubes demonstrated radiographically	J Emerg Med	1992	10	5	581	586	胃洗浄	臨床研究		Gastric lavage may be indicated in the initial treatment of toxic substance ingestion. We retrospectively surveyed the charts of 36 pediatric patients who underwent gastric lavage to evaluate the clinical and radiographic evidence indicating proper tube placement. Only 14 patients had a radiograph prior to lavage, and 50% of these documented malposition. The most common was excess tube insertion, stretching the stomach inferiorly towards the pelvis. The traditionally acceptable clinical test by auscultation of insufflated air was favorable in 100% of patients, thus failing to detect all of the malpositionings documented radiographically. We suggest that initial insertion of tube length be based on the patient's height or length using an adaptation of Strobel's previously published formula for esophageal pH probe placement: Tube Insertion Depth (TID), orogastric = 9.7 cm + (0.226 x length of patient in cm) and TID, nasogastric = 8 cm + (0.252 x length of patient in cm). These formulae
Roivas L, Neuvonen PJ	Reversible adsorption of nicotinic acid onto charcoal in vitro	J Pharm Sci	1992	81	9	917	919	活性炭	in vitro		The effects of various factors on the adsorption of nicotinic acid onto and desorption from activated charcoal were investigated in vitro. The affinity of nicotinic acid for charcoal was poor both in acidic and neutral media. Adsorption increased with increasing charcoal:drug ratios and decreasing incubation volume:charcoal ratios. Desorption of nicotinic acid from dried drug-charcoal complexes was investigated in a Sartorius dissolution apparatus. The rate of the rapid, initial desorption depended on the pH and the amounts of charcoal and drug. As equilibrium was reached in the dissolution chamber, the release rate of nicotinic acid decreased slowly, depending mainly on the flow of the medium. Thus, nicotinic acid preadsorbed onto charcoal was released in a sustained manner under "continuous flow" conditions. However, because of the poor affinity for nicotinic acid, charcoal may not be a suitable matrix for sustained release of nicotinic acid.
McKinney PE, Gillilan R, Watson WA	The preadministration of activated charcoal and aspirin absorption	J Toxicol Clin Toxicol	1992	30	4	549	556	活性炭	ヒトモデル実験		There is little information describing the effects of activated charcoal preadministration on drug absorption. This study was undertaken to determine the effect of activated charcoal preadministration at two different times on aspirin absorption. Fifteen volunteer subjects completed three study phases: 1) 975 mg aspirin alone, 2) 975 mg aspirin 30 min after 10 g activated charcoal, and 3) 975 mg aspirin 60 min after 10 g activated charcoal. Urine was collected for 48 h after the initiation of each study phase, and total aspirin recovery determined by HPLC. The aspirin recovery was 88.8% +/- 4.5% for the control phase, and 84.8% +/- 9.4% (Phase 1) and 85.8% +/- 12.6% (Phase 2) for the activated charcoal treatments (p > 0.05). These results suggest that activated charcoal administered 30 and 60 min prior to drug ingestion has little effect on drug absorption. Further studies of the effect of charcoal preadministration on the absorption of other drugs may provide useful information regarding factors
Burkhart KK, Metcalf S, Shurnas E, O'Meara O, Brent J, Kulig K, Rumack BH	Exchange transfusion and multidose activated charcoal following vancomycin overdose	J Toxicol Clin Toxicol	1992	30	2	285	294	活性炭	症例報告		The inadvertent administration of a concentrated vancomycin solution to a 47 day-old premature male twin resulted in extremely high vancomycin levels and altered renal function. A 1.5 volume exchange transfusion did not change the measured vancomycin level. Multiple doses of oral activated charcoal, 1 g/kg, were administered beginning 5 h after the exchange transfusion. A calculated half-life of vancomycin before the exchange transfusion was 35 h. The half-life after the exchange transfusion and during charcoal administration was calculated to be 12 h. The only apparent adverse effect of this vancomycin overdose was reversible nephrotoxicity. The infant's hearing, tested by brainstem auditory responses, was normal. The higher volume of distribution of vancomycin in infants may preclude removing significant amounts of this drug by exchange transfusion. Gastrointestinal dialysis with activated charcoal warrants consideration in cases of vancomycin overdose in neonates.
Jawary D, Cameron PA, Dziukas L, McNeil JJ	Drug overdose: Reducing the load	Med J Aust	1992	156	5	343	346	胃洗浄／活性炭／催吐／腸洗浄／下剤	総説		OBJECTIVE: To review available information about various methods for reducing gastrointestinal absorption of a poison or drug. DATA SOURCES: Articles on overdose and accidental poisoning generated by the Australian Medlars Service and concentrating on the period between 1985 and 1990 were surveyed. Earlier studies were included if relevant. STUDY SELECTION AND DATA EXTRACTION: English language articles with an emphasis on studies using objective methods to measure individual and comparative efficacy of gastrointestinal decontamination techniques were selected. A total of 65 articles were reviewed. DATA SYNTHESIS: Gastric emptying procedures (gastric lavage or emesis caused by syrup of ipecac) are only effective if performed within one hour of drug ingestion. Gastric lavage is superior to syrup of ipecac. Oral administration of activated charcoal is more effective than either gastric emptying procedure, and is recommended for most cases of poisoning. Cathartics (sorbitol) can be used with activated charcoal. Whole
Kulig K	Initial management of ingestions of toxic substances	N Engl J Med	1992	326	25	1677	1681	胃洗浄／活性炭／催吐／腸洗浄／	総説		
Jeffrey S, Goldfrank LR	Update in medical toxicology	Ped Clin N Am	1992	39	5	1031	1051	胃洗浄／活性炭／催吐／腸洗浄／下剤	総説		This article examines some current issues in toxicologic care. First there is a review of the scope of pediatric poisonings and some aspects of initial management. Then there is a discussion of the decision-making process required to properly use gastric decontamination in the management of poisonings. Each of the common methods available--emesis, gastric lavage, activated charcoal, catharsis, and whole bowel irrigation--is discussed. Finally, several new and old antidotes are reviewed, namely naloxone, glucagon, bicarbonate, dimercaptosuccinic acid, digoxin-specific fab fragments, and
Givens T, Holloway M, Wason S	Pulmonary aspiration of activated charcoal: a complication of its misuse in overdose management.	Pediatr Emerg Care	1992	8	3	137	140	活性炭	症例報告		
Burke GM, Wurster DE, Berg MJ, Veng-Pedersen P, Schottelius DD	Surface characterization of activated charcoal by x-ray photoelectron spectroscopy (XPS); correlation with phenobarbital adsorption data.	Pharm Res	1992	9	1	126	130	活性炭	in vitro		X-ray photoelectron spectroscopy (XPS) was used to identify the functional states of carbon existing on the surfaces of various activated charcoals. The relative percentages of carbon, oxygen, and detectable trace elements comprising the activated charcoal surfaces were determined. Analysis of the carbon core-electron binding energy region revealed the existence of one hydrocarbon state (C-H, C-C are indistinguishable) and three oxygen-containing functional states. These states were hydroxyls or ethers (C-O), carbonyls (C = O), and carboxylic acids or esters (O-C = O). The C-O functional state contributed approximately 60-70% to the total percentage of oxygen-containing states. A very good correlation existed between the apparent areas occupied on the adsorbent surface per phenobarbital molecule and the relative percentages of the C-O functional state. Previously reported heat of displacement results for phenobarbital adsorption are now explained since the C-O state appears to be the primary site involved in the binding of

Everson GW, Bertaccini EJ, O'Leary J	Use of whole bowel irrigation in an infant following iron overdose	Am J Emerg Med	1991	9	4	366	369	腸洗浄	症例報告		An 11-month-old, 11-kg infant presented to the emergency department after ingesting 130 to 150 mg/kg of elemental iron. Emesis was induced twice and the child was lavaged throughout a 4-hour period with some tablet return. An abdominal radiograph after gastrointestinal decontamination showed at least 16 whole iron tablets remaining in the stomach. Serum iron drawn 2 hours postingestion was 46.7 mumol/L. Blood glucose was 7.7 mmol/L and white blood count was 21,800 mm3. Despite a second lavage 8 hours postingestion, a large number of whole tablets were visualized in the stomach per radiograph. Whole bowel irrigation with polyethylene glycol electrolyte lavage solution (Golytely, Braintree Laboratories, Inc, Braintree, MA) was begun via nasogastric tube 14 hours after the ingestion. Serial abdominal radiographs showed tablet movement out of the stomach within 4 hours after initiating whole bowel irrigation. This case demonstrates the safety and efficacy of WBI in an infant when conventional gastrointestinal decontamination has failed.
Krenzelok EP, Lush RM	Container residue after the administration of aqueous activated charcoal products	Am J Emerg Med	1991	9	2	144	146	活性炭	臨床研究		Commercial aqueous activated charcoal (AC) products may sit in emergency departments, pharmacies, and homes for prolonged periods resulting in the inability to resuspend the AC for patient administration. The potential risk to the patient from not receiving an adequate amount of AC, especially when AC may be the sole means of gastric decontamination, is obvious. To simulate this potential problem, samples of five different aqueous AC products (ActaChar, Actidose, InstaChar, LiquiChar, and SuperChar) were placed into storage for periods of 3 and 12 months. At the end of each study period, samples were agitated and the effluent and container residue were collected, oven-dried, and weighed. With the exception of Actidose, all products retained substantial amounts of AC in the container at both time intervals. These data stress the negative impact of dormant storage on the resuspendability of aqueous activated charcoal products. Furthermore, they suggest the importance of thorough container agitation and rinsing to insure that the patient receives
Allerton JP, Strom JA	Hypernatremia due to repeated doses of charcoal-sorbitol	Am J Kidney Dis	1991	17	5	581	584	活性炭／下剤	症例報告		Severe dehydration and hypernatremia developed in a 23-year-old woman following the administration of 210 mL of 70% sorbitol and 600 mL magnesium citrate over 27 hours.··Hypernatremic dehydration due to unreplaced stool water losses often complicates the use of the osmotic cathartic lactulose in the treatment of hepatic encephalopathy. Sorbitol, another osmotic cathartic commonly used in the treatment of drug intoxications, has been reported in the pediatric literature to induce severe hypernatremia, but there is only a rare case report in an adult. We report a dramatic case of severe hypernatremia secondary to repetitive administration of activated charcoal-sorbitol suspension for the treatment of phenobarbital intoxication in an adult. Based on our experience with this case, several recommendations are provided regarding management of drug intoxications with charcoal-sorbitol suspension, including meticulous attention to fluid-electrolyte balance, type of replacement
Payment P, Richardson L, Siemiatycki J, et al	A randomized trial to evaluate the risk of gastrointestinal disease due to consumption of drinking water meeting current microbiological standards	Am J Public Health	1991	81		703	708	胃洗浄	臨床研究		BACKGROUND: This project directly and empirically measured the level of gastrointestinal (GI) illness related to the consumption of tapwater prepared from sewage-contaminated surface waters and meeting current water quality criteria. METHODS: A randomized intervention trial was carried out; 299 eligible households were supplied with domestic water filters (reverse-osmosis) that eliminate microbial and chemical contaminants from their water, and 307 households were left with their usual tapwater without a filter. The GI symptomatology was evaluated by means of a family health diary maintained prospectively by all study families over a 15-month period. RESULTS: The estimated annual incidence of GI illness was 0.76 among tapwater drinkers compared with 0.50 among filtered water drinkers (p less than 0.01). These findings were consistently observed in all population subgroups. CONCLUSION: It is estimated that 35% of the reported GI illnesses among the tapwater drinkers were water-related and preventable. Our results raise questions about
Tenenbein M	Multiple doses of activated charcoal: Time for reappraisal?	Ann Emerg Med	1991	20	5	529	531	活性炭	総説		Multiple-dose charcoal therapy has become a popular treatment for many overdoses. It is generally perceived as a simple, inexpensive, effective, and safe procedure that decreases morbidity and mortality by enhancing drug excretion. However, increased drug clearance has been shown definitively for only a few drugs, and improved outcome has not been demonstrated conclusively for any overdose. Recently, there have been several reports of complications due to this intervention. The role of this pharmacologic curiosity in the management of the acutely poisoned patient requires reassessment.
Eisen TF, Grbcich PA, Lacouture PG, Shannon MW, Woolf A	The adsorption of salicylates by a milk chocolate-charcoal mixture	Ann Emerg Med	1991	20		143	6	活性炭	ヒトモデル実験		STUDY OBJECTIVE: To evaluate the adsorptive capacity of a milk chocolate-charcoal mixture to aspirin, compared with superactivated charcoal and conventional activated charcoal. DESIGN: A prospective, randomized, crossover study. SETTING: The Massachusetts Poison Control Center office in The Children's Hospital, Boston. TYPE OF PARTICIPANTS: Six healthy adult volunteers with no known allergies to aspirin or chocolate, bleeding disorders, or peptic ulcer disease. INTERVENTIONS: Each participant ingested 975 mg of crushed aspirin on separate days, followed by either water; 10 g milk chocolate-charcoal mixture; 10 g SuperChar Liquid; or 10 g Actidose Aqua activated charcoal. Total serum salicylate concentrations were determined by high-performance liquid chromatography at zero, one, two, four, eight, and 24 hours after ingestion. MEASUREMENTS AND MAIN RESULTS: Neuman-Keuls analysis was used to measure time-to-peak concentration, which was reduced by SuperChar Liquid, 67%; milk chocolate-charcoal mixture, 106%; and activated
Smith SW, Ling LJ, Halstenson CE	Whole-bowel irrigation as a treatment for acute lithium overdose	Ann Emerg Med	1991	20	5	536	539	腸洗浄	ヒトモデル実験		STUDY OBJECTIVE: To determine if gastrointestinal decontamination using whole-bowel irrigation (WBI) was an effective treatment for acute ingestion of sustained-release lithium. METHODS: In a two-phase, crossover protocol, ten normal volunteers ingested in each phase 0.80 mEq/kg sustained-release lithium carbonate. In the second phase, WBI was begun one hour after lithium ingestion, and 10 L of polyethylene glycol solution were administered over five hours. Serum samples were collected every half hour for six hours, every hour for an additional six hours, and then every 24 hours for as long as 72 hours after ingestion. These samples were analyzed for lithium concentration. The area under the lithium serum concentration-versus-time curve was calculated for each phase. RESULTS: The average area under the lithium serum concentration-versus-time curve in the WBI phase was 67% +/- 11% less than that in the control phase (P less than .0005 using a two-tailed Student's t test). The mean serum lithium concentration was significantly decreased (P =
Kornberg AE, Dolgin J	Pediatric ingestions: charcoal alone versus ipecac and charcoal	Ann Emerg Med	1991	20		648	651	催吐／活性炭	臨床研究		STUDY OBJECTIVES: To determine the effect of syrup of ipecac (SOI) on time to receive and retention of activated charcoal (AC) and on total ED time. DESIGN: During a two-year period, patients were enrolled in a prospective, randomized, unblinded, controlled trial. SETTING: All patients were recruited and studied in a pediatric emergency department. PARTICIPANTS: Seventy children less than 6 years old (mean age, 2.4 +/- 0.2 years) who presented with mild-to-moderate acute oral ingestions. INTERVENTIONS: Group 1 received SOI before AC. Group 2 received only AC. MEASUREMENTS AND MAIN RESULTS: Group 1 patients took significantly longer to receive AC than group 2 from the time of ED arrival (2.6 +/- 0.1 vs 0.9 +/- 0.1 hours, P less than .0001). Group 1 children were significantly more likely to vomit AC than were group 2 children (18 of 32 vs six of 38, P less than .001). Patients receiving SOI who were subsequently discharged spent significantly more time in the ED than those receiving only AC (4.1 +/- 0.2 vs 3.4 +/- 0.2 hours, P

Rose SR, Gorman RL, Oderda GM, Klein-Schwartz W, Watson WA	Simulated acetaminophen overdose: pharmacokinetics and effectiveness of activated charcoal	Ann Emerg Med	1991	20	10	1064	1068	活性炭	ヒトモデル実験		STUDY OBJECTIVE: To determine the absorption rate of a supratherapeutic dose of acetaminophen elixir and compare the effect of activated charcoal (AC) given at different time intervals on preventing acetaminophen absorption. DESIGN: Randomized, nonblinded, crossover controlled study. SETTING: A certified regional poison control center. PARTICIPANTS: Ten healthy, adult male volunteers from 21 to 39 years old. INTERVENTIONS: Each subject received 5 g acetaminophen (elixir) on four occasions: a control phase plus 30 g of AC administered 15, 30, or 120 minutes after acetaminophen. Serum acetaminophen levels were obtained during the control phase only, and 24-hour urine collections were obtained during all four phases. MEASUREMENTS AND MAIN RESULTS: The highest serum acetaminophen levels were measured 1.4 +/- 0.52 hours after ingestion, and absorption was 97% complete by a mean of 2.05 hours. The administration of AC at 15, 30, and 120 minutes after acetaminophen reduced urinary recovery of acetaminophen and metabolites by
Hodgkinson DW, Jellett LB, Ashby RH	A review of the management of oral drug overdose in the accident and emergency department of the Royal Brisbane Hospital	Arch Emerg Med	1991	8		8	16	活性炭／胃洗浄	ヒトモデル実験		Two-hundred and eighty-nine patients who made a total of 323 presentations to the Royal Brisbane Hospital Accident and Emergency Department with a known or suspected oral drug overdose were reviewed. The majority of patients (76%) could be managed in a 24 h Accident and Emergency observation unit. Activated charcoal given orally or via a nasogastric tube was the recommended method of preventing further absorption of an ingested drug. The use of syrup of ipecac was not encouraged and orogastric lavage was used in only specific situations. The morbidity and mortality of these patients when compared with other studies, was not adversely affected by this protocol which dramatically reduced the indications for the use of orogastric
Akintonwa A, Obodozie O	Effect of activated charcoal on the disposition of sulphadoxine	Arch Int Pharmacodyn	1991	309		185	192	活性炭	ヒトモデル実験		Studies were conducted to examine the effect of activated charcoal on the disposition kinetics of sulphadoxine after Fansidar administration. Activated charcoal caused a significant reduction in ka, half-life and AUC0-48hr from 1.4 to 0.7 hr, 256 to 117 hr and 2533 to 1346 mg/l/hr, respectively. Activated charcoal absorbed sulphadoxine effectively in vitro. Sulphadoxine, at a simulated highly toxic dose of 5 mg/ml, showed adsorption percentages of 23.06, 28.66, 41.24, 64 and 100 to amounts of activated charcoal of 12.5, 25, 50, 100 and 250 mg, respectively. The results show that activated charcoal effectively adsorbs sulphadoxine both in vitro and in vivo.
Dolgin JG, Nix DE, Sanchez J, Watson WA	Pharmacokinetic simulation of the effect of multiple-dose activated charcoal in phenytoin poisoning--report of two pediatric cases.	Drug Intell Clin Pharm	1991	25	6	646	649	活性炭	症例報告		Activated charcoal is commonly used to inhibit the absorption of phenytoin after acute overdose. There are also reports of multiple-dose activated charcoal (MDAC) increasing the clearance of phenytoin in adults. We describe our experience modeling phenytoin pharmacokinetics during therapy with MDAC in the treatment of two cases of acute phenytoin poisoning in children. After extensive attempts at modeling the serum phenytoin concentrations, simulations were performed to identify the possible consequences of MDAC administration. Phenytoin elimination was more rapid than was expected, based on previously reported phenytoin pharmacokinetic parameters. Moreover, the time to peak phenytoin concentration and time course of phenytoin intoxication appeared to be shorter than available reports of phenytoin intoxication treated with a single dose of activated charcoal. MDAC may prevent continued phenytoin absorption and increase phenytoin elimination rate via gastrointestinal dialysis. The effect of MDAC on the clearance of
Watson WA, McKinney PE	Activated charcoal and acetylcysteine adsorption; Issues in interpreting pharmacokinetic data	Drug Intell Clin Pharm	1991	25	10	1081	1084	活性炭／拮抗薬	総説		Studies determining the effects of activated charcoal on drug absorption frequently use area under the plasma drug concentration versus time curve or drug and metabolite recovery in the urine as endpoints. The considerations in using these endpoints is presented using studies that have evaluated the effects of activated charcoal on acetylcysteine absorption. Acetylcysteine's pharmacokinetics, quantitation of plasma concentrations, and the lack of an identifiable pharmacokinetic-pharmacodynamic relationship all contribute to the difficulties in determining whether activated charcoal inhibits the oral absorption of acetylcysteine, or alters acetylcysteine's efficacy in treating acetaminophen overdoses. The results of these studies should be interpreted cautiously, with consideration of internal and external study validity.
Akintonwa A, Obodozie O	Effect of activated charcoal on the disposition of sulphadoxine	East Afr Med	1991	68	6	420	424	活性炭／下剤	in vitro		The effect of an added saline cathartic (Sodium sulphate) on the in vitro adsorption of chloroquine and mefloquine by activated charcoal were determined. Chloroquine phosphate at 125, 250 and 500 micrograms/ml had 10.0, 23.0 and 38.4 percent adsorption to 50 mg charcoal. When the concentration of activated charcoal was increased from 50 to 200 mg, there was no significant difference in the amount of chloroquine adsorbed. The amount of mefloquine (400-1000 ng/ml) adsorbed ranged from 60.62 to 95.8 percent. The common saline purgatives sodium sulphate at 7.5 mg/ml increased the B-50 for chloroquine slightly from 376 to 444 mg whereas it has little or no effect on the adsorption of mefloquine to activated charcoal.
Hall A, Krenzelok E	Gastrointestinal decontamination: sifting through supportive therapic options	Emer Med Rep	1991	12		171	178	胃洗浄			
Kivisto KT, Neuvonen PJ	Effect of activated charcoal on the absorption of amiodarone	Hum Exp Toxicol	1991	10	5	327	329	活性炭	ヒトモデル実験		1 The ability of activated charcoal to prevent the absorption of amiodarone was studied in 18 healthy volunteers, divided into three groups of six subjects. 2 All subjects were administered a single dose of 400 mg amiodarone; one group ingested the drug with water only (control) and the second with 25 g of activated charcoal as a water suspension. The subjects in the third group were given 25 g of charcoal immediately after the 1.5 h blood sample. 3 The extent of amiodarone absorption was reduced by about 98% by simultaneously administered charcoal (P less than 0.001); taking charcoal 1.5 h after amiodarone still resulted in a 50% reduction in amiodarone bioavailability (P less than 0.05). 4 These results indicate that activated charcoal should be effective in preventing amiodarone absorption in acute poisoning
George DL, McLeod R, Weinstein RA	Contaminated commercial charcoal as a source of fungi in the respiratory tract	Infect Control Hosp Epidemiol	1991	12	12	732	734	活性炭	症例シリーズ		OBJECTIVE: To investigate the possibility that contaminated commercial activated charcoal may serve as a source for fungal colonization or infection of the lower respiratory tract. DESIGN: The clinical course of a patient who aspirated commercial activated charcoal was reviewed. Fungal cultures were performed for 2 samples of an activated charcoal in sorbitol product from separate lots produced by a single manufacturer. Details of the manufacturing process were obtained from a representative of the manufacturer. SETTING: An intensive care unit in a large community teaching hospital. PATIENTS: A single patient with steroid-treated lung disease who developed a fatal pulmonary illness after aspirating a commercial activated charcoal product. RESULTS: After aspirating the charcoal product, the patient developed respiratory tract colonization and possible infection with Aspergillus niger, Paecilomyces variotii, and Penicillium species. Similar fungal species were isolated from cultures of samples obtained from two separate lots of the same
Saetta JP, Quinton DN	Residual gastric content after gastric lavage and ipecacuanha-induced emesis in self-poisoned patients: an endoscopic study	J R Soc Med	1991	84		35	38	胃洗浄／催吐	臨床研究		Flexible endoscopy was used to assess the intragastric residue after either ipecacuanha-induced emesis or gastric lavage in 30 self-poisoned patients. Of the 13 patients treated by induced-emesis, five (38.5%) had residual solid in the stomach; 17 patients were treated by gastric washout, and 15 (88.2%) of these had residual intragastric solid. The study provides direct evidence that the gastric decontaminating procedures employed, and especially gastric lavage, do not remove stomach contents completely.
Saetta JP, March S, Gaunt ME, Quinton DN	Gastric emptying procedures in the self-poisoned patient; are we forcing gastric content beyond the pylorus?	J R Soc Med	1991	84	5	274	276	胃洗浄／催吐	臨床研究		A prospective, randomized, single-blind study was carried out to determine whether gastric content is forced into the small bowel when gastric-emptying procedures are employed in self-poisoned patients. They were asked to swallow barium-impregnated polythene pellets, immediately prior to either gastric lavage or ipecacuanha-induced emesis. A second group of patients, who did not require treatment, were used as controls. Sixty patients were recruited to the study. The data show a significant difference in the number of residual pellets in the small bowel of the treated group (n = 40), when compared with the control group (P less than 0.0001). There was no statistical difference in the number of pellets in the small bowel when the treated groups were compared with each other. In addition, the inefficiency of gastric-emptying procedures is highlighted; 58.5% of the total number of pellets ingested were retained in the gastrointestinal tract of the ipecacuanha-treated

Hoffman RS, Chiang WK, Howland MA, Weisman RS, Goldfrank LR.	Theophylline desorption from activated charcoal caused by whole bowel irrigation solution	J Toxicol Clin Toxicol	1991	29		191	201	腸洗浄／活性炭	in vitro		Whole bowel irrigation with polyethylene glycol electrolyte lavage solution has been recommended as an adjunct to traditional overdose management. Although combined activated charcoal and whole bowel irrigation could enhance the efficacy of both modalities, this improvement remains largely speculative. An in vitro experiment was designed to determine whether polyethylene glycol electrolyte lavage solution alters the adsorption of theophylline to activated charcoal. Theophylline was agitated with activated charcoal in either water or polyethylene glycol electrolyte lavage solution, at each of three activated charcoal:theophylline ratios; 1:1, 3:1, and 10:1. The concentration in the supernatant was determined by high pressure liquid chromatography, and the maximal adsorptive capacity of activated charcoal for theophylline was calculated from the Langmuir equation. The percent of theophylline adsorbed by activated charcoal in water was 16 +/- 4%, 67 +/- 5%, and 97 +/- 3% for the 1:1, 3:1, and 10:1 ratios, respectively. This was
Hoffman RS, Chiang WK, Howland MA, Weisman RS, Goldfrank LR.	Emergency treatment of acute drug ingestions	JAMA	1991	27	266(20)	2831	2832	胃洗浄／活性炭／催吐／腸洗浄／下剤	レタ／コメント		
Merigian KS, Woodard M, Hedges JR, Roberts JR, Stuebing R, Rashkin MC	Prospective evaluation of gastric emptying in the self-poisoned patient	Am J Emerg Med	1990	8	6	479	483	胃洗浄／活性炭／催吐	臨床研究		The authors prospectively studied the effect of gastric emptying (GE) and activated charcoal (AC) upon clinical outcome in acutely self-poisoned patients. Presumed overdose patients (n = 808) were treated using an alternate day protocol based on a 10-question cognitive function examination and presenting vital sign parameters. Asymptomatic patients (n = 451) did not receive GE. AC was administered to asymptomatic patients only on even days. GE in the remaining symptomatic patients (n = 357) was performed only on even days. On emptying days, alert patients had ipecac-induced emesis while obtunded patients received gastric lavage. AC therapy followed gastric emptying. On nonemptying days, symptomatic patients were treated only with AC. No clinical deterioration occurred in the asymptomatic patients treated without GE. AC use did not alter outcome measures in asymptomatic patients. GE procedures in symptomatic patients did not significantly alter the length of stay in the emergency department, mean length of time intubated, or mean
Nejman G, Hoekstra J, Kelley M	Journal club: gastric emptying in the poisoned patient	Am J Emerg Med	1990	8	3	265	269	胃洗浄／催吐	総説		
Hoffman RS, Smilkstein MJ, Goldfrank LR	Whole bowel irrigation and the cocaine body-packer; A new approach to a common problem	Am J Emerg Med	1990	8	6	523	527	腸洗浄	症例報告		Gastrointestinal drug smuggling is a common problem in many major cities. Though the majority of cases never require medical attention, the "body-packer" frequently presents with life-threatening symptoms of intoxication, including seizures and cardiorespiratory collapse, as well as mechanical obstruction from the ingested drug packets. The risk to asymptomatic smugglers may vary with packaging materials, and remains unknown. Lack of controlled studies, and variations in packaging materials and clinical outcomes have prevented formulation of a consistent management strategy. Current recommendations for asymptomatic body-packers vary from immediate surgical removal, to use of laxatives, to observation. The authors present the first reported case of an asymptomatic cocaine body-packer treated with whole bowel irrigation with polyethylene glycol electrolyte lavage solution. This strategy was safe, well tolerated, resulted in the rapid elimination of drug packets from the gastrointestinal tract, and facilitated assessment by contrast
Olson KR	Is gut emptying all washed up? Editorial	Am J Emerg Med	1990	8	6	560	561	活性炭／胃洗浄／催吐／腸洗浄／	総説		These studies suggest that activated charcoal may be the only decontamination measure needed to treat an overdose
Burkhart KK, Kulig KK, Rumack B	Whole-bowel irrigation as treatment for zinc sulfate overdose	Ann Emerg Med	1990	19	10	1167	1170	腸洗浄	症例報告		A 16-year-old boy ingested approximately 50 zinc sulfate tablets (ZnSO4; 500-mg tablets). After spontaneous emesis, ipecac-induced emesis, and orogastric lavage, an abdominal radiograph performed four hours after ingestion still demonstrated approximately 50 ZnSO4 tablets within the stomach and three pills within the colon. Whole-bowel irrigation was begun with a polyethylene glycol lavage solution (PEG; Golytely) that was administered through a nasogastric tube; within one hour, the patient began producing a rectal effluent that contained pills. The patient remained asymptomatic throughout whole-bowel irrigation. Stool guaiac tests were negative. The serum chloride, however, increased from 105 to 127 mEq/L. Follow-up kidney, ureter, and bladder studies demonstrated the clearance of the zinc tablets from the
Kirshenbaum LA, Sitar DS, Tenenbein M	Interaction between whole-bowel irrigation solution and activated charcoal; Implications for the treatment of toxic ingestions	Ann Emerg Med	1990	19	10	1129	1132	腸洗浄／活性炭	in vitro		STUDY OBJECTIVES: The purpose of this study was to address the issues of safety and efficacy of combining whole-bowel irrigation and activated charcoal administration for the treatment of toxic ingestions. STUDY DESIGN: Two in-vitro studies were performed. In the first, serial ratios of polyethylene glycol (PEG) and activated charcoal (AC) powders were added to water and the solutions were analyzed for PEG concentration and osmolality. In the second, serial ratios of a pharmaceutical bowel irrigation solution and an AC preparation were combined with a constant amount of salicylic acid. Solution osmolalities, PEG, and salicylic acid concentrations were then quantified. RESULTS: Adsorption of PEG powder by AC was demonstrated; however, changes in solution osmolality were negligible. Thus, concurrent administration of these therapies appears safe. However, combining bowel irrigation solution with AC resulted in decreased salicylic acid adsorption. This was especially so
Keller RE, Schwab RA, Krenzelok EP, et al.	Contribution of sorbitol combined with activated charcoal in prevention of salicylate absorption	Ann Emerg Med	1990	19	6	654	656	下剤／活性炭	ヒトモデル実験		The use of cathartics and activated charcoal in treating toxic ingestions has become a standard treatment modality. Sorbitol has been shown to be the most rapidly acting cathartic, but its therapeutic significance has been debated. Using a previously described aspirin overdose model, ten healthy volunteers participated in a crossover design study that investigated the effect of activated charcoal alone versus that of activated charcoal and sorbitol in preventing salicylate absorption. In phase 1 of the study, subjects consumed 2.5 g aspirin followed by 25 g activated charcoal one hour later. Urine was collected for 48 hours and analyzed for quantitative salicylate metabolites. Phase 2 was identical except that 1.5 g/kg sorbitol was consumed with the activated charcoal. The mean amount of aspirin absorbed without the use of sorbitol was 1.26 +/- 0.15 g, whereas the mean absorption was 0.912 +/- 0.18 g with the addition of sorbitol. This is a 28% decrease in absorption of
Underhill TJ, Greene MK, Dove AF	A comparison of the efficacy of gastric lavage, ipecacuanha and activated charcoal in the emergency management of paracetamol overdose	Arch Emerg Med	1990	7	3	148	154	胃洗浄／活性炭／催吐	臨床研究		The aim of this prospective trial was to compare the efficacy of gastric lavage, activated charcoal and ipecacuanha at limiting the absorption of paracetamol in overdose and to assess the significance of the continued absorption of paracetamol following treatment. Patients aged 16 and over who had ingested 5 gms or more of paracetamol within 4h of admission were entered into the trial. The percentage fall in plasma paracetamol level was used as the measure of the success of a treatment at limiting absorption. The mean percentage fall was 39.3 for gastric lavage, 52.2 for activated charcoal and 40.7 for ipecacuanha, with a significant difference between the treatment methods (p = 0.03). Activated charcoal was more effective at limiting the absorption of paracetamol following overdose than either gastric lavage or ipecacuanha induced emesis. In treated patients continuing paracetamol absorption is not significant if more than 2h have elapsed since ingestion.
Teshima D, Suzuki A, Otsubo K, Higuchi S, Aoyama T, Shimozono Y, Saita M, Noda K	Efficacy of emetic and United State pharmacopoeia ipecac syrup in prevention of drug absorption	Chem Pharm Bull	1990	38	8	2242	2245	催吐	動物実験		The efficacy of both the emetic syrup prepared in the previous report and the United States Pharmacopoeia (USP) ipecac syrup concerning the prevention of drug absorption was investigated in 4 beagle dogs using a randomized and cross-over design. In order to control the intragastric pH of the beagle dogs, the administration of pentagastrin or hydrochloric acid (HCl)-glycine buffer (pH 1.5) was tested. The intragastric pH changed from 7.2 to 1.8 with the intramuscular administration of pentagastrin, but the primary emesis occurred more slowly. On the other hand, the HCl-glycine buffer (pH 1.5) gave the appropriate emesis. Therefore, the HCl-glycine buffer (pH 1.5) was used to control the intragastric pH of the beagle dogs. Acetaminophen (AcA), salicylic acid (SA) and kanamycin (KM) as markers were administered orally after conditioning the intragastric pH at 1.5. The emetic syrup or the USP ipecac syrup was then administered. The recovery rate of AcA and KM from vomit

Remmert HP, Olling M, Slob W, van der Giesen WF, van Dijk A, Rauws AG	Comparative antidotal efficacy of activated charcoal tablets, capsules and suspension in healthy volunteers.	Eur J Clin Pharmacol	1990	39	5	501	505	活性炭	ヒトモデル実験		The efficacy of several formulations of activated charcoal (AC) was compared by measuring the intestinal absorption of a solution of 1 g paracetamol administered 2 min before administration of 5 g AC as suspension (200 ml), tablets (40 of 125 mg) or capsules (25 of 200 mg). The suspension medium without AC was used as the control treatment. Based on the results of a pilot experiment, an 8 subject panel was used in a two 4 x 4 Latin square design. All treatments with AC resulted in a statistically significant decrease in paracetamol absorption compared to the control treatment. The suspension was considerably and significantly more effective than the tablets or capsules. Treatment with tablets was slightly but significantly more effective than capsules. The intake of large numbers of tablets and capsules was difficult. In the hospital AC suspensions are available. For first aid elsewhere, at home, at the working place or in the general practitioner's surgery a preservable and
Al-Shareef AH, Buss DC, Routledge PA	Drug absorption to charcoals and anionic binding resins	Hum Exp Toxicol	1990	9		95	97	活性炭	in vitro		1. The in-vitro binding of four drugs with differing physiochemical properties to two commercial charcoal preparations and two anionic binding resins was studied at 37 degrees C and pH 7.4. 2. The two charcoal preparations (Carbomix and Medicoal) behaved similarly and adsorbed metoclopramide and antipyrine to a greater degree than warfarin or paracetamol. 3. Cholestyramine had a significantly greater maximum adsorption capacity (K2) for warfarin and significantly lower adsorption capacity for paracetamol and metoclopramide than did the charcoals. 4. Colestipol behaved similarly but also bound metoclopramide to a significantly greater extent than did either cholestyramine or charcoal and antipyrine to a significantly lesser extent than did Carbomix. 5. There appeared to be no consistent relationship between the maximum adsorption capacity of the adsorbents for the drugs tested and the physicochemical properties of those drugs (e.g. basic or acidic structure, pKa
Al-Shareef AH, Buss DC, Allen EM, Routledge PA	The effects of charcoal and sorbitol (alone and in combination) on plasma theophylline concentrations after a sustained-release formulation	Hum Exp Toxicol	1990	9	3	179	182	活性炭／下剤	ヒトモデル実験		1. The effects of charcoal and sorbitol, alone and in combination, were investigated in eight healthy female volunteers who received 600 mg slow-release theophylline (two 300 mg capsules). 2. The area under the plasma concentration time curve to 24 h (AUC0-24) after theophylline alone was significantly greater than after both the charcoal and charcoal plus sorbitol phase. 3. Charcoal and charcoal with sorbitol also significantly reduced the maximum plasma theophylline concentration (Tmax) and time to maximum concentration (Cmax). 4. Sorbitol significantly increased Cmax and shortened Tmax. 5. Although sorbitol did not reduce the adsorptive efficacy of charcoal, its use alone may be deleterious in poisoning with sustained-release
Silberman H, Davis SM, Lee A	Activated charcoal aspiration	NC Med J	1990	51	2	79	80	活性炭			
Perry PA, Dean BS, Krenzelok EP	Corneal damage caused by syrup of ipecac: acase report	Vet Hum Toxicol	1990	32	4	361		催吐	症例報告	会議録	
Greb WH, Buscher HD, Dierdorf HW, von Schrader HW,	Ability of charcoal to prevent absorption of paroxetine	Acta Psychiatr Scand	1989	80	Suppl 350	156	157	活性炭			
Tandberg D, Murphy LC	The knee-chest position does not improve the efficacy of ipecac-induced emesis	Am J Emerg Med	1989	7	3	267	270	催吐	ヒトモデル実験		Previous studies have shown that ipecac-induced emesis, even if instituted very early, removes only a mean of 28% to 45% of an ingested tracer. Because vomiting is an ancient reflex that occurs in mammals, reptiles, and other animals, we speculated that, in humans, maintaining a sitting rather than a horizontal posture during induced emesis might decrease the efficacy of gastric emptying. To test this hypothesis, 20 normal fasting adult subjects underwent induced emesis in the knee-chest position on one day and in the sitting position on another. Twenty-five 100-micrograms tablets of cyanocobalamin were ingested as a tracer along with 250 mL tap water. Ten minutes after tracer ingestion, 30 mL ipecac syrup and 640 mL tap water were swallowed. All resulting vomitus was homogenized, frozen, and later assayed for cobalt using atomic absorption spectrophotometry. There was no difference in mean tracer recovery with the two positions: knee-chest, 47.2% v sitting,
Van Ameyde KJ, Tenenbein M.	Whole bowel irrigation during pregnancy	Am J Obstet Gynecol	1989	160	3	646	647	腸洗浄	症例報告		Whole bowel irrigation is a routine colonoscopic preparatory procedure. It has been advocated as a method of cleansing the alimentary canal of poisons after acute overdose. Its use during pregnancy has not been described for either indication. We report a case of an iron overdose during the third trimester treated with whole bowel irrigation without complication.
McNamara RM, Aaron CK, Gemborys M, David-heiser S	Efficacy of charcoal cathartic versus ipecac in reducing serum acetaminophen in a simulated overdose	Ann Emerg Med	1989	18		934	938	活性炭／下剤／催吐	ヒトモデル実験		The traditional role of gastric emptying as the initial step in the management of the poisoned patient has recently been questioned; immediate activated charcoal administration has been recommended by some. In the setting of acetaminophen overdose, ipecac-induced emesis may interfere with subsequent oral antidotal therapy. Therefore, we conducted a study to compare the efficacy of initial therapy with ipecac with therapy with activated charcoal-cathartic in a simulated acetaminophen overdosage. Ten healthy volunteers participated in a randomized, crossover trial. Subjects ingested 3.0 g acetaminophen, followed by either no intervention, 30 mL syrup of ipecac, or 50 g activated charcoal-sorbitol solution at one hour. Serial acetaminophen levels were determined at intervals over eight hours. Both interventions significantly reduced the area under the curve compared with control (P less than .05). When comparing ipecac with activated charcoal-cathartic, no
Tenenbein M.	Whole bowel irrigation and activated charcoal	Ann Emerg Med	1989	18	6	707	708	活性炭／腸洗浄	レター コメント		
Albertson TE, Derlet RW, Foulke GE, Minguillon MC, Tharratt SR.	Superiority of activated charcoal alone compared with ipecac and activated charcoal in the treatment of acute toxic ingestions	Ann Emerg Med	1989	18	1	56	59	活性炭／催吐	臨床研究		A prospective, randomized clinical trial compared the clinical effectiveness of syrup of ipecac and activated charcoal to that of activated charcoal alone in the treatment of acute toxic ingestions. Two hundred adult patients with mild to moderate oral overdoses were entered into the trial. Patients receiving only activated charcoal were discharged from the emergency department in significantly (P less than or equal to .05) less time than those receiving both syrup of ipecac and activated charcoal (6.0 +/- 0.3 vs 6.8 +/- 0.2 hours, respectively). The percentage of patients requiring nonpsychiatric hospitalizations was not significantly different between the two groups (11.2% vs 14.0%, respectively). For the hospitalized patients, the length of time spent in the ICU and in the hospital was not statistically different between the two groups. A complication rate of 5.4% was found with the ipecac and activated charcoal treatment compared with a 0.9% complication rate in the activated charcoal group (P less than or equal to .05). Three episodes of aspiration
Dillon EC Jr, Wilton JH, Barlow JC, Watson WA	Large surface area activated charcoal and the inhibition of aspirin absorption	Ann Emerg Med	1989	18	5	547	52	活性炭	ヒトモデル実験		Activated charcoal's adsorptive capacity, and therefore potential efficacy, is generally related to its surface area. In our study, the efficacy of two activated charcoal preparations, Actidose-Aqua 1,500 m2/g and Super Char, 3,000 m2/g, were compared on the basis of their ability to inhibit aspirin absorption. Twelve healthy male subjects fasted for eight hours before and four hours after a 20 mg/kg oral dose of aspirin. One hour after aspirin dosing, each subject received either no charcoal, 25 g Actidose-Aqua, or 25 g Super Char in a randomized crossover design. Each aspirin dose was separated from the previous dose by at least seven days. Total urine volumes were collected over 12-hour intervals, beginning 12 hours before the aspirin dose and continuing for 72 hours after dosing. Urine salicylate concentration was measured with a colorimetric assay. The fraction of aspirin dose recovered in the urine was 0.96 +/- 0.13, 0.78 +/- 0.18, and 0.50 +/- 0.20 for the control, Actidose-Aqua, and
Mitchell RD, Walberg CB, Gupta RC	In vitro adsorption properties of activated charcoal with selected inorganic compounds	Ann Emerg Med	1989	18		444	445	活性炭	in vitro	会議録	

Vuignier Bl, Oderda GM, Gorman RL, Klein-Schwartz W, Watson WA	Effects of magnesium citrate and clidinium bromide on the excretion of activated charcoal in normal subjects	Ann Pharmacother	1989	23		26	29	活性炭／下剤	ヒトモデル実験		The efficacy of cathartics in shortening the gastrointestinal transit time of activate charcoal (AC) in the presence of drugs that alter gastrointestinal motility has not been determined. We evaluated the effects of magnesium citrate (MC) on the excretion of activated charcoal in healthy volunteers alone and with concurrent administration of the anticholinergic drug clidinium bromide. Forty subjects were randomized to clidinium bromide 5 mg or placebo capsule (PC), followed by activated charcoal 15 g and magnesium citrate or a placebo liquid (PL). The onset and duration of excretion of activated charcoal were noted. Mean onset times for activated charcoal were: group I (CB, MC) 4.5 +/- 2.1 h; group II (CB, PL) 17.0 +/- 10.0 h; group III (PC, MC) 6.3 +/- 5.8 h; and group IV (PC, PL) 20.6 +/- 8.4 h. The onset of excretion of activated charcoal was statistically different in both magnesium citrate groups as compared with the placebo liquid groups. The duration of activated charcoal in
Elliott CG, Colby TV, Kelly TM, Hicks HG	Charcoal lung; Bronchiolitis obliterans after aspiration of activated charcoal	Chest	1989	96		672	674	活性炭	症例報告		Activated charcoal usually provides effective and safe treatment for drug overdose. We describe a patient who developed bronchiolitis obliterans and respiratory failure following aspiration of activated charcoal. This patient had a markedly reduced vital capacity with roentgenographic evidence of airtrapping. Chest roentgenograms did not demonstrate the large amount of charcoal identified at postmortem examination
Weber CA, Santiago RM	Hypermagnesemia; A potential complication during treatment of theophylline intoxication with oral activated charcoal and magnesium-containing cathartics	Chest	1989	95	1	56	59	下剤／活性炭	症例報告		Toxic reaction to theophylline compounds is common. Oral activated charcoal (OAC) is a widely accepted mode of therapy for management of moderate to severe cases of theophylline toxicity. Magnesium-containing cathartics are generally recommended in conjunction with OAC in the treatment of drug or toxin ingestions. We report two cases of hypermagnesemia complicating the treatment of theophylline toxicity with OAC and magnesium citrate. In both patients, the hypermagnesemia contributed significantly to morbidity or mortality. In light of these cases and after review of the literature, we suggest that sorbitol be considered the cathartic agent of choice in the treatment of theophylline toxicity with OAC.
Krenzelok EP	Selection of a gastric decontamination method for poisoning emergencies	Clin Pharm	1989	8	4	294	295	胃洗浄／活性炭／催吐	レタ／コメント		
Mann KV, Picciotti MA, Spevack TA, Durbin DR	Management of acute iron overdose	Clin Pharm	1989	8	10	428	440	腸洗浄／胃洗浄	総説		Treatment of severe iron overdose in two children is described, and the pathophysiology of iron toxicity and management of acute iron poisonings are reviewed. An 11-month-old boy was comatose and in shock several hours after ingesting approximately 50 ferrous sulfate tablets (elemental iron 390 mg/kg). He had hyperglycemia and leukocytosis. Lavage was performed with a solution containing deferoxamine and sodium bicarbonate, and deferoxamine was given by continuous i.v. infusion for 48 hours. The initial serum iron (SI) concentration of 14,250 micrograms/dL decreased to 657 micrograms/dL nine hours after i.v. deferoxamine therapy was initiated. A roentgenogram showed tablets in the stomach and small bowel. Packed red blood cells were administered to treat apparent necrotizing gastroenteritis. SI concentration returned to normal by day three [corrected], and the child recovered. A 2.5-year-old boy was examined 1.25 hr after ingesting an estimated 55 tablets of ferrous gluconate 325 mg (elemental iron 130 mg/kg). Initial SI concentration
Kirshenbaum LA, Mathews SC, Sitar DS, Tenenbein M	Whole bowel irrigation versus activated charcoal in sorbitol for the ingestion of modified-release pharmaceuticals	Clin Pharmacol Ther	1989	46	3	264	271	腸洗浄／活性炭／下剤	ヒトモデル実験		Overdose with modified-release pharmaceuticals is an increasing phenomenon. This study examines whole-bowel irrigation as a potential decontamination strategy after overdose with enteric-coated acetylsalicylic acid and compares it with administration of activated charcoal in sorbitol, which is currently the recommended intervention. A three-phase randomized crossover protocol was used in 10 adult volunteers. Each volunteer ingested nine 325 mg doses of enteric-coated acetylsalicylic acid on three occasions, with at least 1 week between each administration period. Serum samples were analyzed for salicylic acid concentration by HPLC. Both interventions decreased peak salicylic acid concentration, time-to-zero salicylic acid concentration, and AUC when compared with control (p less than 0.01). Whole-bowel irrigation was superior to activated charcoal in sorbitol by all three criteria (p less than 0.05). Adverse effects were qualitatively and quantitatively greater during activated charcoal in sorbitol, and the volunteers preferred whole-bowel irrigation over charcoal in
Kulig K	Gastric lavage and acute poisoning	J Emerg Med	1989	7	4	403	404	胃洗浄	レター コメント		Comment on: J Emerg Med. 1989 Jul-Aug;7(4):373-7
Watson WA, Leighton J, Guy J, Bergman R, Garriott JC	Recovery of cyclic antidepressants with gastric lavage	J Emerg Med	1989	7	4	373	377	胃洗浄	症例シリーズ		The role of lavage fluid volume in recovery of cyclic antidepressant with gastric lavage was determined in 13 patients treated for moderate to severe cyclic antidepressant intoxication. An orogastric tube was placed, gastric contents aspirated, and gastric lavage performed with 60 to 180 mL aliquots of tap water or 0.9% NaCl for irrigation. A volume of 12.8 +/- 4.4 liters of lavage fluid was instilled, and 97.6 +/- 6.9% of this volume was recovered. The recovered aspirate and lavage fluid were inspected for the presence of particulate matter and saved in 4 to 5 liter collections. Determination of cyclic antidepressant and metabolite concentrations was performed using gas chromatography-mass spectrometry, and the amount of cyclic antidepressant recovered was calculated. The mean total amount recovered was 110 mg and ranged from 2.4 mg to 342 mg. Of the total amount recovered, 88% +/- 13% was recovered in the first 4 to 5 liters of lavage fluid. An estimate of the dose ingested was
de Vries MH, Rademaker CM, Geerlings C, Van Dijk A, Noordhoek J	Pharmacokinetic modeling of the effect of activated charcoal on theintestinal secretion of theophylline, using the isolated vascularly perfused rat small intestine	J Pharm Pharmacl	1989		41	528	533	活性炭	動物実験		The effect of activated charcoal administration on the secretion of theophylline from the blood into the intestinal lumen has been examined by use of the rat isolated vascularly perfused small intestine. A closed two compartment model was used to analyse the vascular and luminal concentration-time curves obtained. An equation was derived to calculate the time-dependent intestinal clearance. From control experiments it was concluded that theophylline is secreted by a diffusional transport system through the intestinal wall. The intestinal clearance declined rapidly with time as a result of the concomitant increase in luminal theophylline concentration. After 120 min a steady state between the vascular and luminal perfusate was established. Administration of activated charcoal in the lumen had a profound effect on the kinetics of the drug. The vascular steady state concentration was depressed dramatically. The theophylline clearance remained nearly constant with time, because the blood
Harchelroad F, Cottington E, Krenzelok EP	Gastrointestinal transit times of a charcoal/sorbitol slurry in overdose patients	J Toxicol Clin Toxicol	1989	27	1and 2	91	99	活性炭／下剤	症例シリーズ		Gut decontamination with a slurry of activated charcoal and sorbitol is one of the methods presently available to decrease total body burden of ingested drug. This one year retrospective audit of patients presenting with a history of recent toxic ingestion was designed to determine the time to stool of a charcoal/sorbitol slurry (CSS) when used for differing ingestants. A total of 69 patients received a CSS. 50.7% took less than 6 hours for their first charcoal stool, while 26.1% had emesis of the CSS within 30 minutes of administration. Ingestion of drugs which may increase gastrointestinal transit time (i.e. opioids, cyclic antidepressants) correlated with prolonged time to stool despite treatment with the CSS. Though a prospective, controlled study needs to be performed, variation in dosage of the CSS may be appropriate in select patient groups to offset the effects of the ingestant on bowel motility.
Linakis JG, Lacouture PG, Eisenberg MS, Maher TJ, Lewander WJ, Driscoll JL, Woolf AD	Administration of activated charcoal or sodium polystyrene sulfonate (Kayexalate) as gastric decontamination for lithium intoxication: an animal model.	Pharmacol Toxicol	1989	65		387	389	活性炭／拮抗薬	動物実験		To determine whether sodium polystyrene sulfonate (SPS; Kayexalate) is effective in decreasing the absorption of lithium (Li) and to test the assumption that Li is poorly adsorbed by activated charcoal, 130 mice were administered an orogastric dose of LiCl (250 mg/kg) followed immediately by orogastric SPS (10 g/kg, SPS Group), activated charcoal (6.7 g/kg, AC Group), or water in an equivalent volume (Control Group). Subgroups of each of the 3 groups were sacrificed at 1, 2, 4 and 8 hr after treatment and serum analyzed for Li concentration. Statistical analyses revealed no overall difference between the AC Group and the Control Group. However, the SPS Group differed from both the Control and the AC Group at each time interval, with Li concentrations significantly lower in the SPS Group. These results demonstrate that: 1) SPS, in this study, effectively reduced serum Li concentrations in an in vivo model, and 2) activated charcoal did not.
Banner W, Veltri JC	The case for ipecac syrup	Am J Dis Child	1988	142	6	596		催吐	レタ／コメント		
Arnold M	Ipecac: When prevention fails	Am J Dis Child	1988	142	6	595		催吐	レタ／コメント		

Palatnick W, Tenenbein M	Safety of treating poisoning patients with whole bowel irrigation	Am J Emerg Med	1988	6	2	200	201	活性炭	レター　コメント		
Lambert RJ, Kindler BL, Schaeffer DJ	The efficacy of superactivated charcoal in treating rats exposed to a lethal oral dose of potassium cyanide	Ann Emerg Med	1988	17	6	595	598	活性炭	動物実験		Due to the apparent low binding capacity of activated charcoal for potassium cyanide (KCN) in vitro, the use of oral activated charcoal therapy for oral exposure to cyanide compounds is controversial. In our study, rats were given a lethal oral dose of ground granular KCN (35 or 40 mg/kg) in a gelatin capsule followed immediately by either 4 g/kg of superactivated charcoal in a 20% suspension or a similar volume of deionized water. Signs of cyanide toxicosis occurred rapidly, with a mean time to signs of 3.3 and 2.7 minutes in control animals receiving 35 or 40 mg/kg KCN, respectively. All 26 of the control rats showed signs, and all but one in the 35 mg/kg group died within 19 minutes. Only 12 of 26 rats treated with superactivated charcoal showed signs of KCN toxicosis and eight of those animals died. Oral exposure of rats to lethal doses of KCN can be treated effectively by immediate administration of
Barone JA, Raia JJ, Huang YC	Evaluation of the effects of multiple-dose activated charcoal on the absorption of orally administered salicylate in a simulated toxic ingestion model	Ann Emerg Med	1988	17	1	34	37	活性炭	ヒトモデル実験		The effects of multiple-dose activated charcoal administration on the absorption of orally administered salicylate were evaluated in a simulated overdose model. Thirteen adult volunteers were each given 24 81-mg aspirin tablets during a control phase, and during three randomized treatment periods the volunteers received 50 g activated charcoal for one, two, or three doses (separated by four hours). The control phase and treatment periods were separated by a one-week interval. Urine was collected for 48 hours to determine percent total salicylate excretion. Ten subjects completed all four phases of the study. Mean +/- SD percent recovery of salicylate from urine was: control, 91.0 +/- 6.12; one-dose charcoal, 68.3 +/- 12.46; two-dose charcoal, 65.9 +/- 13.48; and three-dose charcoal, 49.2 +/- 12.48. Each charcoal treatment significantly lowered the absorption of aspirin as compared with the control (P less than .01). There was no significant difference between one-dose and two-dose charcoal regimens. There was a statistically significant
Rosenberg PJ, Livingstone DJ, McLellan BA	Effect of whole-bowel irrigation on the antidotal efficacy of oral activated charcoal	Ann Emerg Med	1988	17	7	681	683	下剤／活性炭	臨床研究		Whole-bowel irrigation was studied in three volunteer subjects and compared with oral activated charcoal as a gastrointestinal decontamination procedure for acute drug overdose. The volunteer subjects were given 650 mg aspirin and were assigned randomly to the following treatment groups: 24-hour urine collection only; immediate whole-bowel irrigation with a polyethylene glycol solution; 50 g oral activated charcoal followed by whole-bowel irrigation; and oral activated charcoal alone. The cumulative 24-hour urinary salicylate excretion was measured in each trial. Catharsis was achieved rapidly with whole-bowel irrigation. Oral activated charcoal without catharsis was most effective in decreasing aspirin absorption (P = .011). These results do not support the routine use of a cathartic in combination with oral activated
Burton BT, Bayer MJ	Gastric emptying: Initial management of the poisoned patient?	Ann Emerg Med	1988	17	7	762	763	活性炭／胃洗浄／催吐	レター　コメント		Comment on Tenenbein M : Efficacy of ipecac-induced emesis, orogastric lavage, and activated charcoal for acute drug overdose Ann Emerg Med 1987;16:838
McNamara RM, Aaron CK, Gemborys M, David-heiser S	Sorbitol catharsis does not enhance efficacy of charcoal in a simulated acetaminophen overdose	Ann Emerg Med	1988	17	3	243	246	下剤／活性炭	ヒトモデル実験		The use of a 70% sorbitol solution has recently been advocated as an adjunct to activated charcoal. This results in rapid and profuse catharsis that could possibly cause fluid and electrolyte imbalance. An investigation was undertaken to determine if sorbitol catharsis enhanced the antidotal efficacy of activated charcoal. Eight healthy volunteers participated in a randomized, crossover trial. Subjects ingested 3 g of acetaminophen followed by either no intervention, 50 g of plain activated charcoal at one hour, or 50 g activated charcoal-sorbitol solution at one hour. Serial acetaminophen levels were determined at intervals over eight hours and side effects noted. Both interventions significantly reduced the area under the curve versus control (P less than .05). The addition of sorbitol did not enhance the efficacy of activated charcoal but did increase the side effects noted. Sorbitol has not been proven effective in enhancing drug removal and has side effects that can be significant in a poisoned patient.
Neuvonen PJ, Kivisto K, Hirvisalo EL	Effects of resins and charcoal on digoxin, carbamazepine and furosemide adsorption	Br J Clin Pharmacol	1988	25	2	229	233	活性炭	ヒトモデル実験		1. The interference of resins and activated charcoal with the absorption of digoxin, carbamazepine and frusemide was studied. 2. In a cross-over study consisting of four phases, single doses of colestipol hydrochloride (10 g), cholestyramine (8 g), activated charcoal (8 g) or water only were given to six healthy volunteers immediately after the simultaneous ingestion of digoxin (0.25 mg), carbamazepine (400 mg) and frusemide (40 mg). Plasma and urine concentrations of the test drugs and the urine volumes were determined up to 72 h. 3. The absorption of digoxin was not reduced by colestipol, moderately (30-40%, P less than 0.05) reduced by cholestyramine and greatly (96%) by charcoal. 4. The absorption of carbamazepine was not decreased by cholestyramine, slightly (10%) by colestipol and greatly (90%) by activated charcoal. 5. The absorption and the diuretic effect of frusemide were significantly diminished by all agents. The bioavailability was reduced by colestipol 80%, by cholestyramine 95% and by activated charcoal 99.5%. 6. The
Menzies DG, Busuttil A, Prescott LF	Fatal pulmonary aspiration of oral activated charcoal	Br Med J	1988	297	6646	459	460	活性炭	症例報告		A 58 year old man with a long history of epilepsy was found unrousable. He took phenobarbitone, carbamazepine. and clonazepam regularly and was presumed to have taken an overdose. Gastric lavage was performed. A loading dose of 50g charcoal in 200 ml water was given via nasogastric tube. Subsequentry, further doses of 12.5g charcoal were administerd hourly after aspiration of the stomach contents. Vomiting occured 12 hours later with pulmonary aspiration of gastric contents. He died 15 days after admission. Necropsy findings included aspiration pneumonia, diffuse pulmonary thromboembolism. Microscopic examination of the lungs showed inflammatory changes with charcoal and crystalline material lying free within alveoli, in alveolar macrophages and histiocytes, and in the sinusoidal histiocytes of the
Danel V, Henry JA, Glucksman E	Activated charcoal, emesis, and gastric lavage in aspirin overdose	Br Med J(Clin Res Ed)	1988	296	6635	1507		胃洗浄／活性炭／催吐	ヒトモデル実験		
Torre D, Sampietro C, Quadrelli C, Bianchi W, Maggiolo F	Effects of orally administered activated charcoal on ciprofloxacin pharmacokinetics in healthy volunteers	Chemiotherapia	1988	7	6	382	386	活性炭	ヒトモデル実験		Ciprofloxacin is a broad-spectrum antibiotic orally active against both gram-positive and gram-negative bacteria. Recent literature indicates that orally administered activated charcoal can alter the bioavailability of many drugs and in vitro studies have demonstrated an interaction with ciprofloxacin. To evaluate in vivo the effects of activated charcoal on ciprofloxacin pharmacokinetics, six healthy volunteers received, according to a cross-over design, either ciprofloxacin 500 mg alone or concomitantly 1 g activated charcoal. The coadministration of the latter drug did not influence any of the considered pharmacokinetic parameters. Activated charcoal at a clinically effective dose, therapeutically used in gaseousness, does not alter ciprofloxacin pharmacokinetics.
Vasquez TE, Evans DG, Ashburn WL	Efficacy of syrup of ipecac-induced emesis for emptying gastric contents	Clin Nucl Med	1988	13	9	638	639	催吐	ヒトモデル実験		Syrup of ipecac (SOI) is a commonly used emetic for toxic ingestions. A preliminary study was undertaken to quantify the efficacy of SOI-induced emesis. Three groups of adult subjects fasted overnight before ingestion of 1 mCi of Tc-99m human serum albumin-sucralfate. Sucralfate is minimally absorbed from the gastrointestinal tract and has a gastric clearance half-time of 90 minutes, approximately equal to that of solid foods. At 5, 30, and 60 minutes after ingestion of radiolabeled sucralfate (RSC), subjects were given a standard dose of 30 ml SOI and 240 ml of water. Gastrointestinal tract images were obtained both at the time of ingestion of RSC and 60 minutes after ingestion of SOI. Regions-of-interest were drawn and activity measured over the stomach and small bowel with correction for physical decay. Those subjects (N =10) treated at 5 minutes after ingestion retained a mean value of 17% of the administered RSC by 60 minutes. The group (N = 5) treated at 30

Hulten BA, Adams R, Askenasi R, Dallos V, Dawling S, Heath A, Volans G	Activated charcoal in tricyclic antidepressant poisoning	Hum Toxicol	1988	7	4	307	310	活性炭／胃洗浄	臨床研究		Tricyclic antidepressants (TCA) bind to activated charcoal both in vitro and in vivo in healthy volunteers after a therapeutic dose of TCA. These findings provide a basis for the routine use of activated charcoal in TCA poisoning. The object of this study was to examine the effect of a single dose of 20 g of activated charcoal in overdose patients. Ninety-one patients from four centres with suspected TCA overdose were entered into a randomized study. Gastric lavage was performed on all patients. Thirty-four received 20 g of activated charcoal and 43 served as controls. Fourteen patients were excluded. Plasma drug concentrations were taken on admission and at 1, 2, 4, 8 and 24 h. The incidence of toxic symptoms was registered during 24 h. There was no significant difference in the area under the plasma drug concentration versus time curve, the peak plasma concentrations or plasma half-lives between the two groups. Toxic symptoms were more frequent in the non-treated groups although this difference was not statistically significant. In patients with TCA
Millar AJ, Rode H, Buchler J, Cywes S	Whole-gut lavage in children using an iso-osmolar solution containing polyethylene glycol (Golytely)	J Pediatr Surg	1988	23	9	822	824	腸洗浄	臨床研究		Whole-gut irrigation with an iso-osmolar solution was assessed in 53 children. The lavage was well tolerated without evidence of fluid or electrolyte shift. The rate of infusion to achieve a clear bowel within six to ten hours was 25 to 35 mL/kg/h.
Postuma R	Whole bowel irrigation in pediatric patients: a comparison of irrigating solutions	J Pediatr Surg	1988	23	8	769	770	腸洗浄	臨床研究		The effect of whole bowel irrigation (WBI) with a polyethylene glycol electrolyte lavage solution (PEG-ELS; 27 children) was compared to the WBI with two electrolytic solutions: normal saline with added potassium chloride (NS; 25 children) and Ringer's injection (RI; 29 children). The PEG-ELS required less volume and time, and did not cause the weight gain, hemodilution, and hyperchloremia associated with use of the electrolytic solutions. A balanced PEG-ELS is preferred in WBI of children
Tenenbein M, Postuma R	Whole bowel irrigation in pediatric patients	J Pediatr Surg	1988	23	1	101	102	腸洗浄	レター　コメント		Comment on ; J Pediatr Surg 1987;22:447
Smilkstein MJ, Steedle D, Kulig KW, Marx JA, Rumack BH.	Magnesium levels after magnesium-containing cathartics	J Toxicol Clin Toxicol	1988	26	3579 6	51	65	下剤	臨床研究		To determine the effect on serum Mg++ levels of oral Magnesium-containing cathartics (MgCC) used in the treatment of suspected drug overdose, a prospective, non-randomized study of 24 cases of suspected drug overdose was conducted. Ten cases admitted to the observation unit were assigned to the single dose MgCC group. Fourteen cases admitted to either the ICU or the observation unit were assigned to the multiple dose MgCC group. Single dose cases received 30 gm of magnesium sulfate (MgSO4) at 0 hours. Multiple dose cases received 3 30 gm doses of MgSO4 at 0, 4, and 8 hours. Mg++ levels were measured prior to each MgSO4 dose and 1 and 4 hours after the final dose in both groups. In the single dose group, there was no difference between baseline Mg++ levels and post MgSO4 levels, and only 2/10 developed slightly elevated levels (2.2, 2.3 mEq/L). In the multiple dose group, levels increased and remained significantly higher than baseline after the second MgSO4 dose, and 9/14 developed elevated levels (2.2 to 5.0 mEq/L). All patients who
Favin FD, Klein-Schwartz W, Oderda GM, Rose SR	In vitro study of lithium carbonate adsorption by activated charcoal	J Toxicol Clin Toxicol	1988	26		443	450	活性炭	in vitro		The purpose of this study was to determine whether lithium carbonate (Li2CO3) is effectively adsorbed by activated charcoal (AC). Either 0 (control), 1.5, 3.0 or 9.0 grams of AC were added to Li2CO3 (300 mg) in distilled deionized water or simulated gastric fluid USP, filtered and and the filtrate analyzed for lithium by flame photometry. Adsorption of lithium was dependent on AC concentration and pH. In water, lithium was 14.7%, 26.5% and 40.4% adsorbed at AC:Li2CO3 ratios of 5:1, 10:1 and 30:1, respectively (p less than 0.05). In simulated gastric fluid, there was no significant adsorption at any of the AC concentrations studied. Since simulated gastric fluid more closely resembles in vivo conditions, the efficacy of AC in lithium carbonate overdoses is questionable but in vivo studies are needed to confirm these findings.
Neuvonen PJ, Olkkola KT	Oral activated charcoal in the treatment of intoxications. Role of single and repeated doses	Med Toxicol Adverse Drug Exp	1988	3	1	33	58	活性炭	総説		Activated charcoal has an ability to adsorb a wide variety of substances. This property can be applied to prevent the gastrointestinal absorption of various drugs and toxins and to increase their elimination, even after systemic absorption. Single doses of oral activated charcoal effectively prevent the gastrointestinal absorption of most drugs and toxins present in the stomach at the time of charcoal administration. Known exceptions are alcohols, cyanide, and metals such as iron and lithium. In general, activated charcoal is more effective than gastric emptying. However, if the amount of drug or poison ingested is very large or if its affinity to charcoal is poor, the adsorption capacity of activated charcoal can be saturated. In such cases properly performed gastric emptying is likely to be more effective than charcoal alone. Repeated dosing with oral activated charcoal enhances the elimination of many toxicologically significant agents, e.g. aspirin, carbamazepine, dapsone,
Tenenbein M	Whole bowel irrigation as a gastrointestinal decontamination procedure after acute poisoning	Med Toxicol Adverse Drug Exp	1988	3	2	77	84	腸洗浄	総説		
Smilkstein MJ. Knapp GL. Kulig KW. Rumack BH.	Efficacy of oral N-acetylcysteine in the treatment of acetaminophen overdose. Analysis of the national multicenter study (1976 to 1985)	New England Journal of Medicine	1988	319	24	1557	1562	解毒剤	多施設臨床研究		During the investigational use of oral N-acetylcysteine as an antidote for poisoning with acetaminophen, 11,195 cases of suspected acetaminophen overdose were reported. We describe the outcomes of 2540 patients with acetaminophen ingestions treated with a loading dose of 140 mg of oral N-acetylcysteine per kilogram of body weight, followed four hours later by 70 mg per kilogram given every four hours for an additional 17 doses. Patients were categorized for analysis on the basis of initial plasma acetaminophen concentrations and the interval between ingestion and treatment. Hepatotoxicity developed in 6.1 percent of patients at probable risk when N-acetylcysteine was started within 10 hours of acetaminophen ingestion and in 26.4 percent of such patients when therapy was begun 10 to 24 hours after ingestion. Among patients at high risk who were treated 16 to 24 hours after an acetaminophen overdose, hepatotoxicity developed in 41 percent--a rate lower than that among historical controls. When given within eight hours of
Litovitz T	In defense of retaining ipecac syrup as an over-the-counter drug	Pediatrics	1988	82		514	515	催吐			
Smilkstein MJ, Smolinske SC, Kulig KW, Rumack BH	Severe hypermagnesemia due to multiple-dose cathartic therapy	West J Med	1988	148	2	208	211	下剤			
Ekins BR, Ford DC, Thompson MI, Bridges RR, Rollins DE, Jenkins RD	The effect of activated charcoal on N-acetylcysteine absorption in normal subjects	Am J Emerg Med	1987	5	6	483	487	活性炭／拮抗薬	ヒトモデル実験		The discovery of the effectiveness of oral antidotes such as N-acetylcysteine (NAC) for acetaminophen poisonings has raised questions about the appropriateness of concomitant administration with activated charcoal. A number of studies have attempted to clarify this question without complete success. This study was designed to evaluate the difference in serum levels of NAC when given with activated charcoal. Nineteen patients completed a two-phase cross-over study in which they served as their own controls. Each subject in phase 1 received 140 mg/kg of diluted, chilled NAC orally, and venous blood samples were drawn for analysis. Phase 2 consisted of a 100-g dose of activated charcoal followed by NAC. Samples were transported immediately and assayed using spectrophotometry. A reduction in peak NAC level of 29% (P less than .02) and a reduction of total area under the curve (AUC) of 39% (P less than .001) was noted. Although it may be preferable to avoid completely the use of activated charcoal when using NAC to treat
Krenzelok EP, Heller MB	Effectiveness of commercially available aqueous activated charcoal products	Ann Emerg Med	1987	16		1340	1343	活性炭	ヒトモデル実験		A human research project was conducted to compare the relative effectiveness of five commercially available aqueous activated charcoal products in 25-g amounts--Acta-Char, Actidose-Aqua, Insta-Char, Liqui-Char, and Super-Char. Seven healthy adult human fasting volunteers participated. The study was double-blinded and subjects served as their own controls. Aspirin 2,592 mg was administered to each subject in the control phase to establish baseline aspirin absorption as measured by serial serum salicylate levels. During each of the five study phases 2,592 mg aspirin and a specific brand of activated charcoal were administered to the subjects and serial serum salicylate levels were drawn. Aspirin absorption was calculated using the trapezoidal rule for measuring the area under the concentration-time curve. Total aspirin absorption was reduced as follows: Super-Char, 57.76%; Actidose-Aqua, 50.42%; Insta-Char, 39.55%; Liqui-Char, 33.40%; and Acta-Char, 27.46%. Although there were large apparent differences in the adsorptive

Tenenbein M, Cohen S, Sitar DS	Efficacy of ipecac-induced emesis, orogastric lavage, and activated charcoal for acute drug overdose	Ann Emerg Med	1987	16	8	838	841	活性炭／催吐／胃洗浄	ヒトモデル実験		The efficacy of ipecac-induced emesis, large-bore orogastric lavage, and activated charcoal as gastrointestinal decontamination procedures after acute drug overdose is unknown. Using an ampicillin overdose model, these three procedures were compared with one another and to a control ingestion in ten human volunteers. Serial serum ampicillin levels were used to compute the areas under the concentration vs time curves (AUC) for each study. The reductions of ampicillin absorption compared to control were as follows: orogastric lavage 32% (NS), ipecac-induced emesis 38% (P less than .01), and activated charcoal 57% (P less than .01). This model examines each intervention in a mutually exclusive fashion. It supports activated charcoal administration as the primary gastrointestinal decontamination procedure after
Dronen SC, Merigian KS, Hedges JR, et al	A comparison of blind nasotracheal and succinylcholine assisted intubation in the poisoned patient	Ann Emerg Med	1987	16		650	652	胃洗浄	Clinical Trial/Randomized Controlled Trial		In the patient obtunded by drug intoxication, the optimal method of airway protection prior to gastric emptying is not clear. We report a prospective randomized trial of two methods of intubation in this patient population. Fifty-two overdose patients with Glascow Coma Scale scores of 12 or less were intubated either orotracheally after succinylcholine administration or nasotracheally. Success rate, time to intubate, difficulty, and complications of intubation were compared for the two groups. We found a success rate of 100% (23 of 23) for succinylcholine assisted intubation (SAI) versus 65% (19 of 29) success with blind nasotracheal intubation (BNI). Mean time to intubate was 64 seconds and 276 seconds in the SAI and BNI groups, respectively. Eighty-six percent (19 of 22) of patients were intubated successfully in less than 120 seconds in the SAI group versus 37% (10 of 27) in the BNI group (P less than .005). In the SAI group, the mean number of attempts was 1.3 per patient,
Freedman GE, Pasternak S, Krenzelok EP	A clinical trial using syrup of ipecac and activated charcoal concurrently	Ann Emerg Med	1987	16	2	164	166	活性炭／催吐	臨床研究		A prospective study was conducted to determine if the emetic effects of syrup of ipecac are preserved when activated charcoal is administered prior to emesis. Ten overdose patients who fulfilled the entrance criteria for the study were administered 60 mL syrup of ipecac by a nasogastric tube followed immediately by 500 mL of tap water. Ten minutes after the ipecac was administered, an aqueous slurry of 50 g activated charcoal diluted to 500 mL was instilled down the nasogastric tube and the tube was removed. Emetic response and time to emesis were recorded. Thirty minutes after emesis subsided, a second dose of 50 g activated charcoal (with sorbitol) was administered orally. Emetic responses were noted in all ten patients. The patients averaged 3.7 emetic episodes. Emesis commenced in an average of 13.8 minutes from the start of ipecac administration and concluded in an average of 45.9 minutes. These results in patients are similar to those
Mauro LS, Mauro VF, Brown DL, Somani P	Enhancement of phenytoin elimination by multiple-dose activated charcoal	Ann Emerg Med	1987	16	10	1132	1135	活性炭	ヒトモデル実験		The effect of multiple-dose activated charcoal on the elimination of intravenously administered phenytoin was studied. Seven normal volunteers received phenytoin sodium 15 mg/kg IV with and without activated charcoal. During the charcoal phase, a total dose of 300 g was administered in repeated doses over 48 hours with sufficient sorbitol to produce one to two bowel movements per day. Serum phenytoin concentrations were determined from one to 72 hours after the infusions and were fitted to a one-compartment linear elimination model. The administration of multiple-dose activated charcoal reduced the phenytoin half-life from 44.5 to 22.3 hours. In addition, phenytoin area under the curve was decreased and the elimination rate was increased. Multiple-dose activated charcoal is effective in enhancing the elimination of phenytoin in normal volunteers. Although future studies are needed to determine its role in treating patients with phenytoin toxicity, multiple-dose activated charcoal may provide a readily available, inexpensive therapeutic
Krenzelok E.	Sorbitol -- a safe and effective cathartic	Ann Emerg Med	1987	16	2	729	730	下剤	レタ／コメント		
Tenenbein M, Cohen S, Sitar DS	Whole bowel irrigation as a decontamination procedure after acute drug overdose	Arch Intern Med	1987	147	5	905	907	腸洗浄	ヒトモデル実験		Whole bowel irrigation, routinely used before colonoscopy, is evaluated as a potential gastrointestinal decontamination procedure for acute drug overdose. Nine adult volunteers, who served as their own controls, each ingested 5.0 g of ampicillin trihydrate on two occasions, one week apart. Whole bowel irrigation with polyethylene glycol electrolyte lavage solution was performed one hour after one ingestion. Serial serum ampicillin levels, electrolytes, osmolalities, body weights, and hematocrits were obtained. The areas under the concentration vs time curves for ampicillin were computed for both groups, and their means were compared. Mean duration of the procedure was 234 minutes and mean volume of infused polyethylene glycol electrolyte lavage solution was 7.7 L. Whole bowel irrigation produced a 67% decrease in ampicillin absorption and there were no significant changes in body weight, hematocrit, serum electrolytes, or osmolality. We conclude that whole bowel irrigation is an
Krenzelok EP, Dean BS	Effectiveness of 15-mL versus 30-mL doses of syrup of ipecac in children	Clin Pharm	1987	6	9	715	7	催吐	臨床研究		The rates at which 15- and 30-mL doses of syrup of ipecac induced emesis within 30 minutes were evaluated in pediatric patients treated for accidental poisoning. A two-year prospective study was conducted to collect data on 4306 pediatric patients (aged one to six years) who received syrup of ipecac to treat accidental poisoning. Patients received either 15-mL (during 1983) or 30-mL (during 1984) doses of syrup of ipecac and 120-240 mL of water or clear liquid. Time of administration and time of the first episode of emesis were reported by the person administering the syrup of ipecac; the difference between these times was recorded as the time to emesis. Successful emesis was defined as emesis within 30 minutes after ipecac administration, while failure was defined as emesis occurring more than 30 minutes after administration. Success and failure rates were compared using chi-square analysis. Syrup of ipecac 15 mL was administered to 1905 patients, resulting in
Knadler MP, Bergstrom RF, Callaghan JT, Obermeyer BD, Rubin A.	Absorption studies of the H2-blocker nizatidine	Clin Pharmacol Ther	1987	42		514	520	活性炭	ヒトモデル実験		The absolute and relative bioavailability of nizatidine, an H2-blocker, was studied in healthy male volunteers. The absolute oral bioavailability, relative to that after intravenous administration, was 98% +/- 14%. The bioavailability of single and multiple oral doses of 150 mg nizatidine was unaffected by concurrent food ingestion; nizatidine may be administered either with or without food. The relative bioavailability of nizatidine was compared when given simultaneously with placebo or Gelusil, 30 minutes after propantheline, or 60 minutes before activated charcoal. Gelusil reduced the amount of nizatidine absorbed by about 10%, charcoal reduced it by about 30%, and propantheline
Goldberg MJ, Spector R, Park GD, Johnson GF, Roberts P	The effect of sorbitol and activated charcoal on serum theophylline concentrations after slowrelease theophylline	Clin Pharmacol Ther	1987	41	1	108	111	活性炭／下剤	ヒトモデル実験		The effect of the addition of sorbitol to an oral regimen of multiple doses of activated charcoal on serum theophylline concentrations was studied after the ingestion of slow-release theophylline in nine healthy male volunteers. At 6, 7, 8, 10, and 12 hours after Theo-24 (1200 mg/70 kg) ingestion, each subject received, in a randomized crossover design, either 300 ml water, 20 gm activated charcoal in water, or 20 gm activated charcoal in water plus 75 ml 70% sorbitol at 6 and 8 hours only. The serum AUCs from 6 to 30 hours after Theo-24 ingestion during the water, charcoal, and charcoal plus sorbitol phases were 305 +/- 16, 113 +/- 6, and 85 +/- 10 mg-hr/L (mean +/- SE), respectively. We conclude that the addition of sorbitol to an oral regimen of multiple doses of activated charcoal decreased the serum theophylline concentrations after therapeutic doses of slow-release theophylline to a significantly greater extent than did the activated charcoal regimen alone.
Watson WA	Factors influencing the clinical efficacy of activated charcoal	Drug Intell Clin Pharm	1987	21	2	160	166	活性炭	総説		The use of activated charcoal as part of the treatment of intoxicated patients has increased dramatically over the last ten years. Activated charcoal is currently suggested as therapy to prevent the absorption of orally ingested compounds, and is gaining popularity as a method of increasing systemic drug clearance. This review presents variables that should be considered when activated charcoal is used in the treatment of intoxicated patients. Variables that may alter the efficacy of charcoal therapy include the preparation and dose of charcoal used, the intoxicants involved, stomach contents, the gastrointestinal pH, concurrently administered materials, and time from toxin ingestion to charcoal administration. As a general guideline, a single, large dose should be administered with a cathartic as soon as possible after oral ingestion to prevent drug absorption. When charcoal is used to enhance systemic drug clearance, the dosage regimen should be individualized, based on the drugs

Siefkin AD, Albertson TE, Corbett MG	Isoniazid overdose; pharmacokinetics and effects of oral charcoal in treatment	Hum Toxicol	1987	6	6	497	501	活性炭	ヒトモデル実験		The pharmacokinetics of isoniazid following overdose in two patients is described. One patient was treated with haemodialysis for seizures and persistent coma without obvious immediate clinical improvement. In addition, three volunteer subjects were given isoniazid orally on two separate occasions. Isoniazid elimination pharmacokinetics were determined with and without concominant charcoal. Oral activated charcoal totally prevented the absorption of isoniazid. Current recommendations for treatment of isoniazid overdoses include intravenous pyridoxine (one gram IV pyridoxine for each gram of ingested isoniazid), intravenous diazepam or phenobarbital for continued seizures, and gastric decontamination with lavage and activated charcoal (1 g/kg). Extraordinary measures such as early haemodialysis and haemoperfusion should be reserved for those patients with persistent coma or refractory
Meredith TJ, Vale JA	Treatment of paraquat poisoning in man: methods to prevent absorption	Hum Toxicol	1987	6	1	49	55	催吐／胃洗浄／活性炭／腸洗浄	総説		Theoretically, absorption of an ingested dose of paraquat may be reduced by gastric lavage, induced emesis, whole-gut lavage or by the oral administration of absorbent substances. Animal experiments suggest that paraquat is absorbed poorly from the stomach and absorbed incompletely (less than 5%) from the small intestine over a 1-6 h period. Although gastric lavage would therefore seem a logical way to ameliorate the toxicity of an ingested dose of paraquat, peak plasma concentrations are attained rapidly and evidence for the efficacy of gastric lavage in man is poor. In 1977, a potent emetic (PP796) was added to liquid and solid formulations of paraquat because experiments in primates had demonstrated a fivefold reduction in toxicity. In man, ingestion of formulations containing an emetic is more likely to cause spontaneous vomiting within 30 min than non-emetic preparations. However, definite evidence of benefit, as judged by improved patient prognosis, has yet to be established.
Thompson AM, Robins JB, Prescott LF	Changes in cardiorespiratory function during gastric lavage for drug overdose	Hum Toxicol	1987	6	3	215	218	胃洗浄／循環	臨床研究		Cardiorespiratory function in 42 patients admitted to the Regional Poisoning Treatment Centre, Edinburgh who underwent gastric lavage for self poisoning, was studied using an electrocardiograph and an ear oximeter. Mean pulse rate rose from 92 to 121 beats per min and the mean partial pressure of oxygen fell from 95 to 80 mmHg during lavage (P less than 0.001). These changes were significantly greater in conscious than unconscious patients, in smokers than in non-smokers and most marked in male smokers aged 45 or older. No sex or age differences were noted. Electrocardiograph changes were noted in 41% of patients, including potentially serious changes in 2 patients. The indications for gastric lavage should probably be reviewed particularly in conscious older patients who smoke and due consideration given to induced emesis and ingestion of activated charcoal as alternatives.
Katona BG, Siegel EG, Cluxton RJ	The new black magic: Activated charcoal and new therapeutic uses	J Emerg Med	1987	5	1	9	18	活性炭	総説		Activated charcoal has been used for centuries as antidotal therapy for poisonings. New variations of charcoal therapy have developed over the last two decades. These modifications include multiple-dose activated charcoal (MDAC) therapy, charcoal hemoperfusion, and a new "superactive" charcoal (SAC). Recent literature suggests using initial charcoal therapy instead of ipecac as a first-line antidotal agent for many acute poisonings. The palatability of charcoal slurries has been enhanced by the addition of carboxymethylcellulose, sucrose, saccharin, chocolate syrup, or sorbitol. The new SAC has shown to adsorb 1.7 to 4 times the amount of substance tested compared with other activated charcoal preparations. Multiple-dose activated charcoal therapy has been shown effective in treating phenobarbital, digoxin, digitoxin, theophylline, and dapsone intoxications, among others. The problems associated with charcoal hemoperfusion therapy have been partially alleviated, and it is now alternative therapy for the seriously intoxicated patient.
Tenenbein M	Whole bowel irrigation in iron poisoning	J Pediatr	1987	111	1	142	145	腸洗浄	症例シリーズ		
McCord MM, Okun AL	Toxicity of sorbitol-charcoal suspension	J Pediatr	1987	111	2	307	8	活性炭／下剤	レター　コメント		comment on; J Pediatr 1986;109:719
Grbcich PA, Lacouture PG, Lovejoy FH Jr	Effect of fluid volume on ipecac-induced emesis	J Pediatr	1987	110		970	2	催吐			
Vila JJ, Gutierrez C, Garcia-Sala C, Ruiz S	Whole bowel irrigation: experience in pediatric patients	J Pediatr Surg	1987	22	5	447	450	腸洗浄	レター　コメント		Whole bowel irrigation (WBI) was used in 50 children aged 16 months to 14 years in preparation for surgery (n = 30) and colonoscopy (n = 20). The patients were divided into three groups according to age: group A, 12 to 36 months; group B, 3 to 6 years; and group C, 6 to 14 years. A hydroelectrolytic solution (Na 150 mEq/L, K 30 mEq/L, Cl 130 mEq/L, HCO3 50 mEq/L) was administered to all the groups at a variable rate established according to tolerance, weight, and age. Neomycin (1 g) and erythromycin (50 mg/kg) were administered in the last liter of the solution of the patients being prepared for colorectal surgery. Vital signs (heartbeat, arterial tension, and central venous pressure) and blood parameters (Na, K, HCO3, pH, and Hct) were assessed before and after irrigation and remained stable in all the groups. The rate of administration of the solution was best tolerated in each group as follows: group A, 75 mL/kg/h; group B, 60 mL/kg/h; and group C, 45 mL/kg/h. Colonic
Landsman I, Bricker JT, Reid BS, Bloss RS	Emergency gastrotomy; Treatment of choice of iron bezoar	J Pediatr Surg	1987	22	2	184	185	胃切開	症例報告		The authors believe that gastrotomy and surgical removal of tablets is the treatment of choice in massive iron ingestion with development of an "iron bezoar" unresponsive to gastric lavage. Prompt surgical treatment in such cases may be lifesaving.
Mckinnon RS, Desmond PV, Harman PJ, Kamm M, Ghabrial H, Martin CJ, Mashford ML	Studies on the mechanisms of action of activated charcoal on theophylline pharmacokinetics.	J Pharm Pharmacol	1987	39	7	522	525	活性炭	動物実験		Oral administration of repeated doses of activated charcoal to volunteers and dogs significantly increased the systemic clearance of intravenously administered theophylline and decreased its elimination half-life. This effect is most likely to be due to theophylline entering the gut and being adsorbed onto the charcoal. The mechanism by which intravenously administered theophylline enters the gut has been examined. Its biliary excretion after intravenous administration to patients with T-tube biliary drainage accounted for 0.28% of the dose and a similarly small biliary excretion was found in dogs. In the latter total biliary diversion had no effect on the clearance or half-life of theophylline after intravenous administration. In two dogs the theophylline content of jejunal aspirate was comparable with that of simultaneously withdrawn venous plasma samples. These results suggest that the presence of charcoal in the gut represents a sink adsorbing theophylline entering the lumen by diffusion across
Amitai Y, Lovejoy FH Jr	Characteristics of vomiting associated with acute sustained release theophylline poisoning: implications for management with oral activated charcoal	J Toxicol Clin Toxicol	1987	25	7	539	554	活性炭	臨床研究		Vomiting in acute theophylline toxicity has assumed increased clinical importance since the introduction of multiple dose activated charcoal therapy. We performed a prospective study of 26 patients with acute overdose of sustained release theophylline to characterize vomiting, and its possible interference with the acceptance of activated charcoal. Twenty five of 26 patients vomited. The duration of vomiting correlated with both peak serum theophylline concentrations (p less than 0.001) and the duration of theophylline toxicity (p less than 0.001). Vomiting extended over 63% of the drug's absorptive phase (the time interval between ingestion and the peak level) and 49% of the elimination phase (the time interval between the peak level and decrease of theophylline level to less than 20 mcg/ml). Patients with peak serum theophylline concentrations less than 70 mcg/ml were able to accept larger amounts of activated charcoal than patients with serum theophylline
Morris ME, Le Roy S, Sutton SC	Absorption of magnesium from orally administered magnesium sulfate in man	J Toxicol Clin Toxicol	1987	25	5	371	382	下剤	ヒトモデル実験		The use of magnesium sulfate (Epsom salt) as a cathartic in patients with impaired renal function can lead to severe toxicity due to hypermagnesemia. Although toxicity is uncommon in healthy subjects, little is known concerning the extent of absorption of magnesium after a cathartic dose of magnesium sulfate. The bioavailability of magnesium following a large oral dose of magnesium sulfate in normal volunteers was examined in the present investigation. Baseline 24-hour urinary excretion rates of magnesium and creatinine were determined over 3 consecutive days in 6 healthy men. The oral administration of 13.9 g (56.5 mmoles) magnesium sulfate U.S.P., in 4 equal hourly increments, resulted in the urinary excretion (corrected for baseline excretion rate) of 4.0 +/- 2.9% (mean +/- SD) of the dose of magnesium during the first 24 hours and 6.9 +/- 7.0% of the dose during a 72-hour interval. Magnesium sulfate administration had no effect on the 24-hour urinary excretion rate of creatinine. The baseline excretion rate of magnesium was

Oderda GM, Klein-Schwartz W, Insley BM	In vitro study of boric acid and activated charcoal	J Toxicol Clin Toxicol	1987	25	1and 2	13	19	活性炭	in vitro		An in-vitro study utilizing a titration assay was performed to evaluate the degree of adsorption of one gram of boric acid by 7.5 g, 15.0 g and 30.0 g of activated charcoal. The mean percentage adsorbed was 5.7 +/- 1.6% for 7.5 g of activated charcoal, 17.6 +/- 3.5% for 15.0 g of activated charcoal and 38.6 +/- 6.3% for 30.0 g of activated charcoal. Analysis of variance showed a significant difference from the control (no activated charcoal) for the 15.0 and 30.0 g samples (p less than 0.05). Although binding of boric acid by activated charcoal increased as the proportion of activated charcoal to boric acid increased, this finding is not clinically significant since the amount of activated charcoal required for 38% adsorption is 30 times the amount of boric acid ingested. Considering the toxic and potentially fatal doses of boric acid in children (5 g) and adults (20 g), doses of activated charcoal of greater than 150 g in children or 600 g in adults would be impractical for the clinical situation.
Curd-Sneed CD, Parks KS, Bordelon JG, Stewart JJ	In vitro adsorption of sodium pentobarbital by superchar, USP and Darco G-60 activated charcoals	J Toxicol Clin Toxicol	1987	25	1and 2	1	11	活性炭	in vitro		This study was designed to examine the in vitro adsorption of sodium pentobarbital by three activated charcoals. Solutions of sodium pentobarbital (20 mM) were prepared in distilled water and in 70% sorbitol (w/v). Radiolabeled (14C) sodium pentobarbital was added to each solution to serve as a concentration marker. Two ml of each drug solution was added to test tubes containing 40 mg of either Darco G-60, USP, or SuperChar activated charcoal. The drug-charcoal mixtures were incubated at 37 degrees C for O, 2.5, 5, 7.5 or 10 min. Equilibrium, indicated by a constant percentage of drug bound for two consecutive time periods, was established immediately for the aqueous mixtures and for Darco G-60 in sorbitol. The time to equilibrium was prolonged for USP (2.5 min) and SuperChar (5 min) in the presence of sorbitol. In the second series of experiments, solutions of sodium pentobarbital (1.25 to 160 mM) were prepared in either distilled water or sorbitol. Amount of drug bound by 10 to 320 mg of activated charcoal within a 10 min incubation period was
Shannon M, Amitai Y, Lovejoy FH Jr	Multiple dose activated charcoal for theophylline poisoning in young infants	Pediatrics	1987	80		364	367	活性炭	症例シリーズ		Five cases are presented in which multiple doses of activated charcoal were given to infants 6 months of age or less, as treatment of theophylline overdose. This therapy was tolerated in all cases with apparent enhancement of theophylline elimination. Use of multiple dose activated charcoal appears to be a viable option in the treatment of young infants with theophylline poisoning.
Greensher J, Mofenson HC, Caraccio TR	Ascendency of the black bottle (activated charcoal)	Pediatrics	1987	80		949	951	活性炭			
Amitai Y, Mitchell AA, McGuigan MA, Lovejoy Jr FH	Ipecac-induced emesis and reduction of plasma concentrations of drugs following accidental overdose in children	Pediatrics	1987	80		364	367	催吐	臨床研究		Syrup of ipecac is widely used following accidental drug overdosage in children. Proof of its efficacy, however, in reducing the risk of poisoning is limited. We prospectively studied the effect of early v late induction of emesis by ipecac in 50 children younger than 5 years of age with accidental acetaminophen poisoning. The mean estimated ingested dose was 165 mg/kg, and all patients vomited within 15 to 255 (mean 78) minutes postingestion. Although the predicted four-hour plasma acetaminophen concentration was 97 +/- 4 micrograms/mL (mean +/- SEM, calculated on the basis of the estimated ingested dose), the measured four-hour plasma acetaminophen concentration was 34 +/- 5 micrograms/mL (P less than .01). To assess the efficacy of early v late ipecac-induced emesis, we used the ratio of measured to predicted four-hour acetaminophen plasma concentration. The ratio of the measured to predicted four-hour level increased as the delay in time to vomiting increased (r = .60, P less than .001). Ipecac syrup was administered more promptly when
Knight KM, Doucet HJ	Gastric rupture and death caused by ipecac syrup	South Med J	1987	80	6	786	7	催吐	症例報告		We have reported a fatal complication of a therapeutic dose of ipecac syrup administered in a hospital emergency room. This child received 15 ml of ipecac syrup shortly after ingesting one to five tablets of chlorpheniramine maleate (4 mg). A prolonged course of vomiting (more than 24 hours) eventually resulted in gastric rupture and death. While the use of ipecac is both efficacious and safe in the overwhelming majority of cases, there have been documented fatalities after appropriate doses. For this reason, ongoing education for physicians is important; education of parents is also warranted since wide-scale distribution to families is the accepted standard. Because most patients stop vomiting within two to three hours after ipecac administration, we recommend that children with persistent vomiting should be observed in a medical facility, where electrolyte levels can be measured and fluids can be
Galey FD, Lambert RJ, Busse M, Buck WB	Therapeutic efficacy of superactive charcoal in rats exposed to oral lethal doses of T-2 toxin.	Toxicon	1987	25		493	499	活性炭	動物実験		Superactive charcoal, a compound known to complex with many toxins, was evaluated in this study for its effectiveness in preventing death in rats given an oral lethal dose of 8 mg/kg body weight of T-2 toxin. The median effective dose of oral superactive charcoal in preventing deaths in rats was 0.175 g/kg body weight. Concurrent use of cathartics, such as sorbitol, magnesium sulfate and sodium sulfate, to facilitate removal of the superactive charcoal:T-2 toxin complex formed in vivo did not enhance the survival rates of rats. One gram per kilogram body weight oral superactive charcoal enhanced survival times and survival rates in rats given 8 mg/kg of T-2 toxin as late as 3 hr after the T-2 toxin was administered. Some benefit in survival rate may be derived from giving the superactive charcoal as late as 5 hr after the T-2 toxin.
Caldwell JW, Nava AJ, DeHaas DD	Hypernatremia associated with cathartics in overdose management	West J Med	1987	147	5	593	596	下剤	症例報告		
Tandberg D, Diven BG, McLcod IW	Ipecac-induced emesis versus gastric lavage: a controlled study in normal adults	Am J Emerg Med	1986	4	3	205	209	胃洗浄／催吐	ヒトモデル実験		Ipecac-induced emesis and gastric lavage are the two procedures most widely used to evacuate the stomachs of patients who have ingested poisons. To resolve a long-standing controversy over the relative efficacy of these two methods, the authors carried out a controlled study in which they administered 25 100-micrograms tablets of cyanocobalamin (vitamin B12) to 18 fasting normal adult volunteers on two separate days. On one day, each subject had emesis induced with 30 ml of ipecac syrup followed by 1,000 ml of tap water; on another day, each underwent gastric aspiration and lavage with a 1.1-cm orogastric tube using 3 l of fluid. Both procedures were begun 10 minutes after the ingestion. The recovered vomitus or gastric washings from each procedure were then analyzed for elemental cobalt using atomic absorption spectrophotometry. The mean rate of recovery of the ingested tracer with ipecac-induced emesis was only 28%, whereas gastric lavage resulted in retrieval of 45% (paired t-test, P less than 0.005). In this study, carefully
Litovitz TL	Emesis versus lavage for poisoning victims	Am J Emerg Med	1986	4	3	294	295	胃洗浄／催吐	レター　コメント		Comment on Am J Emerg Med 1986; 4:205
Auerbach PS, Osterloh J, Braun O, Hu P, Geehr EC, Kizer KW, McKinney H	Efficacy of gastric emptying; Gastric lavage versus emesis induced with ipecac	Ann Emerg Med	1986	15	6	692	698	胃洗浄／活性炭	臨床研究		A prospective study was done to compare the efficacy of gastric emptying achieved by gastric lavage (GL) with that of ipecac-induced emesis (IE) in victims of drug overdose. Thiamine was used as a marker of recovery in gastric samples, as measured by ion exchange/ion pair high-performance liquid chromatography. There were 51 patients in the IE group and 37 in the GL group. GL produced a higher mean percent recovery of thiamine than did IE (90% +/- 34% compared with 50% +/- 35%). There was a significant difference between the two groups (P less than .001). Recovery of thiamine was more than 70% in 28% of the IE patients, and exceeded 70% in 75% of GL patients. When gastric emptying is desired for management of the adult overdose victim, the use of GL maximizes the chance of recovering unabsorbed liquid drugs
Jones J, Heiselman D, Dougherty J, Eddy A	Cathartic-induced magnesium toxicity during overdose management	Ann Emerg Med	1986	15		1214	1218	下剤	症例報告		A 39-year-old women was admitted to the hospital following a large ingestion of a tricyclic antidepressant. The administration of magnesium citrate in repeated doses with activated charcoal resulted in a striking increase in serum magnesium levels followed by acute neuromuscular deterioration and respiratory depression. The patient required dialysis for control of hypermagnesemia. Her clinical condition improved slowly without further complication and she was discharged to a rehabilitation center.

Lim DT, Singh P, Nourtsis S, Dela Cruz R	Absorption inhibition and enhancement of elimination of sustained-release theophylline tablets by oral activated charcoal	Ann Emerg Med	1986	15	11	1303	1307	活性炭	ヒトモデル実験		The effect of orally administered activated charcoal (OAC) on the first 12 hours of absorption and elimination of sustained-release theophylline tablets (SRT) was investigated in 20 normal children ages 8 to 18 years. The theophylline absorption-elimination characteristic of all subjects was determined after ingestion of 10 mg/kg SRT. Blood for theophylline was sampled at 0, two, four, six, eight, ten, 12, and 24 hours. After a 72-hour theophylline washout period, the subjects were assigned randomly to one of four study groups and received 10 mg/kg SRT. OAC then was given as a single dose one hour later to Group 1 subjects. Group 2 subjects took four doses of OAC at three-hour intervals beginning at one hour after SRT dosing. Group 3 subjects also received four doses of OAC at three-hour intervals with the first dose given three hours after SRT; Group 4 subjects received three doses at similar intervals with the first dose administered six hours after SRT dosing. OAC administration reduced the 12-hour area under the concentration time
Czajka PA, Konrad JD	Saline cathartics and the adsorptive capacity of activated charcoal for aspirin	Ann Emerg Med	1986	15	5	548	551	活性炭／下剤	in vitro		The influence of three saline cathartics and tap water on the adsorption characteristics of activated charcoal for aspirin was studied with adsorption isotherms. Compared with distilled water, the adsorptive capacity of activated charcoal for aspirin was not significantly altered by magnesium sulfate, sodium sulfate, or tap water. Pretreating activated charcoal with magnesium citrate reduced the adsorptive capacity of activated charcoal by 15% (P less than .05). There was no significant correlation between mean pH values and adsorptive capacities in all test solutions. None of the saline cathartic solutions apparently displaced aspirin that already was adsorbed by activated charcoal.
Gaudreault P, McCormick MA, Lacouture PG, Lovejoy FH Jr	Poisoning exposures and use of ipecac in children less than 1 year old	Ann Emerg Med	1986	15		808	810	催吐	臨床研究		Poison exposures in children less than 1 year old and the safety and efficacy of syrup of ipecac in children 9 to 12 months old were evaluated in a prospective eight-month study conducted at the Massachusetts Poison Control Center. Poison exposures in children less than 1 year old represented approximately 9% of the 38,080 calls received. Mobile children (in walkers, crawling, or walking) were at the greatest risk of poisoning. The majority of children (94%) were asymptomatic and none were hospitalized or died. The products involved were primarily plants (38%) and household products (30%). All 21 patients, ages 9 to 12 months, were given 10 mL syrup of ipecac under medical supervision and vomited within one hour. The mean time to vomit was 21.7 (SEM +/- 2.8) minutes. The patients vomited 3.3 (SEM +/- 0.3) times and all episodes of vomiting abated by 26.4 (SEM +/- 6.6) minutes. No significant side effects were noted. The use of the syrup of ipecac in the 9- to 12-
Wald P, Stern J, Weiner B, Goldfrank L	Esophageal tear following forceful removal of an impacted oral-gastric lavage tube	Ann Emerg Med	1986	15	1	80	82	胃洗浄	症例報告		We report an unusual complication of oral-gastric lavage in a drug overdose patient. During the lavage procedure, the oral-gastric tube became impacted in the esophagus. Forceful removal of the tube resulted in an esophageal tear. The patient did well with conservative management and was discharged with no long-term sequelae.
Park GD, Spector R, Goldberg MJ, Johnson GF	Expanded role of charcoal therapy in the poisoned and overdosed patient	Arch Intern Med	1986	146		969	973	活性炭	総説		Activated charcoal is widely used as an adsorbent for the management of patients with drug overdoses and poisonings. Activated charcoal can be used orally to prevent drug and poison absorption in cases of overdose and poisoning. Multiple oral doses of charcoal increase the elimination of several, but not all, drugs and poisons. The effectiveness of multiple oral doses of charcoal in accelerating drug clearance is dependent primarily on the endogenous clearance of the drug or poison and its volume of distribution. Multiple doses of charcoal are used to shorten the period of supportive care in certain patients or to more rapidly remove drugs or poisons that may cause tissue damage, eg, theophylline. Charcoal is a safe, effective, and inexpensive alternative to more invasive treatments for some cases of drug overdose and
Vale JA, Meredith TJ, Proudfoot AT	Syrup of ipecacuanha: Is it really useful?	Br Med J	1986	293		1321	1322	催吐	レタ／コメント		
Boldy D, Vale JA	Treatment of salicylate poisoning with repeated oral charcoal	Br Med J	1986	292	6513	136		活性炭	レタ／コメント		
Pond SM	A review of the pharmacokinetics and efficacy of emesis, gastric lavage and single and repeated doses of charcoal in overdose patients	Dev Toxicol Environ Sci	1986	12		315	328	胃洗浄／活性炭／催吐	総説		
Jian R, Cortot A, Ducrot F, Jobin G, Chayvialle JA, Modigliani R	Effect of ethanol ingestion on postprandial gastric emptying and secretion, biliopancreatic secretions, and duodenal absorption in man	Dig Dis Sci	1986	31	6	604	614	胃洗浄／催吐	ヒトモデル実験		Although abdominal complaints are frequent in both acute and chronic alcoholism, little is known of the effect of ingestion of ethanol with a meal on the function of the upper digestive tract. We have studied the effects of oral ethanol (1 g/kg body wt) taken with food on the gastric emptying rate of a solid-liquid meal as measured by a dual radioisotope technique in six normal subjects; and the gastric response (emptying and secretion), biliopancreatic secretions, and duodenal nutrient absorption after an homogenized meal, as evaluated by a gastroduodenal intubation-marker perfusion technique on seven healthy volunteers. In the latter experiments, radioimmunoassays of gastrin, secretin, cholecystokinin, pancreatic polypeptide, motilin, somatostatin, gastric inhibitory polypeptide, and vasoactive intestinal polypeptide were performed serially. As compared with the control experiment, alcohol induced the following effects: marked delay of gastric emptying of solids, smaller slowing
Brady CE 3rd, DiPalma JA, Morawski SG, Santa Ana CA, Fordtran JS	Urinary excretion of polyethylene glycol 3350 and sulfate after gut lavage with a polyethylene glycol electrolyte lavage solution.	Gastroenterology	1986	90	6	1914	1918	腸洗浄	臨床研究		Ingestion of an electrolyte lavage solution containing polyethylene glycol 3350 and sulfate is an effective method of cleansing the colon for diagnostic studies. Polyethylene glycol and sulfate are considered poorly absorbed from the gastrointestinal tract. Because of the quantities administered, concern exists about potential toxicity of absorption of even a small percentage, particularly for polyethylene glycol. We measured the urinary excretion of both polyethylene glycol and sulfate in normal subjects and inflammatory bowel patients. Absorption of polyethylene glycol can be assessed by measuring recovery in urine, as 85%-96% of an intravenous load is excreted in urine. Similarly, appreciable sulfate absorption would exceed renal tubular reabsorption and result in increased urinary excretion. Mean percent polyethylene glycol load recovered in urine was minimal and similar for normal (0.06%) and inflammatory bowel (0.09%) subjects. Urinary sulfate excretion after
Hulten BA, Heath A, Mellstrand T, Hedner T	Does alcohol absorb to activated charcoal?	Hum Toxicol	1986	5	3	211	212	活性炭	ヒトモデル実験		Activated charcoal seldom is used in pure-alcohol poisoning since it is absorbed rapidly from the gut. Furthermore in early reports activated charcoal was found to adsorb alcohol poorly. However, in 1981 North et al. [North, D. S., Thompson, J. D. & Peterson, C. D. (1981). Am. J. Hosp. Pharm., 38, 864-866] demonstrated in dogs that charcoal given at the same time as alcohol can reduce the blood alcohol concentration significantly. To study whether charcoal is of value in a clinical situation, a randomized cross-over study in two phases was conducted. Each person drank 88 g of alcohol and 30 min after either 20 g of activated charcoal was taken or the same volume of water was drunk. There were no significant differences in plasma alcohol concentrations
Neuvonen PJ, Olkkola KT	Effect of purgatives on antidotal efficacy of oral activated charcoal	Hum Toxicol	1986	5	4	255	263	活性炭／下剤	ヒトモデル実験		The effects of purgatives on the antidotal efficacy of oral activated charcoal were studied in seven volunteer subjects. The volunteer subjects were given 1000 mg of aspirin, 100 mg of atenolol and 50 mg of phenylpropanolamine with 100 ml of water on an empty stomach and were assigned randomly to the following treatment groups: after 5 min 150 ml of water, after 5 min 25 g of charcoal, after 5 min charcoal orally with 20 mg of metoclopramide rectally, followed by 10 mg of bisacodyl rectally 3 h afterwards, after 5 min charcoal with 250 ml of magnesium citrate USP and after 60 min charcoal with metoclopramide followed by bisacodyl 3 h thereafter. The plasma concentrations (0-24 h) and the cumulative urinary excretion (0-72 h) of salicylates, atenolol and phenylpropanolamine were measured. Both magnesium citrate and metoclopramide combined with bisacodyl hastened the gastrointestinal transit but magnesium citrate was more effective. Charcoal
Scolding N, Ward MJ, Hutchings A, Routledge PA	Charcoal and isoniazid pharmacokinetics	Hum Toxicol	1986	5	4	285	286	活性炭	ヒトモデル実験		Activated charcoal (10 g) administered 1 h after a 600 mg oral dose of isoniazid to six healthy subjects did not reduce the area under the plasma concentration-time curve for isoniazid significantly. Charcoal administration is unlikely to be of value in isoniazid poisoning if delayed by an hour or more after

Karkkainen S, Neuvonen PJ	Pharmacokinetics of amitriptyline influenced by oral charcoal and urine pH	Int J Clin Pharmacol Ther Toxicol	1986	24	6	326	332	活性炭／利尿	ヒトモデル実験		The effects of orally given activated charcoal, sodium bicarbonate and ammonium chloride on the pharmacokinetics of amitriptyline were studied in 6 volunteers in a randomized, cross-over study. The serum and urine concentrations of amitriptyline and nortriptyline were determined by HPLC for up to 72 h. Activated charcoal (50 g), given within 5 min of the amitriptyline hydrochloride dose (75 mg), reduced its absorption by 99%. When given in repeated doses from 6 h on, 50 g followed by 12.5 g at 6-h intervals, charcoal shortened the serum half-life of amitriptyline by 20% and that of nortriptyline by 35% (p less than 0.05). The renal excretions of amitriptyline and nortriptyline increased 1000-fold by the acidification of urine pH to 4. However, the cumulative excretion of amitriptyline and nortriptyline even into acidic urine only accounted for up to 5% of the dose during 72 h. Since urinary pH has a great influence on the ratio of urinary versus serum amitriptyline and
Laufen H, Leitold M	The effect of activated charcoal on the bioavailability of piroxicam in man	Int J Clin Pharmacol Ther Toxicol	1986	24	1	48	52	活性炭	ヒトモデル実験		The effect of single and multiple oral doses of activated charcoal (a.c.) on the plasma concentrations of piroxicam was investigated in a cross-over study in 6 healthy volunteers after oral and rectal doses of 20 mg piroxicam. 50 g a.c. swallowed 5 min after the oral administration of one capsule of piroxicam almost completely prevented the absorption of the drug. 70 g a.c. per day were given in multiple doses over the interval of 10-58 h after the oral and 2-58 h after the rectal administration of piroxicam. This treatment reduced the mean bioavailability of piroxicam by 41.7% (oral) or 48.8% (rectal), relative to the control. The apparent total clearance increased significantly (p less than 0.05) to 163.6% (oral) or 187.9% (rectal) of the control. Half-lives of elimination were reduced on the average from 40.2 h to 19.6 h after the oral dose and from 40.7 h to 21.6 hours after the rectal dose under the a.c. treatment. It is inferred from these results that piroxicam is subject to enteral circulation. A.c. appears
Lanphear WF	Gastric lavage	J Emerg Med	1986	4	1	43	47	胃洗浄	総説		Gastric lavage has been used to manage toxic ingestions since the early 1800s. The entire realm of gastrointestinal decontamination has been extensively studied for the past 30 years. Recommendations are still evolving and remain controversial. The current indications for lavage are obtundation, unprotected airway, seizures, the need for urgent removal, and the tendency to form concretions. Hydrocarbon management depends on specific toxicity and viscosity. Contraindications for this procedure are insignificant ingestions, prolonged time since ingestion, and caustic poisoning. Proper technique minimizes complications and maximizes toxin removal. Activated charcoal and a cathartic are given after lavage. Complications include nasal trauma, esophageal perforation, tracheal intubation, aspiration, electrolyte imbalance,
Watson WA, Cremer KF, Chapman JA	Gastrointestinal obstruction associated with multiple-dose activated charcoal	J Emerg Med	1986	4	5	401	407	活性炭	症例報告		The development of a gastrointestinal obstruction associated with multiple doses of activated charcoal is described. A carbamazepine-intoxicated patient received 240 g of activated charcoal and a total of 600 mL magnesium citrate with the development of an ileus and a small-bowel obstruction. The patient also had episodes of emesis associated with charcoal administration. This case suggests that the use of multiple doses of activated charcoal may be associated with gastrointestinal obstruction, a previously unreported adverse effect. Further evaluation of the incidence of adverse effects associated with activated charcoal is needed to determine optimal therapeutic regimens.
Farley TA	Severe hypernatremic dehydration after use of an activated charcoal-sorbitol suspension	J Pediatr	1986	109	4	719	722	下剤／活性炭	症例報告		Cathartics should not be administered with each dose of activated charcoal, particularly in infants who are prone to develop electrolyte imbalance. Serious dehydration may result from such repetitive use.･Comment in; J Pediatr 1987;111:307
Rybolt TR, Burrell DE, Shults JM, Kelley AK	In vitro coadsorption of acetaminophen and N-acetylcysteine onto activated carbon powder	J Pharm Sci	1986	75		904	906	活性炭／拮抗薬	in vitro		The in vitro adsorption and coadsorption of acetaminophen and N-acetylcysteine using simulated gastric (pH 1.2) and intestinal (pH 7.0) conditions were examined for a range of charcoal-to-drug ratios between 1 and 7. Although both substances were adsorbed by the activated carbon, the adsorption of acetaminophen was greater than that of N-acetylcysteine for both acidic and neutral pH conditions. In the coadsorption studies, the acetaminophen was always adsorbed to a greater extent than the N-acetylcysteine. These results agree with previous in vivo studies that suggest that the concomitant use of N-acetylcysteine and activated carbon powder is an appropriate treatment for acetaminophen overdose.
Minocha A, Herold DA, Barth JT, Gideon DA, Spyker DA	Activated charcoal in oral ethanol absorption: lack of effect in humans	J Toxicol Clin Toxicol	1986	24		225	234	活性炭	ヒトモデル実験		Activated charcoal has been recommended for use in poisonings by ethanol, other toxic alcohols and glycols, but it has been avoided with therapeutic use of oral ethanol. Six healthy young adults drank a dose of ethanol designed to give a peak concentration of 125 mg/dl on two different days after overnight fasting. Each individual drank the same dose on both occasions; but on one of these days, the subjects drank an aqueous slurry of 60 g of superactive charcoal prior to ethanol ingestion. We compared the pharmacokinetic profile of ethanol with and without activated charcoal treatment. The fraction of ethanol absorbed was similar on both protocols. The mean peak ethanol concentration after pretreatment with activated charcoal was 8% greater than ethanol alone (p = 0.08). Thus oral activated charcoal does not significantly impair ethanol absorption and can be used in patients requiring oral ethanol. Our results do not support the use of activated charcoal in overdose of
Krenzelok EP, Freedman GE, Pasternak S	Preserving the emetic effect of syrup of ipecac with concurrent activated charcoal administration: A preliminary study	J Toxicol Clin Toxicol	1986	24	2	159	166	活性炭／催吐	ヒトモデル実験		Activated charcoal is reported to block the emetic effect of syrup of ipecac. Therefore, activated charcoal administration is commonly delayed until syrup of ipecac induced emesis is complete. The advantages of early administration of activated charcoal have been well documented. Preservation of the emetic effect of syrup of ipecac in the presence of activated charcoal may produce a synergistic effect by enhancing toxin elimination. A study was conducted in ten human volunteers to determine if activated charcoal prevents the emetic effect of syrup of ipecac when a temporal separation exists between administration of the two substances. Syrup of ipecac 60 ml plus water 480 ml was administered via an 18 French nasogastric tube followed by an aqueous slurry of activated charcoal 50 g five minutes later. Eight (80%) of the subjects had emesis in a mean time of 20.25 minutes (range 16-26 min). The total dose of activated charcoal was retained for a mean time of 6.75 minutes (range 0-17
Cordonnier JA, Van den Heede MA, Heyndrickx AM	In vitro adsorption of tilidine HCl by activated charcoal	J Toxicol Clin Toxicol 1986-87;24(6):503-17	1986	24	6	503	517	活性炭	in vitro		In vitro studies were carried out in order to determine the adsorption of tilidine HCl, a narcotic analgesic, by activated charcoal (max. adsorption capacity 185.5 mg/g of charcoal). The path of the adsorption isotherms at pH 1.2 and 7.5 suggests that the in vivo adsorption of tilidine HCl may be increased when the drug passes from the stomach to the intestine, unless the intestinal content exerts a displacing effect. Nevertheless, the adsorption was dependent on the quantity of activated charcoal used, becoming more complete when the quantity of activated charcoal was increased. The effects of additives on the adsorption capacity of activated charcoal were also investigated in vitro. Ethanol, sorbitol and sucrose significantly reduced drug adsorption, while cacao powder, milk and starch had no effect on tilidine adsorption. At an acid pH, Federa Activated Charcoal significantly adsorbed more drug than either Norit A
Wheeler-Usher DH, Wanke LA, Bayer MJ	Gastric emptying: Risk versus benefit in the treatment of acute poisoning	Med Toxicol	1986	1	2	142	153	胃洗浄／催吐／下剤	総説		This review examines the various clinical options used to elicit gastric emptying, viz. drug-induced emesis, mechanical pharyngeal stimulation, gastric lavage, and catharsis. Apomorphine and syrup of ipecac are the 2 drugs most frequently used for induction of emesis. Both agents act centrally and, in addition, syrup of ipecac has a peripheral action. Toxins ingested or foods previously eaten may inhibit or enhance emetic action by interfering with mediating and conducting mechanisms. Studies indicate that both syrup of ipecac and apomorphine are similarly effective in inducing emesis; however, apomorphine has a shorter reaction time compared with syrup of ipecac. There are more risks involved with the use of apomorphine, since it causes central nervous system and respiratory depression. Syrup of ipecac has been shown to be relatively safe when used in its recommended dosage for emesis. However, several toxicities have been reported with the use of the fluid extract
Shannon M, Fish SS, Lovejoy FH Jr	Cathartics and laxatives: do they still have a place in management of the poisoned patient?	Med Toxicol	1986	1	4	247	52	下剤	総説		
Harsch HH	Aspiration of activated charcoal.	N Engl J Med	1986	314	5	318		活性炭	レタ／コメント		

Rodgers GC, Matyunas NJ	Gastrointestinal decontamination for acute poisoning	Pediatr Clin North Am	1986	33	2	261	285	胃洗浄／活性炭／催吐	総説		Gastric decontamination remains an important element in the therapy of pediatric poisoning; however, several issues remain unresolved. Additional studies, particularly in the clinical setting, are necessary to establish optimal therapeutic recommendations. Based on the data presented in this review, the following general recommendations can be made for gastric decontamination in children: If it is necessary to remove an ingested toxin, ipecac syrup is the preferred method if contraindications to its use are not present. The dose should be 30 ml in children older than 1 year of age and 10 ml in children 6 to 12 months of age. Pending further studies, the use of emetics in children younger than 6 months of age cannot be generally recommended, particularly in the home setting. Gastric lavage should be considered to be of very limited use in pediatric patients. Lavage using small nasogastric tubes, except under special circumstances, is nonproductive and cannot be advocated. If it must be
Mofenson HC, Caraccio TR	Benefits/risks of syrup of ipecac	Pediatrics	1986	77	4	551	552	催吐	総説		The status of syrup of ipecac as a nonprescription drug has helped reduce the death rate in children, ages 1 to 5 years. The drug has proven safe and effective in children in the recommended doses. To deprive parents of ready access to ipecac syrup would result in increased disability and death from poisoning and more emergency department visits.
Boldy DA, Vale JA, Prescott LF	Treatment of phenobarbitone poisoning with repeated oral administration of activated charcoal	Q J Med	1986		235	997	1002	活性炭	症例シリーズ		Six patients with moderate to severe phenobarbitone intoxication were treated with repeated oral doses (50 g) of activated charcoal following an initial dose of 50 to 100 g. All recovered more rapidly than would otherwise be expected with supportive care alone. The mean maximum rate of fall in plasma phenobarbitone concentrations corresponded to a half-life of only 6.2 +/- 2.5 h (normally three to five days); 62 to 93 per cent of the absorbed dose was eliminated within 24 h and the mean total body clearance of the drug during and for up to 12 h after administration of charcoal was 84 +/- 34 ml/min. Treatment with repeated oral doses of activated charcoal is simple and safe. It seems to be as effective as forced alkaline diuresis, haemodialysis and haemoperfusion for the removal of phenobarbitone following overdosage.
Cooney DO, Wijaya J	Effect of magnesium citrate on the adsorptive capacity of activated charcoal for sodium salicylate	Vet Hum Toxicol	1986	28	6	521	523	活性炭／下剤	in vitro		The effects of an added saline cathartic (magnesium citrate) on the in vitro adsorption of sodium salicylate by activated charcoal were determined at different pH levels. At low pH added magnesium citrate reduced salicylate adsorption. However, at high pH added magnesium citrate enhanced adsorption. These results indicate that magnesium citrate should have no detrimental effect on the action of activated charcoal in vivo. Indeed, a slight beneficial effect is suggested by this and other studies.
Derlet RW, Albertson TE	Activated charcoal --- past, present and future	West J Med	1986	145		493	6	活性炭	総説		
Porter RS, Baker EB	Drug clearance by diarrhea induction	Am J Emerg Med	1985	3	3	182	186	腸洗浄	動物実験		Perfusion of the gastrointestinal tract with electrolyte solution has been used as an equivalent to peritoneal dialysis in patients with renal failure. It was hypothesized that the back-diffusion into the gastrointestinal tract induced by this procedure could affect systemically circulating drugs as well. Nine dogs were given intravenous phenobarbital and subjected to gastrointestinal perfusion in attempt to lower serum levels. All dogs served as their own controls. Decline in serum phenobarbital level was used to calculate the amount of drug removed from circulation. Five hours after initiation of gastrointestinal perfusion, the experimental dogs had cleared 24.8% of the initial dose of phenobarbital, while controls cleared 3.13% of the initial dose of phenobarbital. This procedure could be of potential benefit to patients in emergency departments who have ingested toxic substances.
Kulig K, Bar-Or D, Cantrm SV, Rosen P, Rumack BH	Management of acutely poisoned patients without gastric emptying	Ann Emerg Med	1985	14	6	562	567	胃洗浄／活性炭／催吐	臨床研究		During an 18-month period, 592 acute oral drug overdose patients were studied prospectively in a controlled, randomized fashion to determine the efficacy of gastric emptying procedures in altering clinical outcome. Patients presenting on even-numbered days had no gastric emptying procedures performed, and they were compared to patients presenting on odd-numbered days who received either syrup of ipecac or gastric lavage. Patients were carefully followed for evidence of subsequent clinical improvement or deterioration after initial management. Syrup of ipecac did not significantly alter the clinical outcome of patients who were awake and alert on presentation to the emergency department (ED). Gastric lavage in obtunded patients led to a more satisfactory clinical outcome (P less than .05) only if performed within one hour of ingestion. Gastric emptying procedures in the ED for initial treatment of drug overdose are generally not of benefit unless gastric
Calvanese JC	Midesophageal kinking and lodgement of a 34-F gastric lavage tube	Ann Emerg Med	1985	14	11	1123	1125	胃洗浄	レターコメント		
Krenzelok EP, Keller R, Stewart RD	Gastrointestinal transit times of cathartics combined with charcoal	Ann Emerg Med	1985	14	12	1152	1155	下剤／活性炭	ヒトモデル実験		Oral activated charcoal usually is administered in toxic ingestions along with a cathartic. A study was done in volunteers to determine the rapidity of gastrointestinal transit when activated charcoal was administered with various cathartics. A control of activated charcoal was compared to the gastrointestinal transit times of activated charcoal plus the cathartics magnesium citrate, magnesium sulfate, or sorbitol. Activated charcoal alone produced a mean transit time of 23.5 hours; magnesium citrate catharsis occurred in 4.2 hours, magnesium sulfate catharsis occurred in 9.3 hours, and sorbitol catharsis occurred in 0.9 hours. Sorbitol clearly was the most rapidly
Rudolph JP	Automated gastric lavage and a comparison of 0.9% normal saline solution and tap water irrigant	Ann Emerg Med	1985	14	12	1156	1159	胃洗浄	臨床研究		Gastric lavage is used frequently in the emergency treatment of upper gastrointestinal hemorrhage, toxin ingestion, drug overdose, and other cases requiring repetitive gastric irrigation. An effective automatic method of gastric lavage is described and evaluated. The use of tap water versus 0.9% normal saline solution also is compared. There is no difference in prelavage and postlavage blood cell concentrations or electrolyte profile with either irrigant. The advantages of tap water lavage fluid are discussed.
Gaudreault P, Friedman PA, Lovejoy FH Jr	Efficacy of activated charcoal and magnesium citrate in the treatment of oral paraquat intoxication	Ann Emerg Med	1985	14	2	123	125	活性炭／下剤	動物実験		The binding capacity of activated charcoal for paraquat was evaluated in vitro and in vivo and compared with Fuller's earth. In vitro activated charcoal absorbs paraquat and is as effective as Fuller's earth. Activated charcoal's absorbing capacity for paraquat is increased when it is suspended in magnesium citrate and is maximal at pH 7.8. Paraquat (200 mg/kg) administered orally to male mice, followed 30 minutes later by activated charcoal, Fuller's earth (4 gm/kg), and magnesium citrate (0.01 cc/gm) resulted in a survival rate of 31% in the controls, 63% in the activated charcoal and Fuller's earth groups, and 69% in the magnesium citrate group (P values not significant). When activated charcoal was administered concomitantly with magnesium citrate, the survival rate was improved significantly to 94% (P less than 0.01). The efficacy and greater availability of activated charcoal and magnesium citrate make these materials the treatment of choice for
Renzi FP, Donovan JW, Martin TG, Morgan LR, Harrison EF	Concomitant use of activated charcoal and N-acetylcysteine	Ann Emerg Med	1985	14	6	568	572	活性炭／拮抗薬	ヒトモデル実験		Activated charcoal is a safe, effective, inexpensive adjunct in the management of most toxic ingestions. It has the ability to adsorb a wide variety of drugs and chemicals, one of which is acetaminophen. N-acetylcysteine (NAC) is the specific antidote available for serious overdoses of acetaminophen. Current management of acetaminophen overdose, however, does not recommend the concomitant oral administration of these two useful agents because adsorption and inactivation of NAC by charcoal is believed to occur. Our study was designed to help evaluate the effect of activated charcoal on N-acetylcysteine absorption. Ten healthy male volunteers were each given in the first, or control, phase of the study an oral dose of 140 mg/kg NAC, and venous blood samples were obtained. In the second phase, after a washout period, each subject received 60 g activated charcoal orally followed immediately by 140 mg/kg NAC. NAC serum levels were measured using gas-liquid chromatography, and levels were compared with and without the concomitant

Olkkola KT	Effect of charcoal-drug ratio on antidotal efficacy of oral activated charcoal in man	Br J Clin Pharmacol	1985	19	6	767	773	活性炭	ヒトモデル実験		The effect of charcoal-drug ratio on the antidotal efficacy of oral activated charcoal was studied in six healthy volunteers in a randomized cross-over study and compared with the adsorption capacity of activated charcoal in vitro. Aminosalicylic acid (PAS) 1 g and 5 g were ingested on an empty stomach in 30 ml of water. Immediately afterwards the subjects ingested 50 g of activated charcoal in 300 ml of water or 300 ml of water only. PAS 10 g 20 g were only given with 50 g of activated charcoal administered immediately afterwards. The plasma concentrations and the cumulative excretion of PAS into urine were measured for 48 h. Increasing the dose of PAS from 1 g to 20 g reduced the antidotal efficacy of activated charcoal: at a charcoal-drug ratio of 50:1 under 5% of the dose was absorbed but at a ratio of 2.5:1 about 37%. These data correlated well to the saturation of adsorption capacity of charcoal in vitro. To minimize the possibility of saturation of the adsorption capacity of charcoal in
El-Bahie N, Allen EM, Williams J, Routledge PA	The effect of activated charcoal and hyoscine butylbromide alone and in combination on the absorption of mefenamic acid	Br J Clin Pharmacol	1985	19	6	836	838	活性炭	ヒトモデル実験		Mefenamic acid 500 mg orally was administered to nine healthy volunteers on four occasions 7 days apart. On two occasions allocated at random, activated charcoal (2.5 g of medicoal) was administered 1 h after the drug. Hyoscine butylbromide (20 mg intramuscularly) was given immediately after mefenamic acid on one of these occasions, and on one occasion after mefenamic acid without charcoal. Hyoscine significantly delayed the time to maximum mefenamic acid concentrations but did not affect the area under the plasma concentration-time curve. Charcoal reduced the area under the plasma concentration curve by 36% and charcoal and hyoscine reduced the area under the plasma concentration curve by 42% from their respective control values. We conclude that early charcoal administration in a ratio of 5 g to 1 g of drug effectively reduces the area under the plasma concentration-time curve after oral mefenamic acid administration. Early charcoal administration may be of value therefore in reducing the toxicity of mefenamic acid after deliberate or
Hillman RJ, Prescott LF	Treatment of salicylate poisoning with repeated oral charcoal	Br Med J (Clin Res Ed)	1985	291	6507	1472		活性炭			
Justiniani FR, Hippalgaonkar R, Martinez LO	Charcoal-containing empyema complicating. treatment for overdose.	Chest	1985	87		404	405	活性炭	症例報告		A 25-year-old man was treated with gastric lavage and activated charcoal for alcohol and drug overdose; immediately following the initial treatment he developed tension pneumothorax successfully managed with a chest tube. The patient presented four weeks later with a charcoal-containing empyema, an unreported condition heretofore.
Mofenson HC, Caraccio TR, Greensher J, D'Agostino R, Rossi A	Gastrointestinal dialysis with activated charcoal and cathartic in the treatment of adolescent intoxications	Clin Pediatr	1985	24	12	678	684	活性炭／下剤	症例シリーズ		This article reports five patients who had taken a substantial medication overdose and presented in coma. Two had taken a salicylate overdose and three a phenobarbital overdose (one of these ingested a combination of phenobarbital and phenytoin). The cases were treated by our standard protocol of supportive therapy and alkaline diuresis plus repetitive oral doses of activated charcoal (gastrointestinal dialysis). All patients were alert and oriented within 24 hours. Toxicokinetic analysis of the blood levels is discussed. Gastrointestinal dialysis represents a relatively noninvasive method that may benefit certain intoxicated patients even after systemic absorption has occurred. The technique and recommendations for its use are discussed
Michael KA, DiPiro JT, Bowden TA, Tedesco FJ	Whole-bowel irrigation for mechanical colon cleansing	Clin Pharm	1985	4	4	414	424	腸洗浄	総説		The physiology, solution composition, indications, efficacy, and safety of whole-bowel irrigation (WBI) for mechanical bowel cleansing are reviewed. WBI with isotonic electrolyte solutions produces diarrhea when the infusion rate exceeds the capacity of the intestine to distend and absorb the solution. A number of solutions are used for WBI, including 0.9% sodium chloride, balanced electrolyte solutions, lactated Ringer's, mannitol, and electrolyte solutions containing polyethylene glycol 3350 (PEG). WBI solution administration rates vary from 15-90 mL/min, by oral ingestion or nasogastric tube, with total volumes ranging from 1 to 20 L. The onset of diarrhea occurs as soon as 20 minutes with clearing of the effluent as early as 90 minutes. Faster administration rates appear to shorten overall cleansing time. Two PEG-electrolyte lavage solutions (ELSs) have recently gained FDA approval. The recommended dosage rate is 1.2-1.8 L/hr orally or by nasogastric tube until
Krenzelok EP	Gastrointestinal transit times of cathartics used with activated charcoal	Clin Pharm	1985	4	4	446	448	活性炭／下剤			
Goldberg MJ, Park GD, Spector R, Fischer LJ, Feldman RD	Lack of effect of oral activated charcoal on imipramine clearance	Clin Pharmacol Ther	1985	38	3	350	353	活性炭	ヒトモデル実験		The effect of oral activated charcoal on the pharmacokinetics of intravenous imipramine was studied in a randomized, crossover trial. Four normal men received intravenous imipramine (12.5 mg/70 kg) on two separate occasions, followed by either water or water plus high-surface-area activated charcoal (180 gm) in divided doses over 24 hours. Serum imipramine concentrations were measured from 0 to 24 hours after the imipramine infusion. There was no difference in the mean (+/- SE) t1/2 (9.0 +/- 0.8 vs. 10.9 +/- 1.6 hours), apparent volume of distribution (11.2 +/- 2.1 vs. 12.4 +/- 2.1 L/kg), or systemic clearance (992.2 +/- 138.3 vs. 930.3 +/- 101.9 ml/min/70 kg) of imipramine after dosing without and with oral activated charcoal, respectively (P greater than 0.05; paired t test). These results suggest that multiple oral doses of activated charcoal do not increase the clearance of imipramine in
Krenzelok EP, Dean BS	Syrup of ipecac in children less than one year of age	Clinical Toxicology	1985	23	2and 3	171	176	催吐	症例シリーズ		A prospective study was conducted to determine if children less than one year of age developed any complications from syrup of ipecac-induced emesis. All patients in the study were derived from cases received by the poison center. Syrup of ipecac (10 ml) was administered with clear fluids to 24 children less than twelve months of age (mean age 8.7 months; median age 9.0 months; range 3.0-12.0). The average time for the onset of emesis was 26.10 minutes. All children vomited with a single dose of syrup of ipecac. No adverse sequelae such as aspiration or prolonged episodes of emesis were observed. Contrary to the popular belief that emesis may be contraindicated in children less than twelve months of age, we believe that emesis can be safely induced in the home setting in these young children.
Park GD, Goldberg MJ, Spector R, Johnson GF, Feldman RD, Quee CK, Roberts P	The effects of activated charcoal on digoxin and digitoxin clearance	Drug Intell Clin Pharm	1985	19	12	937	941	活性炭	ヒトモデル実験		The effect of multiple oral doses of activated charcoal on digitalis glycoside kinetics was studied to determine whether an activated charcoal regimen might have utility in treating patients with digitalis toxicity. Normal subjects were given intravenous infusions of digoxin 0.75 mg/70 kg or digitoxin 1 mg/70 kg iv followed by either water alone or water with activated charcoal in divided doses in a randomized crossover design. A subject with chronic renal failure was also given digoxin 0.5 mg/70 kg iv followed by water alone or water with activated charcoal. In six normal subjects, treatment with activated charcoal did not increase digoxin clearance (Cl) significantly (16.79 +/- 1.70 vs. 22.68 +/- 3.51 L/h). However, digitoxin Cl did increase significantly, from 0.24 +/- 0.01 to 0.47 +/- 0.04 L/h. In the renal failure subject, digoxin Cl increased from 3.6 L/h to 10.1 L/h. We conclude that the activated charcoal regimen is probably useful in patients with digitoxin toxicity. Although similar benefit is
Karkkainen S, Neuvonen PJ	Effects of oral charcoal and urine pH on dextropropoxyphene pharmacokinetics	Int J Clin Pharmacol Ther Toxicol	1985	23	4	219	225	活性炭	ヒトモデル実験		The effects of orally given activated charcoal, sodium bicarbonate and ammonium chloride on the pharmacokinetics of dextropropoxyphene were studied in six volunteers in a randomized, cross-over study. Serum and urine concentrations of dextropropoxyphene and norpropoxyphene were determined by GLC up to 72 h. Activated charcoal (50 g) given 5 min after dextropropoxyphene hydrochloride (130 mg), reduced its absorption by 97-99%. When given in repeated doses from 6 h on, 50 g followed by 12.5 g at 6 h intervals, charcoal significantly shortened the terminal serum half-life of dextropropoxyphene from 31.1 +/- 4.2 h to 21.2 +/- 3.1 h (p less than 0.05) and that of norpropoxyphene from 34.4 +/- 2.5 h to 19.8 +/- 3.4 h (p less than 0.001), and reduced their excretion into urine. The cumulative urinary excretion of unchanged dextropropoxyphene was increased 6-fold by acidification and reduced to 1/20 by alkalinization of urine, but the excretion of norpropoxyphene was much less dependent on urinary pH. However, the
Tenenbein M	Inefficacy of gastric emptying procedures	J Emerg Med	1985	3	2	133	136	胃洗浄／催吐	症例報告		Gastric lavage or ipecac-induced emesis are routinely recommended in the management of the acutely poisoned patient. Efficacy of either procedure has not been shown. Three cases are described clearly demonstrating inefficacy of emesis and wide bore orogastric lavage. The role of these procedures requires careful controlled evaluation. Until the publication of supportive data, their efficacy is unproven.

Minocha A, Krenzelok EP, Spyker DA	Dosage recommendations for sorbitol-charcoal treatment	J Toxicol Clin Toxicol	1985	23	7and 8	579	587	下剤	症例シリーズ		Activated charcoal-sorbitol mixture is used for the treatment of acute poisoning. Based on our experience with healthy adults, overdosed patients and published reports, we have devised a protocol for use of this mixture in different concentrations of sorbitol. The dose is based on the size of the patient, type of poison, and the clinical status. In seriously ill adult patients, we recommend the use of 1 g/kg of activated charcoal in 4.3 ml/kg body weight of 70% sorbitol every 4 hours until the first stool containing charcoal appears. In children and ambulatory adults, the same dose of activated charcoal may be administered in 4.3 ml/kg body weight of 35% sorbitol. Patients requiring multiple doses may be administered activated charcoal as aqueous and sorbitol suspensions alternately every 2-6 hours after the first charcoal stool has appeared. The patients on multiple dose regimen, especially children, should be closely monitored for any fluid or electrolyte imbalance or depletion of
Tenenbein M	Whole bowel irrigation for toxic ingestions	J Toxicol Clin Toxicol	1985	23	2and 3	177	184	腸洗浄	症例シリーズ		Eight children aged eleven months to sixteen years who ingested toxic substances were treated with whole bowel irrigation. This procedure involves the rapid infusion of fluids per nasogastric tube in order to flush the toxic substance out from the gastrointestinal tract thereby preventing its absorption into the bloodstream. The infusion is terminated when the rectal effluent takes on the characteristics of the infusate. The toxic substances included miniature disc batteries, iron, tricyclic antidepressant and paraquat. No significant changes in serum sodium, serum potassium or hematocrit were observed. Whole bowel irrigation was felt to be efficacious in this series. It requires additional study as a therapeutic approach to the patient who has ingested a
Goldberg MJ, Berlinger WG, Park GD	Activated charcoal in phenobarbital overdose	JAMA	1985	253	8	1120	1121	活性炭			
Litovitz TL, Klein-Schwartz W, Oderda GM, et al	Ipecac administration in children younger than 1 year of age	Pediatrics	1985	76	5	761	764	催吐	臨床研究		The efficacy of ipecac syrup in the induction of emesis and safety of its administration was studied in 105 poison-exposed infants 6 through 11 months of age (study subjects) and compared prospectively with 302 poison-exposed infants and children 12 through 35 months of age who served as age controls. Of the 105 study subjects 101 (96.2%) vomited. The failure of ipecac to induce emesis in six patients (four of 105 study subjects two of 302 age control subjects) is comparable with ipecac failure rates reported elsewhere. The frequency of side effects caused by ipecac syrup did not differ between study and control subjects. There were no serious medical complications resulting from the administration of ipecac syrup. When not readily available at home, ipecac administration was delayed an additional 21.8 minutes if obtained from a pharmacy and 38.4 minutes if obtained from an emergency department. Because of the time delay and the increased health care cost, home rather than emergency department administration of ipecac should be advised. These
Chafee-Bahamon C, Lacouture PG, Lovejoy FH Jr	Risk assessment of ipecac in the home	Pediatrics	1985	75	6	1105	1109	催吐	疫学調査		To determine how frequently parents give ipecac syrup without medical consultation and what complications result from this practice, 8 months of telephone calls to a regional poison center for poisonings of children less than age 6 years (23,790 calls) and 3 years of medical records for children's poisonings from 21 hospitals (516 cases) were studied. The practice of using ipecac syrup without consultation ranged from 0.4% of poison center callers to 6.0% of hospital patients. Of the 137 parents who gave ipecac without consultation, only 4% gave ipecac syrup for a poisoning exposure for which its use was contraindicated. In one of these cases did medical complications such as aspiration, seizures, or gastrointestinal burns result. Hence, the practice of giving children ipecac syrup without medical advice was found to be relatively infrequent and rarely produced complications. The study pointed out the importance of educating parents about products for which ipecac syrup is
Czajka PA, Russell SL	Nonemetic effects of ipecac syrup	Pediatrics	1985	75	6	1101	1104	催吐	疫学調査		The after effects of home-induced emesis with ipecac syrup were determined by telephone interviews of callers to a poison center. During the12-week study, the presence of any symptoms at follow-up in 146 patients was compared with findings in 99 callers to the poison center who did not receive ipecac. Within four hours after ipecac-induced emesis, 33.6% had no symptoms and 17.1% experienced protracted emesis. In the ipecac-treated group the incidences of one formed stool (4.1%) and lethargy during a typical sleeping time (42.5%) were not significantly different from the incidences in patients not receiving ipecac syrup. The incidences of diarrhea (13.0%) and atypical lethargy (11.6%) were higher (P less than .025 and P less than .05, respectively) after ipecac-induced emesis than in patients not receiving ipecac syrup. There was no significant statistical association between the propensity of the ingested toxin to produce diarrhea or lethargy and the occurrence of diarrhea or
Rumack BH	Ipecac use in the home	Pediatrics	1985	75	6	1148		催吐	レタ／コメント		
Neuvonen PJ, Olkkola KT, Alanen T	Effect of ethanol and pH on the adsorption of drugs to activated charcoal: studies in vitro and in man	Acta Pharmacol Toxicol (Copenh)	1984	54	1	1	7	活性炭	ヒトモデル実験		The effect of ethanol on the adsorption of aspirin, quinidine and amitriptyline to activated charcoal was studied in vitro at pH 1.2 and 7.0. The adsorption of these drugs was greatly dependent on the charcoal-drug ratio and on the pH. Ethanol (10%) significantly (P less than 0.001) increased the percentage of their unadsorbed fraction at both pHs in vitro. In six healthy volunteers activated charcoal (50 g), ingested 5 min. after aspirin (1000 mg) and quinidine sulfate (200 mg), reduced their bioavailability by about 70% (aspirin) and 99% (quinidine). A significant desorption of aspirin but not that of quinidine from charcoal was obvious on the second and third days and seemed to be related to the effect of pH. The absorption of ethanol was not significantly prevented by charcoal. The concomitant ingestion of alcohol (50 g) with drugs antagonized only slightly the ability of charcoal to reduce the absorption of
Friedman EJ	Death from ipecac intoxication in a patient with anorexia nervosa	Am J Psychiatry	1984	141	5	702	703	催吐	症例報告		A patient with anorexia nervosa developed a fatal cardiomyopathy due to ipecac intoxication. Prodromal signs and symptoms included generalized muscle weakness, dysphagia, and severe palpitations. Autopsy revealed pathological changes in the heart and skeletal muscles.
Askenasi R, Abramowicz M, Jeanmart J, Ansay J, Degaute	Esophageal perforation; An unusual complication of gastric lavage	Ann Emerg Med	1984	13	2	146		胃洗浄	レター　コメント		
Klein-Schwartz W, Gorman RL, Oderda GM, Wedin GP, Saggar D	Ipecac use in the elderly: The unanswered question	Ann Emerg Med	1984	13	12	1152	1154	催吐	症例報告		An elderly patient experienced an intracerebral bleed temporally related to the administration of syrup of ipecac. The experience of the certified regional poison centers of the American Association of Poison Control Centers shows that this is an uncommon event. The use and safety of ipecac in the elderly has not been adequately addressed in the past.
Wolowodiuk OJ, McMicken DB, O'Brien P	Pneumomediastinum and retropneumoperitoneum: An unusual complication of syrup-of-ipecac induced emesis	Ann Emerg Med	1984	13	12	1148	1151	催吐	症例報告		A young woman returned to the emergency department two hours after discharge because of persistent vomiting and chest pain. Six hours earlier she had received syrup of ipecac to induce emesis following a drug overdose. Radiologic examination in the emergency department revealed pneumomediastinum and retropneumoperitoneum. A nasogastric tube was inserted in the emergency department. The patient was admitted to the ICU and placed on prophylactic antibiotics. Barium and gastrograffin esophagrams revealed no evidence of extravasation. Gastrointestinal endoscopy showed distal esophagitis. Gastroscopy and duodenoscopy were unremarkable. The
Moran DM, Crouch DJ, Finkle BS	Absorption of ipecac alkaloids in emergency patients	Ann Emerg Med	1984	13	12	1100	1102	催吐	臨床研究		Syrup of ipecac contains the nauseant alkaloids emetine and cephaeline. Although thousands of doses are given yearly, no data exist on the absorption of these alkaloids in man. We gave 30 mL of USP Syrup to ten adult patients. Blood and urine samples were obtained at approximately one-half and two hours after administration, and the entire volume of vomitus was saved. The samples were then analyzed for cephaeline and emetine by a high-performance liquid chromatographic (HPLC) assay developed in our laboratory. All patients vomited within 30 minutes, but the amounts of alkaloid regurgitated varied from 22 +/- 14% in six patients to 80 +/- 16% in the remaining four. Only six patients had emetine or cephaeline in their blood by two hours (range, 5 to 73 ng/mL), although ten patients had detectable concentrations of the alkaloids in their urine. Measured over two hours, no patient eliminated more than 0.5% of the dose by the urinary route. In our study ipecac was absorbed by all who received it; the extent of absorption varied widely, and elimination by the renal
Proudfoot AT	Abandon gastric lavage in the accident and emergency department?	Arch Emerg Med	1984	1	2	65	71	胃洗浄	総説		

Curtis RA, Barone J, Giacona N	Efficacy of ipecac and activated charcoal/cathartic; Prevention of salicylate absorption in a simulated overdose	Arch Intern Med	1984	144		48	52	活性炭	ヒトモデル実験		Twelve adult volunteers were given 24 81-mg aspirin tablets and were randomly assigned into the following treatment groups: (1) control aspirin, (2) 30 mL of ipecac repeated if vomiting not induced, (3) 60 g of activated charcoal per 15 g of magnesium sulfate (MgSO4), and (4) ipecac repeated if needed, followed by activated charcoal/MgSO4 given 1 1/2 hours after the last vomiting episode. All treatments began 60 minutes following aspirin ingestion. Urine was collected for 48 hours for percent total salicylate excretion. Mean +/- SD recovery of salicylate from urine was as follows: aspirin, 96.3% +/- 7.5%; ipecac 70.3% +/- 11.8%, activated charcoal/MgSO4, 56.4% +/- 12%; and ipecac and activated charcoal/MgSO4, 72.4% +/- 14.1%. Ten subjects completed the study. In group 4, eight of ten subjects vomited the activated charcoal/MgSO4 immediately, making statistical analysis impossible. Analysis revealed that activated charcoal/MgSO4 significantly lowered the absorption of
Olkkola KT, Neuvonen PJ	Do gastric contents modify antidotal efficacy of oral activated charcoal?	Br J Clin Pharmacol	1984	18	5	663	9	活性炭	ヒトモデル実験		The effect of food on the antidotal efficacy of activated charcoal was studied in six healthy volunteers, who ingested aspirin 1000 mg, mexiletine 200 mg and tolfenamic acid 400 mg in a randomized cross-over study. Activated charcoal 25 g, suspended in water, was administered 5 min or 60 min after the drugs were taken on an empty stomach or after a standard meal. The serum concentrations and the cumulative excretion into urine of the drugs were followed for 48 h. When the drugs were taken on an empty stomach, activated charcoal given 5 min or 60 min afterwards reduced the bioavailability of the drugs by 75-98% or 10-60%, respectively. Food moderately weakened the effect of activated charcoal administered 5 min after the drugs, but when the charcoal was given 1 h later the effect was still practically the same, the reduction of absorption varying in both cases in the range of 45-85%. Thus the efficacy of charcoal given 60 min after the drugs was better after a standard meal than on an empty stomach. Presence of food in the stomach of patients
Vale A, Meredith T, Buckley B	ABC of poisoning. Eliminating poisons	Br Med J (Clin Res Ed)	1984	289	6441	366	369	胃洗浄／活性炭／催吐／下剤	総説		
True RJ, Berman JM, Mahutte CK	Treatment of theophylline toxicity with oral activated charcoal	Crit Care Med	1984	12	2	113	114	活性炭	症例シリーズ		Oral activated charcoal was administered to 4 patients with theophylline toxicity, who had gastrointestinal and neurologic symptoms as well as cardiac arrhythmias. Administration of oral charcoal significantly reduced the theophylline half-life in the serum of each patient. The charcoal was well tolerated and symptoms of toxicity rapidly resolved. We conclude that administration of oral charcoal rapidly reduces the serum theophylline concentration and should be used as the initial treatment in patients with
Moore JG, Christian PE, Brown JA, Brophy C, Datz F, Taylor A, Alazraki N	Influence of meal weight and caloric content on gastric emptying of meals in man	Dig Dis Sci	1984	29	6	513	519	胃洗浄／催吐	ヒトモデル実験		This study was designed to assess the relative influence of meal weight and caloric content on gastric emptying of liquid and solid meals in man. A dual radioisotopic method which permits noninvasive and simultaneous measurement of liquid- and solid-phase emptying by external gamma camera techniques was employed. Nine healthy volunteer subjects ingested 50-, 300-, and 900-g lettuce and water meals adjusted to either 68, 208, or 633 kcal with added salad oil. The following observations were made: (1) absolute emptying rates (grams of solid food emptied from the stomach per minute) increased directly and significantly with meal weight; (2) increasing meal total caloric content significantly slowed solid food gastric emptying but did not overcome the enhancing effect of meal weight; and (3) liquid emptying rates were
Cupit GC, Temple AR	Gastrointestinal decontamination in the management of the poisoned patient	Emerg Med Clin North Am	1984	2	1	15	28	胃洗浄／活性炭／催吐	総説		Ipecac syrup is the agent of choice to promote emesis in awake, alert, and cooperative patients who have ingested poison. Lavage is a reasonable alternative when ipecac fails or emesis is contraindicated. Activated charcoal is effective in minimizing absorption of ingested toxins, and saline cathartics may be useful to hasten the elimination of activated charcoal and possibly of enteric-coated or sustained release medications.
Neuvonen PJ, Olkkola KT	Effect of dose of charcoal on the absorption of disopyramide, indomethacin and trimethoprim by man	Eur J Clin Pharmacol	1984	26	6	761	767	活性炭	ヒトモデル実験		The efficacy of various charcoal-to-drug ratios for the absorption of drugs was studied in 6 healthy volunteers and in vitro at two pHs. Disopyramide 200 mg, indomethacin 50 mg and trimethoprim 200 mg were ingested on an empty stomach with 100 ml water. After 5 min the subjects ingested a charcoal suspension in 300 ml--2.5 g, 10 g, 25 g or 50 g of Norit A, or 10 g of PX-21, or water 300 ml only. Increasing the dose of activated charcoal from 2.5 g to 50 g reduced the gastrointestinal absorption of disopyramide and indomethacin from 30-40% to 3-5%, and that of trimethoprim from 10% to 1% of the respective controls. Disopyramide and trimethoprim were best adsorbed by charcoal in vitro at neutral and indomethacin at acid pH, but saturation of the adsorption capacity was apparent at charcoal-to-drug ratios less than 7.5. Combining the in vitro and in vivo results it can be concluded that the dose of activated charcoal to be given in acute intoxication should be as large as possible,
Adler M, Quenon M, Even-Adin D, et al.	Whole gut lavage for colonoscopy: a comparison between two solutions.	Gastrointest Endosc	1984	30	2	65	67	腸洗浄	臨床研究		The clinical efficacy and patient acceptability of a new solution containing mainly sodium sulfate and polyethylene glycol (solution II) compared with a balanced standard electrolyte solution (solution I) for whole gut lavage prior to colonoscopy were evaluated in 240 ambulatory and hospital patients randomly allocated to receive either of the two solutions. On the basis of the quality and rapidity of the bowel preparation and the good results obtained by clinical and biological parameters, we found that the newly designed solution was superior.
Guay DR, Meatherall RC, Macaulay PA, Yeung C	Activated charcoal adsorption of diphenhydramine	Int J Clin Pharmacol Ther Toxicol	1984	22	8	395	400	活性炭	ヒトモデル実験		The adsorption of the antihistamine diphenhydramine (D) by activated charcoal (AC) was assessed in vitro and in vivo in six healthy volunteers in order to assess the utility of AC as an adjunct in the treatment of antihistamine overdose. Results of greater than 85% adsorption with AC:D weight ratios of 10:1 or greater in the in vitro studies led to a three-way crossover trial in six volunteers. Fifty mg D was administered alone (control), with 50 g AC within 5 minutes of D (D + C5) and with 50 g AC 60 minutes after D (D + C60). Mean reductions in peak serum D concentrations of 94.8% (D + C5) and 12.3% (D + C60), AUC 0-24 h of 96.9% (D + C5) and 20.4% (D + C60), and AUC 0-omega of greater than 90% (D + C5) and 24.0% (D + C60) were noted, although only the comparison of D with D + C5 reached statistical significance due to wide interpatient variation. A positive correlation of time to peak concentration of drug in serum in the control group with percentage reduction in AUC in the D +
Karkkainen S, Neuvonen PJ	Effect of oral charcoal and urine pH on sotalol pharmacokinetics	Int J Clin Pharmacol Ther Toxicol	1984	22	8	441	446	活性炭	ヒトモデル実験		The effects of orally given activated charcoal, sodium bicarbonate and ammonium chloride on the pharmacokinetics of sotalol were studied in 7 volunteers in a randomized, cross-over study. Serum and urine concentrations of sotalol were determined by HPLC up to 72 h. Activated charcoal, 50 g, given within 5 min of sotalol hydrochloride (160 mg), reduced its absorption by 99%. When given in repeated doses from 6 h on, 50 g followed by 12.5 g at 6 h intervals, charcoal shortened the half-life after sotalol in serum from 9.4 +/- 0.4 h to 7.6 +/- 0.3 h and in urine from 9.4 +/- 0.4 h to 7.3 +/- 0.3 h (p less than 0.01). The excretion of unchanged sotalol into urine was 65% of the dose during the control phase but neither acidification nor alkalinization of urine for 3 days did increase its urinary excretion. Thus, activated charcoal seems to be effective in prevention of the absorption of sotalol when ingested without delay. Given in repeated oral doses charcoal moderately increases the rate of
Olkkola KT, Neuvonen PJ	Effect of gastric pH on antidotal efficacy of activated charcoal in man	Int J Clin Pharmacol Ther Toxicol	1984	22	10	565	569	活性炭	ヒトモデル実験		Environmental pH is important for the adsorption capacity of activated charcoal: in our experiments the unadsorbed fractions of aspirin and disopyramide were increased by 10-20-fold as the pH was altered from 1.2 to 7.0 or vice versa. In order to study the effect of pH in vivo, six subjects were given 500 mg aspirin, 200 mg disopyramide and 200 mg tolfenamic acid on an empty stomach with 20 ml of8.5% magnesium hydroxide or without it. A small dose of charcoal, 2.5 g, administered immediately after the drugs, reduced the absorption of aspirin by 30-40%, whereas the absorption of disopyramide and tolfenamic acid was reduced by 70-80%. The inhibition of absorption was irrespective of whether the drugs were taken with the antacid or without it. Thus, in vivo other factors than the gastric pH must be more important in controlling the adsorption to activated charcoal. Accordingly, the simultaneous administration of antacids cannot be recommended to enhance the adsorptive

Burton BT, Bayer MJ, Barron L, Aitchison JP	Comparison of activated charcoal and gastric lavage in the prevention of aspirin absorption	J Emerg Med	1984	1	5	411	416	胃洗浄／活性炭	動物実験		Effectiveness of initial treatment of aspirin (ASA) overdosage was evaluated by comparing treatment with activated charcoal (AC) to treatment with gastric lavage in combination with AC. Dogs were used as subjects in four experimental groups. All subjects were administered an overdose of 500 mg/kg of ASA. Treatment was performed 30 minutes later on all groups except controls. Treatment with AC alone resulted in a 17% reduction (P greater than .05) of peak plasma salicylate levels compared with controls. When lavage preceded administration of AC, a 37% reduction (P less than .05) occurred. There was a 48% reduction (P less than .025) in plasma salicylate levels when lavage was preceded and followed by administration of AC. This study demonstrates that gastric lavage in combination with AC is more effective in reducing ASA absorption than AC given alone.
Kulig K	Interpreting gastric emptying studies	J Emerg Med	1984	1		447	448	胃洗浄／活性炭	レタ／コメント		comment on ;J Emerg Med 1984;1:411
Kannisto H, Neuvonen PJ	Adsorption of sulfonylureas onto activated charcoal in vitro	J Pharm Sci	1984	73	2	253	6	活性炭	in vitro		Adsorption of carbutamide, chlorpropamide, tolazamide, tolbutamide, glibenclamide (glyburide), and glipizide onto activated charcoal was compared in vitro using different charcoal-to-drug ratios. Maximal binding capacities of different sulfonylureas were 0.45-0.52 g/g of charcoal at pH 7.5. The affinity of the second generation derivatives, glibenclamide and glipizide, was considerably higher than that of the first generation derivatives. The affinity of sulfonylureas to charcoal was higher at pH 4.9 than at pH 7.5. Poor water solubility of sulfonylureas at pH 1 prevents the adequate testing in these conditions. Contrary to what has appeared previously, activated charcoal effectively adsorbs different sulfonylureas and can be used to possibly prevent their
Galinsky RE, Levy G	Evaluation of activated charcoal-sodium sulfate combination for inhibition of acetaminophen absorption and repletion of inorganic sulfate	J Toxicol Clin Toxicol	1984	22	1	21	30	活性炭／下剤	ヒトモデル実験		Activated charcoal is an effective inhibitor of acetaminophen absorption while sodium sulfate can prevent the depletion of endogenous inorganic sulfate associated with the formation of acetaminophen sulfate. Administration of activated charcoal plus sodium sulfate soon after acetaminophen overdose may reduce acetaminophen absorption and facilitate the elimination of absorbed acetaminophen by providing sufficient sulfate ion for rapid sulfation of the drug. This investigation was designed to determine if sodium sulfate modifies the inhibitory effect of activated charcoal on acetaminophen absorption or if activated charcoal affects the absorption of sodium sulfate. Eight normal adults received, on separate occasions, 1 g acetaminophen, 1 g acetaminophen and 18 g sodium sulfate (decahydrate), 1 g acetaminophen with 10 g activated charcoal and 1 g acetaminophen, with 10 g activated charcoal and 18 g sodium sulfate, in random order. Urine was collected for 48 hours and assayed for acetaminophen and its major metabolites and for inorganic sulfate.
Neuvonen PJ, Olkkola KT	Activated charcoal and syrup of ipecac in prevention of cimetidine and pindolol absorption in man after administration of metoclopramide as an antiemetic agent	J Toxicol Clin Toxicol	1984	22	2	103	114	活性炭／催吐	ヒトモデル実験		The effects of activated charcoal and ipecac syrup by mouth on cimetidine and pindolol absorption were studied in seven subjects, who had ingested 20 mg metoclopramide 1 h earlier, and compared with the adsorption capacity of charcoal in vitro. Activated charcoal, 50 g, given 5 min after 400 mg cimetidine + 10 mg pindolol, reduced their absorption by 99% or more, based on AUC0-48h and the 48-h urinary excretion of the drugs. Syrup of ipecac caused emesis on each occasion. On the average, ipecac reduced the absorption of cimetidine and pindolol by 75% and 60%, respectively. Based on studies in vitro it seems probable that the adsorbing capacity of charcoal for cimetidine but not for pindolol will be saturated if 50 g charcoal is given after an overdose of about 100 fold the therapeutic dose. Because the use of ipecac allowed an absorption of the drugs at least 30 fold that allowed by charcoal, the immediate administration of activated charcoal, without preceding lavage or emesis,
Olkkola KT	Does ethanol modify antidotal efficacy of oral activated charcoal studies in vitro and in experimental animals	J Toxicol Clin Toxicol	1984	22	5	425	432	活性炭	動物実験		The effect of ethanol on the adsorption of strychnine to activated charcoal was studied in vitro at pH 1.2 and 7.0. At high charcoal-drug ratios the adsorption of strychnine was significantly (p less than 0.001) more complete at neutral pH than at pH 1.2. At these ratios ethanol 10% increased (p less than 0.001) the unadsorbed fractions at both pHs. The acute toxicity of oral strychnine in mice was not influenced by ethanol. Activated charcoal (1000 mg/kg) mixed with strychnine prior to the administration increased its LD50 by 410 fold. When ethanol was administered with charcoal and strychnine, the increase in the LD50 was only 220 fold which is significantly (p less than 0.05) less than without ethanol. Accordingly, the concomitant ingestion of ethanol in drug intoxications may slightly impair the antidotal efficacy of oral activated charcoal. Despite this potential reduction of the antidotal efficacy of charcoal in some extreme situations, there should be no hesitation in administering
Minocha A, Herold DA, Bruns DE, Spyker DA	Effect of activated charcoal in 70% sorbitol in healthy individuals	J Toxicol Clin Toxicol	1984	22		529	536	活性炭／下剤	ヒトモデル実験		Activated charcoal in 70% sorbitol enjoys wide use in the management of acute poisonings but the effects of the activated charcoal-sorbitol mixture in healthy individuals have not been characterized. We were concerned about the possibility of sorbitol causing changes in the routinely monitored serum chemistry and hematological parameters, either directly due to the absorbed polyol or due to the diarrhea induced by it, thus complicating the diagnosis and management in an overdose setting. We assessed the action of a single dose of 30g of activated charcoal in 150 ml of 70% sorbitol and its effects on serum osmolality, electrolytes, metabolic profile (SMAC), magnesium, hepatic enzymes, and complete blood count in healthy adult individuals. The only significant change in the laboratory parameters tested was the consistent rise in serum sodium and phosphorus concentrations four hours after drinking the charcoal-sorbitol mixture. However, a similarly consistent rise in the concentrations at the same hours on another day without ingestion of the
Neuvonen PJ, Kannisto H, Lankinen S	Capacity of two forms of activated charcoal to adsorb nefopam in vitro and to reduce its toxicity in vivo.	J Toxicol Clin Toxicol	1984	21	3	333	342	活性炭	動物実験		The adsorption of nefopam hydrochloride to two different charcoals was studied in vitro at pH 1.2 and 7.4. Both forms of activated charcoal effectively adsorbed nefopam, but the adsorption was significantly (p less than 0.001) more complete to PX-21 than to Norit A and the neutral pH favored adsorption over the acid pH. The unadsorbed fraction increased steeply when the charcoal-to-nefopam ratio was decreased below 5. In mice, the administration of Norit A and PX-21 (1700 mg/kg) significantly (p less than 0.001) increased the acute LD50 of nefopam hydrochloride, by 4.3 fold and 5.8 fold, respectively. The calculated amounts of free drug in the gastrointestinal tract are in good agreement with the observed LD50 values without charcoal when the free fractions at pH 1.2 and the corresponding charcoal-to-nefopam ratios in vitro are used in the calculations. The antagonism of charcoal to nefopam toxicity was confirmed in rats, too. At charcoal-to-nefopam ratios
Pond SM, Olson KR, Osterloh JD, Tong TG	Randomized study of the treatment of phenobarbital overdose with repeated doses of activated charcoal	JAMA	1984	251	23	3104	3108	活性炭	臨床研究		We performed a prospective randomized study of the effectiveness of repeated oral doses of activated charcoal in the treatment of phenobarbital overdose. Ten comatose patients who required intubation and mechanical ventilation completed the protocol. Five patients received repeated doses of activated charcoal and sorbitol. Five other patients who received a single dose of charcoal and cathartic served as control subjects. The serum half-life of phenobarbital (mean +/- SD, 36 +/- 13 hours) during repeated administration of charcoal and sorbitol was significantly shorter than that after charcoal administration was discontinued (93 +/- 7 hours) and shorter than the half-life in the single-dose group (93 +/- 52 hours). The length of time that patients in each group required mechanical ventilation, 39 +/- 24 hours (single-dose group) and 48 +/- 8 hours (repeated-dose group), did not differ significantly, nor did the time spent in the hospital. Although administration of repeated
Todd JW	Do measures to enhance drug removal save lives?	Lancet	1984	1	8372	331		胃洗浄／活性炭／催吐／下剤	レタ／コメント		
Timberlake GA	Ipecac as a cause of the Mallory-Weiss syndrome	South Med J	1984		77	804	805	催吐	レタ／コメント		

Neuvonen PJ, Elonen E, Haapanen EJ	Acute dapsone intoxication: clinical findings and effect of oral charcoal and haemodialysis on dapsone elimination.	Acta Med Scand 1983;214(3):215-20	1983	214	3	215	220	活性炭／血液浄化	症例シリーズ		Three patients were treated after ingestion of an overdose of dapsone (1-10 g). A considerable acute cyanosis due to methaemoglobinaemia was followed by a late haemolysis within 1-2 weeks. Activated charcoal given orally in multiple doses (20 g X 4/day) shortened the half-life of dapsone to 12.7 +/- 0.7 hours, i.e. to about 1/3-1/6 of the preceding control value. The half-life of dapsone was about 10 hours during each of the three 5-hour haemodialysis treatments given to one patient. However, owing to the rebound phenomenon between haemodialyses, the half-life of dapsone from the start of the first to the end of the third haemodialysis was 26 hours. The efficacy of orally administered activated charcoal is fully comparable to that of haemodialysis in increasing the rate of elimination of dapsone and its metabolite monoacetyldapsone. Activated charcoal is cheap, it can be administered
Neuvonen PJ, Karkkainen S	Effects of charcoal, sodium bicarbonate and ammonium chloride on chlorpropamide kinetics	Clin Pharmacol Ther	1983	33	3	386	393	活性炭／利尿	ヒトモデル実験		The effects of activated charcoal, sodium bicarbonate, and ammonium chloride by mouth on chlorpropamide kinetics was studied in six healthy subjects. Activated charcoal, 50 gm, given immediately after 250 mg chlorpropamide reduced its absorption by 90%, but when given in repeated doses from 6 hr on (50 gm followed by 12.5 gm at 6-hr intervals) it did not shorten the chlorpropamide half-life (t 1/2). The t 1/2 of chlorpropamide was shortened from 49.7 +/- 7.4 to 12.8 +/- 1.1 hr by sodium bicarbonate and prolonged to 68.5 +/- 10.5 hr by ammonium chloride. The 72-hr urinary excretion of chlorpropamide was increased fourfold by alkalinization and decreased to 1/20 of baseline by acidification of the urine. The renal clearance of chlorpropamide correlated with urinary pH, ranging from 1 to 1000 ml/hr at the pH from 5 to 8. Urinary pH is likely to explain at least a part of great interindividual differences in the serum chlorpropamide concentrations during steady-state and variations
Berlinger WG, Spector R, Goldberg MJ, Johnson GF, Quee CK, Berg MJ	Enhancement of theophylline clearance by oral activated charcoal	Clin Pharmacol Ther	1983	33	3	351	354	活性炭	ヒトモデル実験		A randomized crossover trial of the effect of oral activated charcoal on the kinetics of intravenous theophylline was carried out in six normal male subjects. After intravenous aminophylline (6 mg/kg), subjects received water or water with activated charcoal (140 gm) in divided doses over 12 hr. Serum theophylline concentrations were measured from 0 to 24 hr after the aminophylline infusion. Treatment with activated charcoal decreased the serum t 1/2 from 6.4 +/- 1.2 to 3.3 +/- 0.4 (SEM) hr and the serum AUC from 78 +/- 14 to 42 +/- 4 mg . hr/l. Percent decrease in AUC after treatment with charcoal correlated positively with the endogenous theophylline serum t 1/2 (r = 0.94). These results suggest that oral activated charcoal (1) enhanced the total body clearance of theophylline and (2) may be efficacious in the treatment of theophylline poisoning, especially in patients with prolonged serum
Neuvonen PJ, Kannisto H, Hirvisalo EL	Effect of activated charcoal in absorption of tolbutamide and valproate in man	Eur J Clin Pharmacol	1983	24	2	243	246	活性炭	ヒトモデル実験		The claim that activated charcoal should be ineffective or even contraindicated in intoxication due to tolbutamide is based only on limited in vitro studies. To test the claim, the effect of activated charcoal 50 g on the absorption of tolbutamide and, as a reference, of sodium valproate, was studied in 6 healthy volunteers. Each volunteer swallowed tolbutamide 500 mg and sodium valproate 300 mg with 50 ml water 1 h after a light breakfast, and within 5 min they took in randomized order either a suspension of activated charcoal or water. The absorption of tolbutamide, calculated as the peak concentration and the area under the serum drug concentration-time curve during 0-48 h, was reduced by 90% by charcoal (p less than 0.001). The absorption of valproate in these conditions was reduced on average by 65% (p less than 0.01). In each subject charcoal had a greater effect on the absorption of tolbutamide than of valproate. According to these findings and preliminary in vitro studies on other
Neuvonen PJ, Vartiainen M, Tokola O	Comparison of activated charcoal and ipecac syrup in prevention of drug absorption	Eur J Clin Pharmacol	1983	24	4	557	562	活性炭／催吐	ヒトモデル実験		The efficacy of activated charcoal and ipecac syrup in the prevention of drug absorption was studied in 6 healthy adult volunteers, using a randomized, cross-over design. Paracetamol 1000 mg, tetracycline 500 mg and aminophylline 350 mg were ingested on an empty stomach with 100 ml water. Then, after 5 or 30 min, the subjects ingested, either activated charcoal suspension (50 g charcoal), syrup of ipecac, or, only after 5 min, water 300 ml. Activated charcoal, given either after 5 or 30 min, significantly (p less than 0.01 or less 0.05) reduced the absorption of these 3 drugs measured, for example as AUC0-24 h. Syrup of ipecac caused emesis on each occasion, with a mean delay of 15 min. When ipecac was given 5 min after the drugs, its effect on absorption was significant, but when it was given after 30 min only the absorption of tetracycline was reduced. Activated charcoal was significantly (p less than 0.05) more effective than ipecac in reducing drug absorption when
Ernstoff JJ, Howard DA, Marshall JB, Jumshyd A, McCullough AJ	A randomized blinded clinical trial of a rapid colonic lavage solution (Golytely) compared with standard preparation for colonoscopy and barium enema	Gastroenterology	1983	84	6	1512	1516	腸洗浄	臨床研究		The efficacy and safety of the new colonic lavage solution, Golytely (an electrolyte-polyethylene glycol solution), was compared with standard 2- and 3-day bowel preparations in a randomized blinded study of patients undergoing colonoscopy and barium enema examination. Side effects, patient preference, and quality of examinations were monitored. Colonoscopy was scored by colonic segment for type of residual stool and percentage of bowel wall visualized. Barium enema was graded by stool particle size in the least clean segment. For colonoscopy, preparation with Golytely allowed better visualization of colonic mucosa (p less than 0.002) due to less retained stool (p less than 0.002), produced more optimal exams (p less than 0.002), and required less time to reach the cecum (p less than 0.05). Furthermore, it was preferred by patients, required less than 5 preparation time, and caused no notable side effects. For barium enema, no significant difference existed between preparations. We conclude that Golytely is effective for barium enema
Crome P, Adams R, Ali C, Dallos V, Dawling S	Activated charcoal in tricyclic antidepressant poisoning; pilot controlled clinical trial.	Hum Toxicol	1983	2		205	209	活性炭	臨床研究		1 A randomised clinical trial was carried out to assess the effects of activated charcoal in the management of suspected tricyclic antidepressant poisoning. 2 Forty-eight patients entered the study, twenty receiving supportive care plus activated charcoal (10 g) and twenty-eight supportive care alone. 3 Drug screening showed that only seventeen patients had taken tricyclic antidepressants alone. 4 Activated charcoal had no effect on either the rate of lightening of coma or the fall in plasma antidepressant concentration in the 'pure' tricyclic antidepressant poisoning group. 5 No serious side-effects of activated charcoal were reported.
Stewart JJ	Effects of emetic and cathartic agents on the gastrointestinal tract and the treatment of toxic ingestion	J Toxicol Clin Toxicol	1983	20		199	253	催吐／下剤	総説		Emetic drugs and saline cathartics produce direct or reflex changes in gastrointestinal motility. The changes in gastrointestinal smooth muscle function may be important in the rapid oral or rectal expulsion of gastrointestinal contents, effects which serve as a basis for emetic and cathartic drug use in the treatment of toxic ingestion. Because of difficulties in recording gastrointestinal smooth muscle contractile activity from the intact, unanesthetized animal or man, relatively few studies have attempted to characterize the changes in gastrointestinal motility preceding vomiting. Limited results from past studies and the results of more recent studies employing improved technology suggest that pharmacological activation of the emetic reflex is accompanied by characteristic movements of the stomach and small intestine. The gastric response consists of initial muscle relaxation and an expansion of gastric volume. The intestine responds with a contraction,
Decker WJ	Gastrointestinal decontamination	J Toxicol Clin Toxicol	1983	20	3	3	6	活性炭	レターコメント		
Easom JM, Caraccio TR, Lovejoy, Jr FH	Evaluation of activated charcoal and magnesium citrate in the prevention of aspirin absorption in humans	Clin Pharm	1982	1	2	154	156	活性炭／下剤	ヒトモデル実験		Inhibition of aspirin absorption by activated charcoal and magnesium citrate solution was compared with the inhibition produced by activated charcoal alone. Following an overnight fast, eight healthy male volunteers were given three 325-mg aspirin tablets under four study regimens: (1) water 360 ml; (2) water 300 ml and activated charcoal 10 g in water 60 ml; (3) water 105 ml, activated charcoal 10 g in water 60 ml, and magnesium citrate solution 200 ml; and (4) same as (3) except that administration of magnesium citrate was delayed 30 minutes. At least one week separated each regimen. Urine samples were collected at 0, 2, 4, 8, 12, 24, 36, and 48 hours, and percent of the aspirin dose excreted in the urine was determined. The data were analyzed using analysis of variance for Latin-square design and Newman-Keuls test. The salicylate excreted with regimens 2, 3, and 4 was each significantly less compared with that excreted following regimen 1 (p less than 0.001). Salicylate
Neuvonen PJ	Clinical pharmacokinetics of oral activated charcoal in acute intoxications	Clin Pharmacokinet	1982	7	6	465	489	活性炭			

Skoutakis VA		Clinical Toxicology of Drugs: Principles and Practice	1982			12		胃洗浄	＊単行本など		
Sketris IS, Mowry JB, Czajka PA, Anderson WH, Stafford DT	Saline catharsis; Effect on aspirin bioavailability in combination with activated charcoal	J Clin Pharmacol	1982	22	1	59	64	活性炭／下剤	ヒトモデル実験		The effect of a saline cathartic combined with activated charcoal or activated charcoal alone on aspirin bioavailability was characterized in six healthy volunteers. Using a random, Latin-square design, subjects were given 975 mg aspirin followed by either water alone, 15 Gm activated charcoal (AC), or 15 Gm activated charcoal plus 20 Gm sodium sulfate (AC + SS) separated by one week. Both AC (44.16 +/- 16.85 microgram/ml) and AC + SS (58.61 +/- 10.63 microgram/ml) decreased (P less than 0.001) the maximal plasma salicylate concentration (Cpmax) compared to control (86.61 +/- 12.69 microgram/ml). Urinary salicylate recovery was decreased (P less than 0.01) for AC (57.88 +/- 16.26 per cent) and AC + SS (61.00 +/- 11.49 per cent) as compared to control (93.73 +/- 6.83 per cent), while for area under the plasma concentration-time curve (AUC) only AC showed a decrease (P less than 0.01) compared to control. Neither AC nor AC + SS differed from each other for Cpmax, AUC, or cumulative urinary recovery. Our findings indicate that the
Postuma R	Whole bowel irrigation in pediatric patients.	J Pediatr Surg	1982	17		350	352	腸洗浄	症例シリーズ		Whole bowel irrigation was used in 24 patients ages 8 to 17 yr, mean 13 yr, in preparation for colonoscopy (18), colon surgery (2), therapeutic irrigation for treatment of drug overdose (2), and constipation (2). An average of 9 liters warm, normal saline with added KCL (5 mEq/liter) was infused through a nasogastric tube over a period of 7 +/- 2 hr (mean +/- SD). This resulted in a weight gain of 2% and a mild hyperchloremia. The vital signs remained stable and there were no complications. The colonic preparation was complete in 10, adequate in 8 and unsatisfactory in 2. The irrigation was effective in the treatment of overdose ingestion and constipation. It is concluded that whole bowel irrigation is a satisfactory method of colonic preparation of pediatric
Van de Graaff WB, Thompson WL, Sunshine I, et al	Adsorbent and cathartic inhibition of enteral drug absorption	J Pharmacol Exp Ther	1982	221	3	656	663	活性炭／下剤	動物実験		The effects on absorption of drugs given by mouth of adsorbents (charcoals and resins) and cathartics (osmotic and oil) were studied in vitro and in vivo using acetaminophen (paracetamol) as a test drug. In vitro adsorption isotherms were measured at 37 degrees C in simulated gastric and gastric plus intestinal juices. Maximum binding capacity (MBC) of 16 charcoals and resins varied 30-fold, from 0.36 to 9.32 mol/kg. Dissociation constants varied directly with MBC. In vitro adsorption was little changed by addition of d-mannitol and d-sorbitol, N-acetylcysteine (NAC) or l-methionine. Acetaminophen (0.6 g/kg by orogastric tube) was given to 17 dogs protected by i.v. injections of NAC and methylene blue. One minute later, dogs were given: 1) water; 2) Norit A or Nuchar 1110 charcoal, 3 g/kg; 3) d-mannitol and d-sorbitol, 2 g/kg or castor oil, 3 ml/kg; or 4) both charcoal and either d-mannitol and d-sorbitol or castor oil. Cathartics alone decreased the area under plasma acetaminophen
Picchioni AL, Chin L, Gillespie T	Evaluation of activated charcoal-sorbitol suspension as an antidote	J Toxicol Clin Toxicol	1982	19		433	444	活性炭／下剤	動物実験		Studies in rats were performed to evaluate the effect of sorbitol on the antidotal efficacy of activated charcoal against four test drugs and to investigate the influence of storage upon the antidotal effect of activated charcoal-sorbitol suspension. The antidotal potency of activated charcoal was not diminished by sorbitol solution 70% w/v. In fact, it was enhanced by the sorbitol solution, as indicated by greater decrease in peak tissue drug concentration, compared to the effect produced by activated charcoal in aqueous suspension. Furthermore, storage of activated charcoal in sorbitol for as long as 1 year did not reduce the antidotal-efficiency of the absorbent.
Chung DC, Murphy JE, Taylor TW	In-vivo comparison of the adsorption capacity of "superactive charcoal" and fructose with activated charcoal and fructose.	J Toxicol Clin Toxicol	1982	19	2	219	224	活性炭	ヒトモデル実験		This study was undertaken to assess the in-vivo capacity of two activated charcoal products to adsorb aspirin after its ingestion by seven healthy volunteers. The two products, Norit-A and Super-Sorb, were combined with fructose solution and administered after the subjects ingested 975 mg of aspirin. Urinary excretion of salicylates was measured during both charcoal administration phases and after ingestion of aspirin alone in all subjects. Results showed statistically significant differences in salicylate excretion between all phases. Super-Sorb ("superactive charcoal") adsorbed almost twice (1.7) as much as aspirin as the regular activated charcoal, Norit-A. Super-Sorb therefore has a greater in-vivo adsorption capacity for aspirin and should be a more effective antidote in poisonings with this drug.
Comstock EG, Boisaubin EV, Comstock BS, Faulkner TP	Assessment of the efficacy of activated charcoal following gastric lavage in acute drug emergencies	J Toxicol Clin Toxicol	1982	19	2	149	165	胃洗浄／活性炭	臨床研究		The efficacy of administering a slurry of 100 g of activated charcoal (AC) via the gastric tube following lavage was assessed in 25 treated and 37 control patients presenting to the emergency room with chemical evidence of sedative-hypnotics or aspirin in the blood. Efficacy was evaluated as the ability of AC to prevent further absorption as determined by subsequent blood drug concentration changes. Although fewer patients in the AC group showed increased blood drug concentrations, the differences were not statistically significant. Comparison of the mean percent change in blood drug concentrations at various times following treatment produced similar results. Comparisons using subgroups of patients based on the individual drugs, the treatment delay time, and entering functional decompensation showed significant benefit from AC only in the less symptomatic patients. Comparing these results with other studies demonstrating the unequivocal efficacy of
Dournon E, Bure A, Desplaces N, Carette MF, Mayaud C	Legionnaires' disease related to gastric lavage with tap water	Lancet	1982	1	8275	797	798	胃洗浄	レタ／コメント		
Berg MJ, Berlinger WG, Goldberg MJ, Spector R, Johnson GF	Acceleration of the body clearance of phenobarbital by oral activated charcoal.	N Engl J Med	1982	307	11	642	644	活性炭	ヒトモデル実験		We investigated the effect of multiple oral doses of activated charcoal on the pharmacokinetics of intravenously administered phenobarbital in a randomized crossover trial. Six healthy men volunteered to take 200 mg of phenobarbital sodium per 70 kg of body weight intravenously on two separate occasions. On one occasion, each subject received oral activated charcoal (180 g) in divided doses over three days after the infusion of phenobarbital. Serum levels of phenobarbital were measured in all subjects up to 96 hours after the infusion, and urinary excretion of phenobarbital was measured in two subjects 24 to 96 hours after the infusion. A pharmacokinetic analysis showed that the charcoal decreased the serum half-life of phenobarbital form 110 +/- 8 to 45 +/- 6 hours (S.E.M.) (P less than 0.01), increased the total body clearance of phenobarbital from 4.4 +/- 0.2 to 12.0 +/- 1.6 ml per kilogram per hour (P less than 0.01), and increased the nonrenal clearance from 52 to 80 per cent of the
Levy G	Gastrointestinal clearance of drugs with activated charcoal	N Engl J Med	1982	307	11	676	678	活性炭	レタ／コメント		Comment on ; N Engl J Med 1982;307:642
Bennett HS, Spiro AJ, Pollack MA, Zucker P	Ipecac-induced myopathy simulating dermatomyositis	Neurology	1982	32		91	94	催吐	症例報告		We studied a young woman with an eating disorder. To induce vomiting, she took syrup of ipecac daily for 2 years, and then developed insidious, progressive muscle weakness. Skin findings were similar to those of dermatomyositis. Muscle biopsy, however, was similar to experimental emetine myopathy and lacked inflammatory features. Upon cessation of ipecac abuse, strength returned. We believe that this patient had ipecac-induced muscle
North DS, Thompson JD, Peterson CD	Effect of activated charcoal on ethanol blood levels in dogs	Am J Hosp Pharm	1981	38		864	866	活性炭／拮抗薬	動物実験		The effect of activated charcoal on ethanol blood levels following oral administration of ethanol was studied. Six healthy laboratory dogs were administered 2 ml/kg of 95% ethanol diluted to a 20% solution. Blood ethanol concentrations were measured at 0.5, 1.2, and 3 hours after dosing. After a one-week washout period, the same animals received an identical dose of ethanol preceded by 50 g of activated charcoal in a water slurry. Blood ethanol concentrations were again determined. Absorption of ethanol was significantly (p less than 0.005) inhibited by activated charcoal during the first hour after administration. Blood ethanol levels remained significantly lower (p less than 0.025) throughout the study in the activated charcoal group. Especially during the initial, critical hours of therapy, activated charcoal can significantly reduce the desired blood ethanol concentration required when ethanol is used as an emergency antidote for methanol or ethylene glycol poisonings. The use of activated charcoal is discouraged in poisoning emergencies where such oral-

North DS, Peterson RG, Krenzelok EP	Effect of activated charcoal administration on acetylcysteine serum levels in humans	Am J Hosp Pharm	1981	38	7	1022	1024	活性炭／拮抗薬	ヒトモデル実験		The effect of orally administered activated charcoal on the absorption of acetylcysteine in three men was studied. Each of the three volunteers was given 140 mg/kg acetylcysteine as a single oral dose. Blood samples were taken at 0, 0.5, 1, 1.5, 2, 4, 6, and 8 hours after acetylcysteine ingestion. Following a one-week washout period, each subject was given orally 50 g of Activated Charcoal, USP, 15 minutes before a 140-mg/kg acetylcysteine oral dose. Blood samples were taken. Acetylcysteine content in the plasma was determined with a high-pressure ion-exchange chromatography system using a gold-mercury electrochemical cell. No statistically significant differences were found between total areas under the curves, peak concentrations, or time of peak concentrations of acetylcysteine given with or without charcoal. Although acetylcysteine absorption was delayed in two patients, the differences were not significant. These data suggest that acetylcysteine absorption is not impaired by activated charcoal administration. This conflicts with previously
Rumack BH	Emesis: Safe and effective?	Ann Emerg Med	1981	10		551		催吐	レタ／コメント		
McDougal C, Maclean MA	Modifications in the technique of gastric lavage	Ann Emerg Med	1981	10	10	514	517	胃洗浄	in vitro		A simple experimental model was used to demonstrate the effects of water temperature and mechanical agitation in removing pills during gastric lavage. It was nearly impossible to remove pills from an artificial stomach using room temperature water and no mechanical agitation, Using warm tap water and repetitive compressions of the artificial stomach, the pills were consistently removed with ease. We recommend that gastric lavage for poisoning victims include two phases, the first using traditional lavage technique, and the second using larger aliquots, warm lavage fluid, and massage of the epigastrium.
Tandberg D, Liechty EJ, Fishbein D	Mallory-Weiss syndrome: An unusual complication of ipecac-induced emesis	Ann Emerg Med	1981	10	10	521	523	催吐	症例報告		A young presented to the emergency department after ingesting multiple drugs. Upper gastrointestinal bleeding developed after emesis was induced with syrup of ipecac. A small Mallory-Weiss tear of the cardioesophageal junction was found at endoscopy. This case is presented to alert physicians to this uncommon complication of ipecac-induced emesis.
Pollack MM, Dunbar BS, Holbrook PR, Fields AI	Aspiration of activated charcoal and gastric contents	Ann Emerg Med	1981	10	10	528	529	活性炭	症例報告		A case of aspiration of activated charcoal and gastric contents is reported. The patient developed immediate airway obstruction treated by endotracheal intubation and suctioning. Protracted respiratory insufficiency characterized by severe bronchospasm developed after airway obstruction was alleviated.
Uden DL, Davison GJ, Kohen DP	The effect of carbonated beverages on ipecac-induced emesis	Ann Emerg Med	1981	10	2	79	81	催吐	臨床研究		To determine the effect of carbonated beverages on syrup of ipecac, 24 pediatric patients were randomly administered six ounces of water or a carbonated beverage with syrup of ipecac. Changes in the abdominal girth, the volume of emesis, and time of emesis were monitored in all patients. In the carbonated beverage group a significant difference (P less than 0.05) was observed between the baseline and 10-min post-ipecac administration abdominal girth measurements. The time of emesis and volume of emesis were not significantly different in the water or carbonated beverage groups. We conclude that carbonated beverage administration does not alter the effectiveness of syrup of ipecac.
Riegel JM, Becker CE	Use of cathartics in toxic ingestions.	Ann Emerg Med	1981	10	5	254	258	下剤	総説		Cathartics are commonly recommended for treatment of ingestion of toxic substances. Literature review shows little evidence of efficacy of this practice. Published reports of morbidity are limited to pediatric patients experiencing electrolyte imbalance. Our survey of the members of the American Board of Toxicology, as well as our literature review, form the basis for suggesting catharsis of most patients when treating toxic ingestions. However, caution must be used in very old or very young patients, in those with preexisting renal disease or ingestion of nephrotoxic substances, in corrosive ingestions, in patients with recent bowel surgery or absent bowel sounds, and in patients with hypertension or congestive heart failure. Oil catharsis is not
Gilmore IT, Ellis WR, Barrett GS, Pendower JE, Parkins RA	A comparison of two methods of whole gut lavage for colonoscopy.	Br J Surg	1981	68	6	388	389	腸洗浄	臨床研究		Two forms of bowel preparation for colonoscopy were compared--19 patients were given 5 per cent mannitol solution orally while a further 19were infused with isotonic saline via a nasogastric tube. Both methods proved equally acceptable to the patients and endoscopists. Saline led to a rise in body weight (+0.75 +/- 0.35 kg) and blood pressure (+7.5 +/- 2.8 mmHg) while mannitol caused a significant fall in both body weight (-0.74 +/- 0.28 kg) and blood pressure (-3.8 +/- 2.9 mmHg). Plasma volume measurements were carried out on 17 patients; 8 receiving saline showed a rise (+0.22 +/- 0.08 l) while 9 taking mannitol experienced a fall (-0.17 +/- 0.08 l). Twelve further subjects prepared with a combination 10 per cent mannitol and isotonic saline showed a small fall in plasma volume (-0.08 +/- 0.05 l). Mannitol proved an acceptable preparation for colonoscopies but a fall in body weight, blood pressure and plasma volume posed a small risk to the elderly subject and in view of the known risks of
Brotman MC, Forbath N, Garfinkel PE, Humphrey JG	Myopathy due to ipecac syrup poisoning in a patient with anorexia nervosa	Can Med Assoc J	1981	125	5	453	454	催吐	症例報告		
Chin L, Picchioni AL, Gillespie T	Saline cathartics and saline cathartics plus activated charcoal as antidotal treatments	CJ Toxicol Clin Toxicol	1981	18	7	865	871	活性炭／下剤			The results of this experimental study indicate that Na2SO4 reduces the gastrointestinal absorption of aspirin, but not that of pentobarbital, chlorpheniramine, or chloroquine. Activated charcoal (AC) and the combination of AC + Na2SO4 were effective in reducing gastrointestinal absorption of all four test drugs. The combination treatment was more effective than AC treatment in reducing gastrointestinal absorption of aspirin, pentobarbital, and chloroquine. We believe that saline cathartics should not be used in lieu of AC for treatment of poison ingestions, and their routine use to treat poison ingestion should be reevaluated. On the other hand, saline cathartics may be used in conjunction with AC to enhance the antidotal effect of the adsorbent.
LaPierre G, Algozzine G, Doering PL	Effect of magnesium citrate on the in vitro adsorption of aspirin by activated charcoal	J Toxicol Clin Toxicol	1981	18	7	793	796	活性炭／下剤	in vitro		The objective of this study was to determine if magnesium citrate solution given concurrently with activated charcoal would affect charcoal's in vitro ability to bind aspirin. Aspirin and charcoal were mixed in simulated gastric fluid and simulated intestinal fluid, and then magnesium citrate solution was added in proportions simulating those encountered clinically. Results indicate that no clinically significant interaction occurs between magnesium citrate and activated charcoal in either fluid, and that these two agents can be given simultaneously without decreasing the binding capacity for aspirin.
Klein-Schwartz W, Oderda G	Adsorption of oral antidotes for acetaminophen poisoning (methionine and N-acetylcysteine) by activated charcoal	J Toxicol Clin Toxicol	1981	18	3	283	90	活性炭／拮抗薬	in vitro		An in vitro experiment was performed to assess the degree of adsorption of oral antidotes for acetaminophen poisoning, methionine and N-acetylcysteine, by activated charcoal. Results indicate that activated charcoal effectively adsorbs both methionine and N-acetylcysteine. Since these agents must be absorbed from the GI tract to prevent acetaminophen hepatotoxicity, concurrent administration of methionine or N-acetylcysteine and activated charcoal would be expected to markedly diminish their antidotal effectiveness.
Comstock EG, Faulkner TP, Boisaubin EV, Olson DA, Comstock BS	Studies on the efficacy of gastric lavage as practiced in a large metropolitan hospital	J Toxicol Clin Toxicol	1981	18	5	581	597	胃洗浄	臨床研究		The efficacy of gastric lavage as it is practiced in a major metropolitan hospital was evaluated. From a population of 76 patients with chemical evidence of sedative-hypnotic drugs in the blood, two or more therapeutic doses were recovered from 15.8% of the lavage samples, and 10 or more therapeutic doses were recovered from 6.6%. In a population consisting of patients with detectable quantities of drugs in the lavage sample, diazepam and amitriptyline are more adequately recovered than the sedative-hypnotic drugs. Very poor recoveries were obtained in patients lavaged more than 2 h after ingestion except in cases of amitriptyline overdose or massive sedative-hypnotic ingestion. The study indicates that inadequate criteria are employed in selecting patients most likely to benefit from lavage. Dose, time since ingestion, and symptomatology are discussed as criteria for selection of patients for
Minervini S, Alexander-Williams J, Donovan IA, et al.	Comparison of three methods of whole bowel irrigation	Am J Surg	1980	140	3	400	402	腸洗浄	臨床研究		Sixty-two patients undergoing colorectal surgery or colonoscopy were prepared by three methods of whole bowel irrigation: nasogastric saline solution alone, nasogastric saline irrigation with oral mannitol, and oral mannitol solution without saline. The additional of mannitol to saline irrigation reduced the risk of sodium and water retention, which was eliminated by oral mannitol alone. The best mechanical preparation was achieved by adding mannitol to saline irrigation, but oral mannitol alone was judged more acceptable by the patients and less demanding by the nursing staff and was the preparation of

Peterson CD, Fifield GC	Emergency gastrotomy for acute iron poisoning	Ann Emerg Med	1980	9	5	262	264	胃切開	症例報告		A 15-month-old girl who ingested an estimated 80 mg/kg to 100 mg/kg of elemental iron was treated in the emergency department for acute iron poisoning. Attempts to evacuate the stomach using emesis and gastric lavage were ineffective. Abdominal radiographs confirmed the presence of large, iron-containing aggregates in the stomach. An emergency gastrotomy was required to remove this potentially lethal dose of iron. During surgery the iron was noted to be embedded in the gastric mucosa, explaining its previous resistance to conventional stomach-emptying methods.
Neuvonen PJ, Elonen E	Effect of activated charcoal on absorption and elimination of phenobarbitone, carbamazepine and phenylbutazone in man.	Eur J Clin Pharmacol	1980	17	1	51	57	活性炭			
Davis GR, Santa Ana CA, Morawski SG, Fordtran JS	Inhibition of water and electrolyte absorption by polyethylene glycol (PEG).	Gastroenterology	1980	79	1	35	39	腸洗浄	ヒトモデル実験		Polyethylene glycol (PEG) is commonly used as a nonabsorbable volume marker in intestinal perfusion and flow studies. It has been assumed that PEG does not affect water and electrolyte movement, but this has not been extensively investigated. Using triple-lumen tube perfusion technique, we examined the effect of various PEG concentrations (0, 2, 5, 10, and 20 g/liter) on water and electrolyte absorption by the jejunum and ileum in normal subjects. 14C-labeled PEG served as the nonabsorbable marker in the 0 PEG concentration solution. There was a progressive reduction in water, sodium, and chloride absorption as the concentrations of PEG was increased from 0 to 20 g/liter. Though further studies are necessary to establish the mechanism responsible for this PEG effect, the observed changes in luminal fluid osmolality and electrolyte concentrations suggest that the reduction in absorption most likely results from an osmotic effect rather than an inhibition of active absorption or stimulation of secretion.
Davis GR, Santa Ana CA, Morawski SG, Fordtran JS	Development of a lavage solution associated with minimal water and electrolyte absorption or secretion	Gastroenterology	1980	78	5 Pt 1	991	995	腸洗浄	ヒトモデル実験		Ingestion of large volumes of a balanced electrolyte solution has previously been shown to be an effective method of cleaning the colon for diagnostic studies. However, in this paper we have shown that total gut perfusion with such a solution results in absorption of 2400 ml water and 375 meq of sodium over 3 hr, which is the approximate time required to clean the colon by this technique. This might be hazardous to patients who are unable to readily excrete a salt and water load. We, therefore, designed a solution containing mainly sodium sulfate that was associated with only trivial amounts of water and sodium absorption or secretion during total gut perfusion. This new solution might be useful in colon cleansing before colonoscopy, barium enema, and surgery. In addition, such a solution may have some therapeutic indications, including bowel cleaning in patients with hepatic encephalopathy or
Ryan CF, Spigiel RW, Zeldes G	Enhanced adsorptive capacity of activated charcoal in the presence of magnesium citrate, N.F	J Toxicol Clin Toxicol	1980	17	3	457	461	活性炭／下剤			In a series of experiments to determine the effect of magnesium citrate solution, NF, on the adsorption of sodium salicylate onto charcoal, salicylate adsorption was shown to be enhanced in the presence of citrate ion and, to a lesser extent, magnesium ion. Additional in vitro and in vivo studies with sodium salicylate, as well as other drugs, will be necessary to fully assess the potential clinical implications of these findings.
Cooney DO, Kane RP	Superactive charcoal adsorbs drugs as fast as standard antidotal charcoal	J Toxicol Clin Toxicol	1980	16		123	125	活性炭			Experimental data on the uptake of two test drugs by powdered Amoco PX-21 and Norit A activated charcoals in stirred-batch tests indicate that the rate of uptake by the Amoco charcoal is equal to, or higher than, the uptake rate by Norit A. In contrast to the conjecture of Medema [1], the superactive Amoco charcoal is not kinetically inferior to Norit A. The superactive charcoal remains highly recommended for antidotal uses.
Adler AG, Walinsky P, Krall RA, Cho SY	Death resulting frorn Ipecac syrup poisoning	JAMA	1980	243	19	1927	1928	催吐	症例報告		
Chinouth RW, Czajka PA, Peterson RG	N-acetylcystine adsorption to activated charcoal	Vet Hum Toxicol	1980	22	6	392	393	活性炭／拮抗薬	in vitro		N-acetylcysteine was adsorbed by activated charcoal, lending in vitro support to previous clinical of activated charcoal for NAC in biologic fluid was significantly greater than in nonbiologic fluid and has important clinical implications. Although some have advocated lavage to remove activated charcoal prior to the administration of NAC, the avid adsorption of NAC suggested that activated charcoal may not be justifiable for acetaminophen overdosage when NAC therapy is indicated. Studies in humans are required to substantiate the clinical significance of this in vitro adsorption.
Decker WJ, Corby DG	Activated charcoal adsorbs aflatoxin B1	Vet Hum Toxicol	1980	22	6	388	389	活性炭	in vitro		Activated charcoal was demonstrated to adsorb aflatoxin B1 in an efficient manner in vitro at a neutral pH. One mg aflatoxin was adsorbed by 100mg activated charcoal. The complex appeared to be quite stable. Destruction of the aflatoxin by alkaline conditions was confirmed, and a large measure of destruction was also noted at acid pH. Implications of the adsorption phenomenon include prevention of systemic absorption.
Juhl RP	Comparison of kaolinpectin and activated charcoal for inhibition of aspirin absorption	Am J Hosp Pharm	1979	36		1097	1098	活性炭	ヒトモデル実験		The effects of kaolin-pectin suspension and of activated charcoal on aspirin absorption were compared. Ten fasting volunteers each received on five separate occasions three 325-mg aspirin tablets with: (1) 240 ml of water, (2) 10 g of activated charcoal in a slurry with 240 ml of water, (3) 30 ml of kaolin-pectin suspension with 210 ml of water, (4) 60 ml of kaolin-pectin with 180 ml of water, and (5) 90 ml of kaolin-pectin with 150 ml of water. Aspirin bioavailability was estimated from spectrophotometric assay of total 48-hour urinary salicylate recovery. The mean urine salicylate recovery following administration of activated charcoal (69.5%) was significantly less (p less than 0.01) than that following administration of 30, 60 or 90 ml of kaolin-pectin (90.6, 94.6 and 95.3%, respectively) or of water only (98.6%). The mean percent aspirin recoveries for the 30-ml and 60-ml kaolin-pectin treatments were significantly less than that for water only (p less than 0.05). Neither activated
Chung RS, Gurll NJ, Berglund EM	A controlled clinical trial of whole gut lavage as a method of bowel preparation for colonic operations.	Am J Surg	1979	137	1	75	81	腸洗浄	臨床研究		In a prospective randomized clinical trial, whole gut lavage was evaluated against conventional mechanical cleansing for colonic operations. The lavage took less time to perform, was better tolerated by patients, and resulted in more satisfactory preparation as judged by frequency of collapsed intestines. There was no difference in the outcome in the two series as measured by wound infection rate and length of hospitalization. It is concluded that whole gut lavage is as good as conventional mechanical cleansing but surpasses the latter in logistic advantages.
Boba A	Management of drug overdose. Rapid whole-gut evacuation	Illinois Medical Journal	1979	155	3	156	157	腸洗浄			
Sintek C, Hendeles L, Weinberger M	Inhibition of theophylline absorption by activated charcoal	J Pediatr	1979	94	4	314	316	活性炭			
Robertson WO	Syrup of ipecac associated fatality : a case report	Vet Hurn Toxicol	1979	21	2	87	89	催吐	症例報告		
Scholtz EC, Jaffe JM, Colaizzi JL	Evaluation of five activated charcoal formulations for the inhibition of aspirin absorption and palatability in man	Am J Hosp Pharm	1978	35	11	1355	1359	活性炭			
Clements JA, Heading RC, Nimmo WS, Prescott LF	Kinetics of acetaminophen absorption and gastric emptying in man	Clin Pharmacol Ther	1978	24		420	31	胃洗浄／活性炭／腸洗浄	ヒトモデル実験		Eight healthy male volunteers ingested an aqueous solution containing acetaminophen (20 mg/kg) and a nonabsorbable isotopic marker. The concentrations of unconjugated acetaminophen in samples of blood plasma taken at frequent intervals were measured by gas-liquid chromatography. The data points followed a smooth curve in most cases and were fitted to the classical two-compartment pharmacokinetic model to obtain KA, the apparent first-order rate constant for absorption from the gastrointestinal tract. Gastric emptying was measured simultaneously from serial scintiscans of the subject's abdomen. The subjects were also studied after intramuscular injection of meperidine (150 mg) and pentazocine (60 mg) with and without naloxone (1.2 mg). The acetaminophen absorption curves and gastric emptying patterns were consistent with negligible absorption from the stomach. A new model is proposed in which the conventional single compartment used to represent the gastrointestinal tract is replaced by two compartments: one represents the

Dawling S, Crome P, Braithwaite R	Effect of delayed administration of activated charcoal on nortriptyline absorption	Eur J Clin Pharmacol	1978	14	6	445	447	活性炭	ヒトモデル実験		Activated charcoal is known to reduce the absorption of therapeutic doses of nortriptyline in vivo when administered 30 min after drug ingestion. In a group of volunteers, one sachet (10 g) of a new activated charcoal preparation, 'Medicoal' was found to produce a highly significant reduction in nortriptyline absorption when given as long as four hours after nortriptyline dosing. Activated charcoal may therefore be useful in the treatment of tricyclic antidepressant poisoning even if a delay of several hours ensues before
Neuvonen PJ, Elfving SM, Elonen E	Reduction of absorption of digoxin, phenytoin, and aspirin by activated charcoal in man	Eur J Clin Pharmacol	1978	13	3	213	218	活性炭	ヒトモデル実験		The inhibitory effect of activated charcoal 50 g suspended in water on the absorption of digoxin, phenytoin and aspirin was studied in six healthy volunteers in a cross-over manner. The absorption of digoxin and phenytoin were almost completely prevented (about 98%) when activated charcoal was ingested immediately after the drug. The total absorption of aspirin was inhibited by 70%; with clear postponement of absorption and partial release of aspirin from the charcoal in the gut: The peak serum concentration of aspirin was reduced by 95% by charcoal. When activated charcoal was ingested 1 hour after the drugs the inhibition of absorption was considerably less. However, since the absorption of larger doses of the drugs is often slow, the administration of an adequate dose of activated charcoal will be of definite value in the treatment of acute intoxication, even if delayed for several hours.
Cooney DO	In vitro evidence for ipecac inactivation by activated charcoal	J Pharm Sci	1978	67		426	427	活性炭／催吐	in vitro		The in vitro adsorption of the alkaloid emetine, a primary constituent of ipecac, on activated charcoal was studied. The results support the supposition that syrup of ipecac should not be given to counteract poisonings if activated charcoal is also to be administered.
Blake DR, Bramble MG	Is there excessive use of gastric lavage in the treatment of self-poisoning?	Lancet	1978	2(8104-5)	Dec 23-30	1362	1364	胃洗浄	症例シリーズ		An attempt to identify those factors which influenced the decision to perform gastric lavage in 236 cases of deliberate self-poisoning seen over 6 months showed that 87% of patients seen within 4 hours of ingestion of the poison had a lavage, irrespective of the number of tablets and nature of drug taken. Overall, 77% had a gastric lavage. Most of the late lavages were carried out for salicylate ingestion. The changing pattern of drugs used for attempted selfpoisoning suggests that at least 50% of patients are being unnecessarily subjected to gastric lavage.
Chambers CE, Carter HG	Saline lavage : A rapid, safe, effective method of whole-gut irrigation for bowel preparation.	South Med J	1978	71		1065	1066	腸洗浄	臨床研究		The standard preparation for cleansing the colon usually involves dietary restrictions, purgatives, and enemas. This is time-consuming, often uncomfortable, and at times unsuccessful. This study of 37 patients examines the efficacy of saline lavage as an alternative method for cleansing the bowel. Isotonic sodium chloride solution is passed into the gut via a small nasogastric tube. The flush is continued for about four hours, until clear effluent is passed per anus. There were no significant complications or variations in weight or serum electrolyte values. Patient acceptance was generally excellent. In our opinion, this rapid bowel preparation consistently provided a clean bowel so that both bowel preparation and colonscopy were accomplished the same day.
Miser JS, Robertson WO	Ipecac poisoning	West J Med	1978	128	5	440	442	催吐			
MamoBR, MamoJE	Toxicology of Ipecac：a view	ClinToxicol	1977		10	1221	42	催吐			
Ritschel WA, Erni W	The influence of temperature of ingested fluid on stomach emptying time	Int J Clin Pharmacol Biopharm	1977	15	4	172	175	胃洗浄	ヒトモデル実験		The influence of the temperature of ingested water on the stomach emptying time of solid material was studied in healthy volunteers using a telemetric pH measurement device. The time of discharge of the indigestible capsule from the stomach into the duodenum is statistically faster when administered with 250 ml of water at 5 degrees C, 15.91+/-10.04 min. (mean+/-SD) than it is with water at 20-25 degrees C, 48.18+/-28.97 min (mean+/-SD) or at 45 degrees C 71.42+/-37.08 min. (mean+/-SD). It seems that the interindividual variation is larger than the intra-individual one. These observations suggest that enteric coated preparations and drugs which are inactivated by gastric fluid or irritate gastric mucosa should be administered only with ice water (4-6 degrees C), and stomach washings (with charcoal) in order to remove a poisoning agent should be performed with warm water (45 degrees C).
Mayersohn M, Perrier D, Picchioni AL	Evaluation of a charcoal-sorbitol mixture as an antidote for oral aspirin overdose	J Toxicol Clin Toxicol	1977	11	5	561	570	活性炭／下剤			The preparation of charcoal in a 70% sorbitol solution results in a suspension that is more palatable and less gritty than an aqueous slurry of charcoal. Although the charcoal-sorbitol mixture may be slightly less effective in reducing the extent of aspirin absorption compared with a charcoal slurry, it may prove to be of particular value in those cases where acceptance of a
Mathur LK, Jaffe JM, Colaizzi JL, Moriarty RW	Activated charcoacarboxy-methylcellulose gel formulation as an antidotal agent for orally ingested aspirin	Am J Hosp Pharm	1976	33	7	717	719	活性炭	ヒトモデル実験		The in vivo effect on aspirin absorption of a potentially more palatable form of activated charcoal was compared to that of a simple aqueous slurry of activated charcoal. The experimental formulation consisted of 20.0 g of activated charcoal, 2.25 g of carboxymethylcellulose (CMC) and 42.8 ml of water; it was tested with and without chocolate syrup as a flavoring agent added just prior to administration. Six subjects were treated in crossover fashion following an aspirin dose of 972 mg. Total urinary excretion of salicylate was measured over 48 hours. Although all three treatments appeared to be effective in reducing the rate and extent of aspirin absorption, the slurry was significantly more effective in reducing the total amount absorbed than the charcoal-CMC gel with chocolate syrup. The slight difference in effectiveness between the gel formulation with and without the chocolate syrup was not
Levy AG, Benson JW, Hewlett EL, Herdt JR, Doppman JL, Gordon RS Jr	Saline lavage : A rapid, effective, and acceptable method for cleansing the gastrointestinal tract.	Gastroenterology	1976	70	2	157	161	活性炭	臨床研究		The standard preparation for cleansing the gastrointestinal tract for diagnostic studies such as barium enema usually involves dietary restrictions, purgatives, and cleansing enemas. This preparation is time consuming, often uncomfortable for the patient, and frequently unsuccessful. In this study, we examined the efficacy of saline lavage (without dietary restrictions or cleansing enemas) as a gentle, alternative method for cleansing the bowel, and compared lavage to the standard castor oil method of bowel preparation. Lavage cleansing was preferred by 75% of patients who had previously experienced a castor oil preparation. Although 11% of patients could not consume an adequate (4-liter) lavage volume, there was no significant difference in preparation success rate between the remaining lavage patients and the castor oil patients. Total preparation time for lavage (3 +/- 1 hr) was 60% less than for castor oil. The anticipated·dehydration produced by castor oil and the hydration produced by
Schwartz HS	Acute meprobamate poisoning with gastrotomy and removal of a drug-containing mass	N Engl J Med	1976	295	21	1177	1178	胃切開	症例報告		
Levy G, Houston JB	Effect of activated charcoal on acetaminophen absorption	Pediatrics	1976	58	3	432	435	活性炭	ヒトモデル実験		Acetaminophen intoxication can cause hepatic, renal, and myocardial necrosis which is often fatal. These lesions develop very rapidly, perhaps during the first pass of the drug through the liver. In case of acute ingestion of an overdose it is therefore essential to employ measures for reducing the absorption of acetaminophen. The effect of activated charcoal on acetaminophen absorption by normal volunteers was determined as a function of the dose of charcoal, the dosage form of acetaminophen, and the charcoal-to-acetaminophen dose ratio. The results indicate that activated charcoal can be an effective antidote for acute acetaminophen intoxication, if administered promptly and in sufficient quantity.
Levy G, Soda DM, Lampman TA	Inhibition by ice cream of the antidotal eificacy of activated charcoal	Am J Hosp Pharm	1975	32	3	289	291	活性炭	in vitro		A study was conducted to determine if ice cream and sherbet interfered with the adsorption of aspirin onto activated charcoal both in vivo and in vitro. An aqueous suspension of 20 g activated charcoal decreased the absorption of 1 g aspirin by 65%; the same dose of activated charcoal with 50 g of ice cream reduced aspirin absorption by only 42% under otherwise identical conditions. In vitro tests showed that different ice creams and sherbet decrease the adsoprtion of aspirin onto activated charcoal. Thus, although ice cream is useful for preparing palatable suspensions of activated charcoal, it decreases appreciably the antidotal efficacy of the adsorbent.
Sorensen PN, Lindkaer-Jensen S, Dijk A, Maes RA, Drost RH	The effect of magnesium sulfate on the absorption of acetylsalicylic acid and lithium carbonate from the human	Arch Toxicol	1975	34	2	121	127	下剤	ヒトモデル実験		Magnesium sulfate given orally in a hypertonic or isotonic solution did not alter the absorption of therapeutic doses of acetylsalicylic acid or lithium carbonate, despite a purgative effect in 10 volunteers. The concentration of magnesium in serum remained unchanged during the experiments.

Crapp AR, Tillotson P, Powis SJ, Cooke WT, Alexander-Williams J	Preparation of the bowel by whole-gut irrigation.	Lancet	1975	2		1239	1240	腸洗浄	臨床研究		Experience with whole-gut irrigation as a method of bowel preparation in eightyone patients is described. The mean (+/-S.D.) weight-gain during irrigation was 1-9 +/- 0-8 kg; potassium losses in the effluent after one hour (4-0 +/- 2-5 g) were not significantly altered by adding potassium chloride to the irrigant. Eight irrigations were unsatisfactory, three being due to unrecognised obstructive neoplasms. The method provided excellent preparation for colonoscopy and large-bowel resection with anastomosis and
harman JR, Cretney MJ, Scott RD, Janus ED	Drug overdoses: Is one stomach washing enough?	N Z Med J	1975	81	534	195	197	胃洗浄	症例シリーズ		Naso-gastric tube aspirates were taken from patients with drug overdoses who had been given a gastric lavage and admitted to the resuscitation ward. Although care was taken to conduct thorough washouts, it was found that these were not always efficient. In several cases an amount equivalent to a therapeutic dose of drug was recovered in later aspirates. There was no correlation between the amount of drug recovered in the initial stomach washings and that found in the aspirates. It was concluded that routine aspiration of gastric contents at hourly intervals after admission was of
Mattila MJ, Takki S, Jussila J	Effect of sodium sulphate and castor oil on drug absorption from the human intestine	Ann Clin Res	1974	6		19	24	下剤			
Alvan G, Ericsson O, Levander S, Lindgren JE	Plasma concentrations and effects of methaqualone after single and multiple oral doses in	Eur J Clin Pharmacol	1974	7	6	449	454	活性炭			
Bartecchi C	A modification of gastric lavage technique	JACEP	1974	3		304	305	胃洗浄			
Hewitt J, Reeve J, Rigby J, Cox	Whole-gut irrigation in preparation for large-bowel	Lancet	1973	2	7825	337	340	腸洗浄	ヒトモデル実験		
Otto U, Stenberg B	Drug adsorption properties of different activated charcoal dosage forms in vitro and in man	Svensk Farm Tids	1973	77		613	615	活性炭			
Chin L, Picchioni AL, Bourn WM, Laird HE	Optimal antidotal dose of activated charcoal	Toxicol Appl Pharmaco	1973	26	1	103	108	活性炭			
Levy G, Tsuchiya T	Effect of activated charcoal on aspirin absorption in man. Part I	Clin Pharmacol Ther	1972	13	3	317	22	活性炭			
Tsuchiya T, Levy G	Drug adsorption efficacy of commercial activated charcoal tablets in vitro and in man	J Pharm Sci	1972	61	4	624	625	活性炭	ヒトモデル実験		
Tsuchiya T, Levy G	Relationship between effect of activated charcoal on drug absorption in man and its drug adsorption characteristics in vitro	J Pharm Sci	1972	61	4	586	589	活性炭			
Burke M	Gastric lavage and emesis in the treatment of ingested poisons: A review and a clinical study of lavage in ten adults.	Resuscitation	1972	1	2	91	105	胃洗浄／催吐	総説		
Calvert WE, Corby DG, Herbertson LM,	Orally administered activated charcoal : acceptance by children	JAMA	1971	215	4	461		活性炭			
Boxer L, Anderson FP, Rowe DS	Comparison of ipecac-induced emesis with gastric lavage in the treatment of acute salicylate ingestion	J Pediatr	1969	74	5	800	803	胃洗浄／催吐	臨床研究		
Chin L, Picchioni AL, Duplisse BR	Comparative antidotal effectiveness of activated charcoal, Arizona montmorillonite, and evaporated milk	J Pharm Sci	1969	58		1353	1356	活性炭			
Ritter FN, Newman MH, Newman DE	A clinical and experimental study of corrosive burns of the stomach	Ann Otol Rhinol Laryngo	1968	l 77		830		胃洗浄			
Corby DG, Decker WJ, Moran MJ, Payne	Clinical comparison of pharmacologic emetics in children	Pediatrics	1968	42		361	364	催吐			
Abdallah AH, Tye A	A comparison of the efficacy of emetic drugs and stomach lavage	Am J Dis Child	1967	113		571	575	胃洗浄／催吐	動物実験		
Corby DG, Lisciandro RC, Lehman RH, Decker WJ	The efficiency of methods used to evacuate the stomach after acute ingestions	Pediatrics	1967	40	5	871	874	胃洗浄／催吐	動物実験		The ingestion of substances capable of causing death is a medical problem of considerable importance. In the United States, approximately eight persons die each day from accidentally or intentionally swallowing a variety of agents ranging from aspirin to insecticides. For every fatality it is estimated there are several hundred non-fatal cases. At William Beaumont General Hospital approximately 400 cases of acute ingestion of potentially fatal substances are given emergency treatment annually. The two methods generally used for the removal of toxic products from the stomach are gastric lavage and the use of emetic agents. Although lavage is probably most frequently used, studies comparing it with ipecac and apomorphine indicate that lavage is inefficient and support the use of pharmacologically induced emesis. Syrup of ipecac and apomorphine are the emetics generally described as being the most clinically useful. Of the two, syrup of ipecac is used almost universally at the present
Smith RP, Gosselin RE, Henderson JA, Anderson DM	Comparison of the adsorptive properties of activated charcoal and Alaskan montmorillonite for some common poisons	Toxicol Appl Pharmacol	1967	10	1	95	104	活性炭			
Matthew H, Mackintosh TF, Tompsett SL, Cameron JC	Gastric aspiration and lavage in acute poisoning	Br Med J	1966	28	5499	1333	1337	胃洗浄			
Robertson WO	Syrup of ipecac: A slow or fast emetic?	Am J Dis Child	1962	103		136	139	催吐			
Allan BC	The role of gastric lavage in the treatment of patients suffering from barbiturate overdose	Med J Aust	1961	2		513	514	胃洗浄			
Smith RP, Smith DM	Acute ipecac poisoning : report of a fatal case and review of the literature	N Engl J Med	1961		265	523	525	催吐			
Arnold FJ, Hodges Jr JB, Barta Jr RA	Evaluation of the efficacy of lavage and induced emesis in treatment of salicylate poisoning. (An unusual complication of ipecac-induced emesis)	Pediatrics	1959	23	2	286	301	胃洗浄／催吐	動物実験		Since the end of the Nineteenth Century, lavage has been used as the initial procedure in the treatment of acute poisonings. At present, it is generally considered as the "accepted" form of therapy, except when more than 4 hours has elapsed since the ingestion of the poison, or in cases of poisoning by strong acids or bases. Yet, in spite of such general acceptance, a review of the literature from 1900 to the present time reveals only one experimental investigation as to the efficacy of this form of therapy. The authors of this investigation reported that in a study of 55 acute poisonings which resulted in the death of the patient, only a small portion of the ingested poison was found in the stomach post mortem. In 80 acutely poisoned patients who were initially treated by lavage, the recovered fluid failed to contain a significant amount of the ingested poison. It was their opinion that in none of these cases was washing the stomach of therapeutic value. The appearance of only a small
Anderson H	Experimental studies on the pharmacology of activated charcoal	Acta Pharmacol	1948		4	275	284	活性炭			
Gimble AI, Davidson C, Smith PK	Studies on the toxicity, distribution and excretion of emetine	J Pharmacol Exptl Therap	1948		94	431	438	催吐			
Andersen AH	Experimental studies on the pharmacology of activated charcoal II;The effect of pH on the adsorption by charcoal from aqueous solutions	Acta Pharmacol	1947	3		199	218	活性炭			

Andersen AH	Experimental studies on the pharmacology of activated charcoal, I. Adsorption power of charcoal in aqueous solutions	Acta Pharmacol	1946	2		69	78	活性炭			
Harstad E, Moller KO, Simesen MH	The value of gastric lavage in the treatment of acute poisoning. (_er den Wert der Magenerweiterung bei der Behandlung von akuten Vergiftungen.)	Acta Med Scand	1942	112		478	514	胃洗浄			
Pellini EJ, Wallace GB	The Pharmacology of emetine	Am J Med Sci	1916		152	325	337	催吐			
Kussmaul A	uber die Behandlung der Magenerweiterung durch eine neue Methode, mittelst der Magenpumpe	Deutsch Arch Klin Med	1869		6	455		胃洗浄			
郡山一明	急性中毒初期治療の再評価、1. 消化管除洗　活性炭による吸着ー臨床上の問題点		2001	14	1	26	29	活性炭	会議録		
山下雅知	催吐法	中毒研究	2001	14		61	65	催吐	総説		
水谷太郎	腸洗浄	中毒研究	2001	14		347	353	腸洗浄	総説		
浅利靖	活性炭	中毒研究	2001	14		251	257	活性炭	総説		
奥村徹, 鈴木幸一郎	胃洗浄	中毒研究	2001	14		133	139	胃洗浄	総説		
山下雅知, 山下衛, 藤井祐一	トコンシロップ製剤 (TJN-119) の薬物動態および組織内分布	中毒研究	2001	14		11	15	催吐	動物実験		
木下順弘(熊本大学 救急医)	〔アトラス　ベッドサイド処置〕　腹部･消化器系の手技　胃管挿入, 胃洗浄,腸洗浄	救急医学	2000	24	10	1354	1358	胃洗浄／腸洗浄	総説		
白川洋一	序論：消化管除染の再評価	中毒研究	2000	13		415	421	胃洗浄／活性炭／催吐／腸洗浄	総説		
広瀬保夫,　木下秀則,　田中敏春, 他	毒物と胃酸の反応により医療者に二次被害が発生したと考えられる中毒事例	日本救急医会誌	2000	11		528		胃洗浄		会議録	
副島由行, 山本彩, 立石彰男　他	中毒用胃･腸分割洗浄チューブの開発	中毒研究	1999	12	1	83		胃洗浄／腸洗浄	レターコメント		
曽我幸弘, 鈴木忠	〔救命救急処置マニュアル〕　小腸洗浄	救急医学	1998	22	4	452	453	腸洗浄	総説		
岡田芳明	中毒治療におけるコントラバシー活性炭	中毒研究	1998	11		115	120	活性炭	総説		
浅利靖, 熊谷謙, 上條吉人　他	急性有機リン中毒における催吐と胃洗浄の有効性に関する検討	中毒研究	1998	11	4	417		催吐／胃洗浄	症例シリーズ	会議録	
金賢一, 北澤康秀, 新谷裕　他	胃内視鏡下摘出を施行したKCl腸溶錠大量内服の1例	中毒研究	1998	11	3	304		胃洗浄	症例報告	会議録	
和田　攻	胃洗浄	内科総合誌 Medical Practice 臨時増刊	1998	15		335	338	胃洗浄	＊単行本など		
副島由行, 他	バルーン付き中毒用胃腸洗浄チューブによる希塩酸腸洗浄にて救命しえたパラコート中毒の1例	中毒研究	1997	10	4	445		腸洗浄	症例報告	会議録	
山下衛, 山下雅知	経口毒薬物の吸収阻止	日救急医会誌	1997		8	273	287	胃洗浄／活性炭／催吐／腸洗浄	総説		
坂田育弘	救急処置基本手技アトラス　胃洗浄,腸洗浄	救急医学	1996	20	10	1202	1207	胃洗浄／腸洗浄	総説		
滝下佳寛, 吉田豊治, 石川聖子, 他	パラコート中毒 当院での検討も加えて	徳島県立中央病院医学雑誌	1994	16		1	4	腸洗浄	症例シリーズ		1982年から現在の間19例のパラコート中毒を経験し,10例で剖検を行っているが,救命できたのは少量服毒の1例のみである。パラコートの中毒の治療には胃洗浄,腸洗浄,DHP等による血液浄化が行われており,さらにパラコート原液の濃度も下げられているが,救命率は期待した程向上していない
竜庸之助, 九里武晃, 菊野隆明, 他	急性薬物中毒の腸洗浄法の検討	日本救急医学会関東地方会雑誌	1994	15	2	610	611	腸洗浄	症例シリーズ	会議録	
坂田育弘, 北岸英樹	救急患者のための診療技術 胃洗浄･腸洗浄	Modern Physician	1993	13	5	555	557	胃洗浄／腸洗浄	総説		
山本保博	腹部･消化器外科治療マニュアル 基本手技 胃･腸洗浄法	外科治療	1993	68	5	555	558	胃洗浄／腸洗浄	総説		
山下衛	薬毒物の吸収防止法	中毒研究	1993	6		109	19	胃洗浄／活性炭／催吐／腸洗浄／	総説		
金井尚之, 他	パラコート中毒における開腹腸洗浄法	ICUとCCU	1992	16	臨増	270		腸洗浄	症例報告	会議録	
金井尚之, 他	パラコート中毒における開腹腸洗浄法	ICUとCCU	1992	16	臨増	223	224	腸洗浄	症例報告		
大西雄二, 竹智義臣, 杉沢徹, 他	宮崎市郡医師会病院における農薬中毒診療について(その2) パラコート剤中毒と有機リン剤中毒	宮崎県医師会医学会誌	1992	16	1	62	66	腸洗浄／胃洗浄	症例シリーズ		昭和61年5月以降7年間のパラコート中毒患者は27例(女13例)で,平均52.5歳である.直接搬送4例,一次医療施設経由23例である.26例で服用時間,16例で量を明らかにでき,平均入院日数は7.6日で,19例が死亡した.死因は中毒性ショックが最も多く,その他呼吸不全,腎不全であった.急性期を脱しても間質性肺炎,肺線維症がみられた.腸洗浄を徹底的に行い,胃洗浄,強制利尿,血流灌流を行っている.同期間の有機リン剤中毒は31例(女17例)で,平均46.7歳である.直接搬送12例,一次医療施設経由19例である.30例で服用時間,21例で量を明らかにでき,平均入院日数は11日で,3例が死亡し,死因は中毒性ショック2例,呼吸不全1例であった.体内の農薬の排泄とニコチン･ムスカリン作用への対策と呼吸･循環管理が
横井徹, 福島正樹, 関川孝司, 他	パラコート中毒8例の臨床的検討	集中治療	1992	4	3	365	366	腸洗浄	症例シリーズ		胃洗浄,血液吸着(DHP),強制利尿に加えてポリエチレングリコール含有電解質溶液Golytelyを用いた連続的な腸洗浄を行い6例を救命した
菅政治, 神田和哉, 辻雅士, 他	パラコート中毒の臨床的検討	西日本泌尿器科	1992	54	2	172	175	腸洗浄	症例シリーズ		パラコート中毒86例について検討した.1)救命20例,死亡66例であった.2)治療法として腸洗浄,ステロイドパルス療法を加えたことが境界域の症例で治療成績向上に貢献した可能性はあるが,推計学的有意差は認めなかった.3)現在もProudfootらの生命予後曲線(服用後時間を考慮した血中濃度測定)が正確な予
小倉真治, 白川洋一, 横野敦子, 他	パラコート中毒症例における硫苦使用中の高マグネシウム血症	中毒研究	1992	5	1	55	58	腸洗浄／下剤	症例シリーズ		硫酸マグネシウムを用いて腸洗浄を行ったパラコート中毒患者19例のうち6例において血中マグネシウム濃度は正常範囲を大きく越えていた.急性腎不全がなくても,パラコート中毒患者の腸洗浄に比較的大量のマグネシウムを用いると,意識障害を伴うほどの急性マグネシウム中毒が起こり,その機序は,腸管麻痺や腸粘膜障害による吸収の促進である可能性が示唆された
石光淳, 播磨由紀子, 藤田俊生, 他	パラコート中毒の救命治療と血中濃度	中毒研究	1992	5	2	149	154	腸洗浄	症例シリーズ		山口大学病院におけるパラコート中毒症例のうち,血中パラコート濃度を測定し得た16例について紹介し,腸洗浄を行うための空腸瘻･回腸瘻造設術の評価方法について検討した。1)生命予後推測法の比較では,ProudfootのSurvival Curveおよび重症度指数ともに,腸洗浄を行うための空腸瘻･回腸瘻造設術で大きな進展はみられていないと思われた。2)空腸瘻･回腸瘻を造設した症例では,重症度指数と生存時間の関係の改善,および長時間経過して除去され難くなったパラコートの除去を促進させている可能性が考えられた
中川隆雄, 他	パラコート中毒に対するポリエチレングリコール含有電解質液(PEG液)による腸洗浄と持続血液濾過(CAVH)の効果に関する実験的および臨床的検討	ICUとCCU	1991	15	臨増		165	腸洗浄	症例報告	会議録	
北本幹也, 久保典史, 佐川広, 他	急性パラコート中毒9例の臨床的検討	腎と透析	1991	30	2	251	255	腸洗浄／強制利尿	症例シリーズ		1) 1985年4月から1989年3月までに9例の急性パラコート中毒を経験し,3例の救命例を得,腸洗浄,強制利尿の重要性が示唆された.2)血清LDH値が1,000 U/lを超えた症例は死亡し,一方生存中の症例の血清LDH値は1,000 U/l未満で推移
矢野隆郎, 他	パラコート中毒における腸洗浄の効果	日本救急医学会雑誌	1991	2	5	803		腸洗浄	症例シリーズ	会議録	

横井徹, 和田淳, 森信暁雄, 他	ポリエチレングリコール含有電解質溶液(PEG-ELS) Golytelyを用いて腸洗浄を行ったパラコート中毒6例の臨床的検討	日本透析療法学会雑誌	1991	24	11	1463	1469	腸洗浄	症例シリーズ		1989年7月からの15ヵ月間に経験したパラコート中毒例6例に対し,胃洗浄,血液吸着(DHP),強制利尿に加えて,ポリエチレングリコール含有電解質溶液Golytelyを用いた72?96時間の連続的な腸洗浄を行い5例を救命した.救命例5例では,治療開始後比較的短時間で尿中パラコート定性反応は陰性化し,全例後遺症なく1ヵ月後に退院した.死亡例1例は大量服用例で,尿中パラコート定性反応は陰性化せず,多臓器不全に陥った
栄博史	救命救急処置のコツとpitfall 小腸洗浄	救急医学	1990	14	10	1242	1243	腸洗浄	総説		
榮博史	胃洗浄	救急医学	1990	14		1240	41	胃洗浄	総説		
岡田芳明	催吐	杉本侃編:図説救急医学講座第6巻 中毒, メジカルビュー	1990			35		催吐	＊単行本など		
岡田芳明	胃洗浄	杉本侃編:図説救急医学講座第6巻 中毒, メジカルビュー	1990			36	37	胃洗浄	＊単行本など		
岡田芳明	下剤. 吸着剤の投与	杉本侃編:図説救急医学講座第6巻 中毒, メジカルビュー	1990			38	39	下剤／活性炭	＊単行本など		
岡田芳明	腸洗浄	杉本侃編:図説救急医学講座第6巻 中毒, メジカルビュー	1990			40	41	腸洗浄	＊単行本など		
定光大海 他	パラコート中毒に対する空回腸瘻造設による腸洗浄法	中毒研究	1990	3	3	301		腸洗浄	症例シリーズ	会議録	
吉岡敏治	パネルディスカッションⅠ イントロダクション急性中毒に対する消化管洗浄-多施設間のアンケート	中毒研究	1990	3		19	23	胃洗浄／活性炭／腸洗浄／下剤	疫学調査		
竹智義臣	十二指腸チューブとガストログラフィンによる腸洗浄の有用性につ	中毒研究	1990	3	3	301		腸洗浄	症例シリーズ	会議録	
鵜飼卓、山下衛他	パネルディスカッションⅠ 消化管洗浄	中毒研究	1990	3		19	49	胃洗浄／活性炭／腸洗浄／下剤	その他		
水谷太郎, 他	パラコート中毒における腸洗浄の効果の検討(第2報)	中毒研究	1989	2	3	324		腸洗浄	動物実験	会議録	
河野一造, 篠崎正博, 細川哲哉, 他	パラコート中毒に対する腸洗浄の効果	中毒研究	1989	2	1	25	29	腸洗浄	症例シリーズ		
杉浦敏之 他	超早期大量胃洗浄の血中パラコート濃度に及ぼす効果	中毒研究	1989	2	3	324		胃洗浄	症例報告	会議録	
関由紀夫 他	薬物中毒に対するポリエチレングリコール含有電解質液による腸管洗浄法	中毒研究	1989	2	3	324		腸洗浄	症例報告	会議録	
山本保博	中毒治療の基本処理 小腸洗浄, 下剤･吸着剤の投与	救急医学	1988	12	12	1221	1222	腸洗浄／下剤	総説		
水谷太郎, 他	パラコート中毒における腸洗浄の効果の検討(第1報)	中毒研究	1988	1	2	240		腸洗浄	動物実験	会議録	
河野一造, 他	パラコート中毒での空腸瘻からの腸洗浄の効果	中毒研究	1988	1	2	212		腸洗浄	症例シリーズ	会議録	
野口照義, 青柳光生	パラコート中毒の治療 腸洗浄法	救急医学	1987	11	8	957	963	腸洗浄	総説		
三宅範明, 米田文男, 辻村玄弘, 他	パラコート中毒37症例の臨床学的検討	西日本泌尿器科	1987	49	5	1339	1343	腸洗浄	症例シリーズ		昭和54年1月よりの7年6ヵ月の間に経験した37例のパラコート中毒(男性18例,女性19例)について臨床学的検討を行った.1)生存率はA期(昭和54?59年度)では,0.0%であったがB期(昭和60年度以後)には,28.0%(7/25)と改善した.2)従来の治療方法に腸洗浄,ステロイドパルス療法を加えたことが治療成績向上に貢献したと考える.3)予後推定因子としては服用後時間を考慮した血中パラコート濃
安藤義孝, 安藤公子, 土屋智, 他	急性パラコート中毒53症例の治療経験 特に腸洗浄法の有効性	群馬医学	1986		43	73	79	腸洗浄	症例シリーズ		
安藤義孝, 他	パラコート中毒患者に対する腸洗浄のための内視鏡下十二指腸ゾンデの挿入について	日本透析療法学会雑誌	1986	19	4	395		腸洗浄	症例報告	会議録	
安藤義孝, 石原弘, 阿久沢巨, 他	急性パラコート中毒57症例の治療経験 特に腸洗浄法の有効性について	日本救急医学会関東地方会雑誌	1985	6	1	250	251	腸洗浄	症例シリーズ	会議録	
安藤義孝, 安藤公子, 土屋智, 他	急性パラコート中毒症例に対する腸洗浄法の有効性について	日本透析療法学会雑誌	1985	18	4	365	370	腸洗浄	症例シリーズ		
古賀俊彦, 野瀬育宏	内視鏡下挿管による強力な腸洗浄が奏効したパラコート大量内服者の一治験例	Gastroenterological Endoscop	1984	26	5	728	733	腸洗浄	症例報告		
安藤義孝, 他	急性パラコート中毒症例に対する治療,特に腸洗浄法の有効性について	人工透析研究会会誌	1984	17	6	804		腸洗浄	症例シリーズ	会議録	
中村紘一, 他	パラコート胃内注入犬に対する腸洗浄	救急医学	1983	7	臨増	289	290	腸洗浄	動物実験	会議録	
山下衛, 他	パラコート中毒患者に対する腸洗浄療法	ICUとCCU	1982	6	臨増	222		腸洗浄	症例シリーズ	会議録	