Current Guidelines For Gastrointestinal Decontamination In The Emergency Department

It is estimated that roughly 1% of emergency department (ED) visits in the US are poisoning-related.1 Historically, aggressive and categorical gastrointestinal decontamination (GID) was the accepted medical standard following ingestion of drugs or toxins in overdose or suspected overdose. The general principle of GID is to minimize the systemic absorption and/or decrease the gastrointestinal transit time of the ingested agent. In recent years, the routine utilization of GID in the ED has greatly diminished. Various clinical studies have consistently failed to show a benefit for indiscriminate GID of the generic or undifferentiated mild to moderate overdosed patient.2-4 In this issue of EM Practice Guidelines Update, a body of position papers regarding GID following acute drug or toxin ingestions or exposures will be discussed.

Practice Guideline Impact

- The aggressive and routine use of GID in the generic or undifferentiated ingestion is not recommended.
- Routine out-of-hospital and ED ipecac-induced emesis is no longer recommended.
- The routine use of single-dose or multi-dose activated charcoal is not recommended in generic acute toxic ingestions.
- Gastric lavage is rarely, if ever, indicated in acute toxic ingestions.
- Whole bowel irrigation is not recommended for generic acute toxic ingestions.

Prior to beginning this activity, see “CME Information” on page 12.
Introduction

In 2004 and 2005, 6 major Position Statements were issued by leading clinical toxicology societies. Now referred to as "Position Papers," they reflect the scientific evidence published in the English language medical literature and are collaborative efforts of both the American Academy of Clinical Toxicology (AACT) and the European Association of Poisons Centres and Clinical Toxicologists (EAPCCT). Organization members from over 60 countries contributed to, reviewed, and revised the Position Papers.

Unfortunately, due to the heterogeneous nature of acute toxic drug ingestions, the general treatment guidelines derived from medical toxicology, evidence-based medicine (EBM) syntheses, and consensus statements are not always directly applicable to individual cases. The most seriously ill patients tend to be under-represented in or excluded from clinical trials, and volunteer studies often do not recreate the abnormal physiology and pharmacodynamics seen in severe ingestions. Anecdotes in the form of case reports provide potentially valuable information that often cannot be validated. An absence of benefit in generic patients may not translate to an absence of benefit in selected high-risk patients.

In 1999, a clinical policy was published by the American College of Emergency Physicians (ACEP) to address the general approach to patients presenting with acute toxic ingestions, in which the authors addressed common strategies used for gastric decontamination. However, as the weight of evidence and opinion has shifted, this clinical policy has become outdated and has been rescinded by ACEP.

In this issue, we review 6 Position Papers from AACT/EAPCCT which include: 1) use of ipecac-induced emesis, 2) single-dose activated charcoal, 3) multi-dose activated charcoal, 4) cathartics, 5) whole bowel irrigation, and 6) gastric lavage.
The following 6 Position Papers were developed by a panel of experts assembled by the American Academy of Clinical Toxicology (AACT) and the European Association of Poisons Centres and Clinical Toxicologists (EAPCCT). The Position Statement includes recommendations on the following 6 therapies:

- Ipecac syrup, [page 4](#)
- Single-dose activated charcoal, [page 5](#)
- Multi-dose activated charcoal, [page 6](#)
- Cathartics, [page 7](#)
- Whole bowel irrigation, [page 8](#)
- Gastric lavage, [page 9](#)

The methodology was reported:

“In preparing the original Position Statement and the update, all relevant scientific literature was identified and reviewed by acknowledged experts using agreed-upon criteria. Well-conducted clinical and experimental studies were given precedence over anecdotal case reports. A draft Position Statement was then produced and subjected to detailed peer review by an international group of clinical toxicologists chosen by the AACT and the EAPCCT. The Position Statements went through multiple drafts before being approved by the boards of the 2 societies. ... The Position Papers are based only on evidence published in the English medical literature. Expert opinion was not a basis for the recommendations as expert opinion is so divergent.”

No evidence grading system was used. Conflicts of interest are not reported. The statements are intended for the in-hospital treatment of the poisoned patient.

Link to full-text PDF files of all Position Papers:
[http://www.clintox.org/positionstatements.cfm](http://www.clintox.org/positionstatements.cfm)
Traditionally, ipecac syrup was available as a non-prescription medication routinely administered at home with ambulance staff or in-hospital as a means to rapidly empty the GI tract following toxic ingestions. Its use was particularly prevalent in the pediatric population where the logistics of other forms of GID were more challenging.

**Recommendation**

Based on experimental and clinical studies, the panel concluded that ipecac syrup should not be routinely administered in the management of the poisoned patient. There was no evidence from clinical studies that ipecac improves outcomes in poisoned patients and its routine use in the ED should be abandoned. There was insufficient data to support or exclude ipecac administration soon after poison ingestion. Ipecac may delay or reduce the effectiveness of activated charcoal, oral antidotes, and whole bowel irrigation. Ipecac is contraindicated in patients with decreased level of consciousness and hydrocarbon ingestion, secondary to aspiration risks.

**Editorial Comment**

In 2003, the American Academy of Pediatrics (AAP) issued a Policy Statement regarding poison treatment in the home. The prior recommendation had been to keep a 1-oz bottle of ipecac syrup in the home, to be used only under the guidance of a poison center or physician in the event of toxin ingestion. With its 2003 Policy Statement, the AAP no longer recommended ipecac syrup as a home strategy for GID and further recommended that existing ipecac in the home be discarded.

In 2005, members of the Guidelines for the Management of Poisonings Consensus Panel, in collaboration with the American Association of Poison Control Centers (AAPCC), American College of Medical Toxicology (ACMT) and American Academy of Clinical Toxicology (AACT) concluded that the use of ipecac for emesis in toxic ingestion may be acceptable in rare situations where ALL of the following circumstances are present:

- The risk of serious toxicity to the patient is substantial
- Ipecac syrup is not contraindicated
- No alternative therapy (such as activated charcoal) to reduce gastrointestinal absorption is effective or available
- It will be more than 60 minutes before the patient arrives at an emergency medical facility
- The ipecac syrup can be administered within 30-90 minutes of the toxic ingestion
- The administration of ipecac will not interfere with treatment that the hospital would provide

Taken all together, the consensus is that routine use of ipecac is no longer recommended in the prehospital setting and that consultation with a medical toxicologist and/or poison center should be considered in the very rare event that induced emesis may be indicated.
Single-dose activated charcoal therapy involves the oral administration or instillation via nasogastric tube of an aqueous activated charcoal solution. The goal of therapy is for activated charcoal to directly contact and adsorb the ingested poison, thereby reducing systemic toxicity.

**Recommendation**

Based on experimental and largely volunteer clinical studies, the panel concluded that single-dose activated charcoal should not be administered routinely to poisoned patients. Volunteer studies demonstrated that using at least 50 g activated charcoal produced a mean reduction in absorption of approximately 50% at 60 minutes and approximately 20% at 180 minutes. The panel recommended consideration of single-dose activated charcoal following ingestion of potentially toxic amounts of poison up to 60 minutes prior to presentation.

The panel further cites a lack of evidence from volunteer studies to demonstrate either a clinical benefit or an absence of clinical benefit when activated charcoal was administered beyond the first 60 minutes post ingestion. Activated charcoal is contraindicated in patients with loss of protective airway reflexes, caustic ingestions, and bowel obstruction.

**Dosage Regimen**

- Children up to 1 year old: 10-25 g or 0.5-1 g/kg
- Children 1-12 years old: 25-50 g or 0.5-1 g/kg
- Adolescents and adults: 25-100 g

**Editorial Comment**

The optimal ratio of charcoal to drug is 10:1; the recommended dosage regimens will provide this ratio in most ingestions. Given the unclear benefit of a hypothesized 20% reduction in absorption at 180 minutes, patients who present 1 to 2 hours following an ingestion who are determined to be at risk for significant morbidity and mortality should probably receive activated charcoal. Trivial ingestions should not be treated with activated charcoal. Ingestions with an established antidote (such as acetaminophen) or ingestions that will evolve favorably with supportive care should probably not be treated with activated charcoal if they present beyond 60 minutes post ingestion.

Aspiration of charcoal can have significant pulmonary consequences, including pneumonitis, acute respiratory distress syndrome, and death. The importance of cautious use of activated charcoal in patients at risk for aspiration cannot be overemphasized. Obtunded patients or patients at risk for hemodynamic collapse or seizures should have their airway protected with orotracheal intubation prior to the administration of activated charcoal. Alcohols, hydrocarbons, caustics, and small molecules such as lithium, potassium, and iron are inappropriate for activated charcoal therapy.
The rationale behind the use of multiple-dose activated charcoal (MDAC) (ie, 2 or more doses of activated charcoal) is to enhance elimination in drugs with enterohepatic or enteroenteric circulation, to provide continued adsorption of sustained-release preparations, and/or to continue to adsorb the drug when prolonged GI transit time occurs.

**Recommendation**
Based on experimental and clinical studies, the panel concluded that MDAC should be considered only in patients with suspected or confirmed life-threatening carbamazepine, dapsone, phenobarbital, quinine, or theophylline ingestions. Though conclusive evidence of clinical benefit was not established, there were data to support enhanced elimination. There were insufficient data in poisoned patients to recommend the routine use of MDAC in salicylate poisoning. Since pylorospasm and bezoar formation may occur in salicylate poisoning, careful use of MDAC may be appropriate in selected cases of significant salicylate ingestion. Lack of an intact or protected airway and intestinal obstruction are contraindications to MDAC. Repeated doses of cathartics are neither indicated nor recommended in MDAC.

**Editorial Comment**
MDAC is rarely indicated in toxic ingestions. When a toxin is known to undergo enhanced enterohepatic or enteroenteric elimination with MDAC, it is reasonable to administer it in massive or life-threatening ingestions. Clinicians should consider consultation with a medical toxicologist or poison center in such cases, because the risks may outweigh the benefits. Though delayed GI transit may appear to be an indication for MDAC, it may also place the patient at increased risk for aspiration and obstipation. Too-rapid re-dosing of charcoal may also place the patient at risk for aspiration and subsequent charcoal pneumonitis.
The rationale behind the use of cathartics is to offset the theoretically constipating effects of activated charcoal (though this is generally not the case with a single dose of charcoal), to increase the palatability of charcoal (in the case of sorbitol), and to decrease the transit time of ingested poisons.

**Recommendation**

Based on experimental and clinical studies, the panel concluded that the administration of cathartics alone had no role in the management of the poisoned patient and was not recommended as a method of gut decontamination. Based on the available data, routine use of a cathartic in combination with activated charcoal was also not endorsed. There were no definite indications for cathartics in acute poisoning. If a cathartic was used, it was recommended to limit it to a single dose to minimize the associated adverse effects on fluid and electrolytes. There are 2 general types of osmotic cathartics used in drug ingestions: saccharide cathartics (sorbitol) and saline cathartics (magnesium citrate, magnesium sulfate, and sodium sulfate).

**Dosage Regimen**

- **Sorbitol:** 1-2 g/kg (70% sorbitol in adults, 35% in children)
- **Magnesium citrate:** 250 mL of a 10% solution in adults, 4 mL/kg in children

**Editorial Comment**

The routine use of cathartics is not supported. Osmotic cathartics work primarily by the attraction and retention of water in the intestinal lumen and may alter fluid and electrolyte balance. Excessive doses of osmotic cathartics have been associated with dehydration, hypernatremia, and hypermagnesemia. Since most drug absorption occurs in the upper portion of the GI tract soon after ingestion, and cathartics increase GI transit via small bowel and colonic osmotic effects, it is likely that much GI absorption will have occurred prior to the onset of the cathartic’s effect. Experimental models have failed to show a clear benefit of the addition of a cathartic and there is insufficient data to comment broadly on the theoretical benefit in sustained-release preparation ingestions. Clinicians should use their judgment in selecting patients who may benefit from the addition of a cathartic, such as those taking sustained-release preparations or those receiving MDAC (see MDAC Position Paper summary, page 6). In patients receiving MDAC, the cathartic should only be given with the first dose. The Position Paper outlined the following general contraindications:

- Absent bowel sounds, intestinal obstruction, or recent abdominal surgery
- Corrosive substance ingestion
- Significant electrolyte imbalance, volume depletion, or hypotension
- Extremes of age (ie, infants and the elderly)
- Renal failure, renal insufficiency, or heart block (magnesium cathartics)
The rationale behind the use of whole bowel irrigation (WBI) is to cleanse the bowel and expedite passage of ingested toxins through the GI tract into the colon, where there is less absorption, and then ultimately out of the body. Large volumes of osmotically balanced polyethylene glycol electrolyte solution (PEG-ES) are used.

**Recommendation**

Based on experimental and clinical studies, the panel concluded that WBI should not be used routinely in the acutely poisoned patient. Though volunteer studies have shown significant decreases in drug bioavailability, there have been no controlled studies showing clinical benefit. The panel recommends considering WBI for patients with potentially toxic ingestions of sustained-release products and/or enteric-coated drugs, particularly if the patient presents more than 2 hours after ingestion. Whole bowel irrigation is also recommended for substantial iron ingestions and for selected cases of ingestion of packages of illicit drugs, ie, gastrointestinal drug smuggling ("body packing"). Contraindications to WBI include bowel obstruction, ileus, perforation, hemodynamic instability, intractable vomiting, and compromised airway reflexes. WBI solution is not associated with significant changes in water or electrolyte balance.

**Dosage Regimen**

- Children 9 months to 6 years old: 500 mL/h
- Children 6 to 12 years old: 1000 mL/h
- Adolescents and adults: 1500-2000 mL/h

**Editorial Comment**

The theoretical utility of WBI in certain ingestions is well-established, based on volunteer studies of decreased drug bioavailability following WBI. The concurrent administration of activated charcoal with WBI may decrease the effect of the charcoal, but it is unclear whether this has a clinical impact in acute toxic ingestions. From a practical standpoint, WBI is labor-intensive and can be unpleasant both for the patient and clinical staff. WBI should be performed with the head of the bed at a 45° angle and the rate of fluid administration should be advanced to the desired rate (see dosage regimen) as tolerated by the patient. The endpoint of WBI is clear rectal effluent. Infants, the elderly, or debilitated patients may not tolerate WBI. Ingestions that decrease GI transit such as salicylates, opioids, and anticholinergics may not be appropriate for WBI. promotility agents and antiemetics may be useful adjuncts.

In selected cases where morbidity is anticipated to be high, such as ingestions of iron, sustained-release cardiac medications (ie, beta-adrenergic antagonists and calcium channel blockers) and/or neuropsychiatric medications (ie, sustained-release lithium), WBI should be considered. The use of WBI to aid in the passage of drug packets in body packers may be beneficial. The WBI process also serves as bowel preparation in the event that patients ultimately need surgical removal of the packages. Maintaining patient alertness and using a bedside commode and promotility agents (metoclopramide or erythromycin) may facilitate the passage of the packages. Prolonged WBI may be required, because large wax-coated packages can be slow to move through the GI tract. Symptomatic body packers with cocaine ingestion are usually catastrophic and require immediate surgical exploration for package removal. Consultation with a medical toxicologist or poison center should be considered in difficult cases.
Gastric lavage involves the passage of a large-caliber orogastric tube and sequential administration and aspiration of small volumes of liquid with the intent to remove toxic substances from the stomach.

**Recommendation**

Based on experimental and clinical studies, the panel concluded that gastric lavage should not be performed routinely, if ever, in the acutely poisoned patient. Experimental studies have shown variable amounts of marker removal and that effectiveness diminishes with time. Significant complications such as hypoxia, dysrhythmias, laryngospasm, GI tract or oropharynx perforation, fluid and electrolyte abnormalities, and aspiration pneumonitis have been reported. Contraindications include loss of protective airway reflexes (unless intubated), ingestion of a caustic or hydrocarbon, or underlying risk for GI hemorrhage.

**Editorial Comment**

Though indications for gastric lavage seem few, if any, many case reports have described impressive returns. It is difficult to quantify the benefit of such interventions. The panel suggests that in exceptional situations, a clinician may weigh the risk-benefit ratio of lavage versus conventional GID versus general supportive care. An example of an exceptional situation might include a very early presentation and massive ingestion of a highly toxic drug such as a beta-adrenergic antagonist, calcium channel blocker, tricyclic antidepressant, colchicine, and/or lithium (immediate-release formulation). Studies suggest that gastric lavage should be performed as close to the time of ingestion as possible, ideally, within or close to 1 hour. When available, knowledge of the pill formulation (ie, size/composition) may be helpful, because many sustained-release formulations are either large or buoyant and not likely to be easily retrieved with gastric lavage. If gastric lavage is performed, the patient should be calm and with an intact gag reflex or controlled airway. Gastric lavage is generally poorly tolerated in awake and/or agitated patients. Patients should be placed in the left lateral decubitus position with the head down slightly. Lavage should be performed with small aliquots of liquid (water is appropriate) until the lavage fluid is clear. One liter is usually adequate.
Patients presenting following acute toxic ingestion span a clinical spectrum that ranges from trivial to catastrophic. Gastric decontamination can be achieved by adsorption of the poison in the GI tract, thereby limiting systemic absorption, or by enhanced elimination from the GI tract by induced emesis, catharsis, hydrostatic forces of whole bowel irrigation, or by surgical means. Over the past decade, clinical and experimental research showing a lack of clear benefit to GID has led to a paradigm shift and general trend towards a dramatically decreased use of routine GID. Severely or potentially severely poisoned patients pose a unique problem for the clinician, because they are inherently difficult to study and may be a group where every additional reduction in absorption counts.

An evidence-based approach to clinical practice can only be strictly applied if the study population reflects the clinical population. These Position Papers on GID represent a review of the best available evidence; however, as in much of the clinical trial literature surrounding toxic ingestions and substance abuse, severely ill patients tend to be under-represented or excluded.

Though the Position Papers discussed in this issue suggest a judicious and minimalist approach to GID in the generic acute toxic ingestion, one should not assume that an apparent lack of benefit from GID in generic patients or healthy volunteers equates to no benefit in severely poisoned patients. There may never be sufficient high-quality evidence in the medical toxicology literature to know with certainty which treatment course is best or whether there is true benefit of GID in the severely poisoned patient. Caution must be exercised in each case and the risks of GID weighed against the risks of the ingestion as well as the anticipated benefits. In cases where a high risk of death or severe morbidity is present, we recommend a decision process that encompasses the best evidence-based medicine available, combined with clinical experience and consultation with a medical toxicologist.
References


CME information for *EM Practice Guidelines Update*

To take the CME test, visit: www.ebmedicine.net/cme

**Date of Original Release:** August 1, 2010. Date of most recent review: July 19, 2010. Termination date: August 1, 2013.

**Accreditation:** EB Medicine is accredited by the ACCME to provide continuing medical education for physicians.

**Credit Designation:** EB Medicine designates this educational activity for a maximum of 12 AMA PRA Category 1 Credits™ per year. Physicians should only claim credit commensurate with the extent of their participation in the activity.

**Needs Assessment:** The need for this educational activity was determined by a survey of practicing emergency physicians and the editorial board of this publication; knowledge and competency surveys; and evaluation of prior activities for emergency physicians.

**Target Audience:** This enduring material is designed for emergency medicine physicians, physician assistants, nurse practitioners, and residents.

**Goals:** Upon completion of this article, you should be able to: 1) demonstrate medical decision-making based on the strongest clinical evidence; 2) cost-effectively diagnose and treat the most critical ED presentations; and 3) describe the most common medicolegal pitfalls for each topic covered.

**Objectives:** Upon completion of this article, you should be able to: 1) discuss the current recommendations and contraindications for the use of activated charcoal in acute toxic ingestions; 2) discuss changes in the general management recommendations for GI decontamination in acute toxic ingestions; and 3) describe the limitations of the medical literature and evidence with regard to acute toxic ingestions.

**Discussion of Investigational Information:** As part of the newsletter, faculty may be presenting investigational information about pharmaceutical products that is outside Food and Drug Administration-approved labeling. Information presented as part of this activity is intended solely as continuing medical education and is not intended to promote off-label use of any pharmaceutical product.

**Faculty Disclosure:** It is the policy of EB Medicine to ensure objectivity, balance, independence, transparency, and scientific rigor in all CME-sponsored educational activities. All faculty participating in the planning or implementation of a sponsored activity are expected to disclose to the audience any relevant financial relationships and to assist in resolving any conflict of interest that may arise from the relationship.

In compliance with all ACCME Essentials, Standards, and Guidelines, all faculty for this CME activity were asked to complete a full disclosure statement. The information received is as follows: Dr. Bouchard, Dr. Strayer, and their related parties reported no significant financial interest or other relationship with the manufacturer(s) of any commercial product(s) discussed in this educational presentation.

**Method of Participation:** Current, paid subscribers of Emergency Medicine Practice and *EM Practice Guidelines Update* who read this *EM Practice Guidelines Update* CME article and complete the online CME Evaluation survey at www.ebmedicine.net/CME are eligible for up to 1 hour of Category 1 credit toward the AMA Physician’s Recognition Award (PRA). Results will be kept confidential. CME certificates may be printed directly from the website.

**Hardware/Software Requirements:** You will need a PC or Macintosh to access the online archived articles and CME testing. Adobe Reader is required to view the PDFs of the archived articles. Adobe Reader is available as a free download at www.adobe.com.

**Additional Policies:** For additional policies, including our statement of conflict of interest, source of funding, statement of informed consent, and statement of human and animal rights, visit: http://www.ebmedicine.net/policies
Want to receive EM Practice Guidelines Update free?

Subscribe to Emergency Medicine Practice and you’ll receive EM Practice Guidelines Update at no additional charge! Plus, you receive all the benefits of Emergency Medicine Practice:

- A chief-complaint focus: Every issue starts with a patient complaint — just like your daily practice. You’re guided step-by-step in reaching the diagnosis — often the most challenging part of your job.
- An evidence-based medicine approach: The degree of acceptance and scientific validity of each recommendation is assessed based on strength of evidence.
- Diagnosis and treatment recommendations solidly based in the current literature.
- Abundant clinical pathways, figures, and tables: You’ll find reliable solutions quickly. The easy-to-read format delivers solid information appropriate for real-time situations.
- Unlimited online access: Search and access each monthly issue of Emergency Medicine Practice since inception in June 1999 — plus print and read each new issue before it even hits the mail.
- All the CME you need at no extra charge: Earn up to 48 AMA PRA Category 1 Credits™, 48 ACEP Category 1, 48 AAFP Prescribed, or 48 AOA Category 2B credits over the coming year-plus up to 144 credits from the online repository of articles!

Subscribe to Emergency Medicine Practice today and receive EM Practice Guidelines Update at no additional charge! Or, subscribe to EM Practice Guidelines Update only at the discounted rate below. To subscribe, complete the order form below and mail or fax it to EB Medicine, or visit www.ebmedicine.net/subscribe.

Do you like what you’re reading?

Then ask a colleague to become a subscriber too — at this special introductory rate: Just $279 for a full year (12 issues) of Emergency Medicine Practice. Plus, you receive 3 free issues for each colleague you refer. Emergency Medicine Practice subscribers receive EM Practice Guidelines Update FREE!

Please choose your subscription preference

☐ 1-Year subscription to Emergency Medicine Practice, includes EM Practice Guidelines Update - $279 (a $50 savings)
☐ 1-Year subscription to EM Practice Guidelines Update - $99

Please choose a payment option

☐ Check enclosed (payable to EB Medicine)
☐ Charge my: ☐ Visa ☐ MC ☐ AmEx: ________________________________ Exp: ______

Signature: __________________________________________________________

☐ Bill me

Name of new subscriber: ________________________________

Address line 1: _________________________________________________

Address line 2: _________________________________________________

City, State, Zip: _________________________________________________

Email: _________________________________________________________

Colleague’s name who referred you: ________________________________

Promotion Code: ISSUEG

Send to: EB Medicine / 5550 Triangle Pkwy, Ste 150 / Norcross, GA 30092. Or fax to: 770-500-1316.
Or visit: www.ebmedicine.net/subscribe and then enter Promo Code ISSUEG in your cart. Or call: 1-800-249-5770 or 678-366-7933.