

## Hypothermia: an unusual indication for gastric lavage.

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## Selected Topics: Toxicology

### HYPOTHERMIA: AN UNUSUAL INDICATION FOR GASTRIC LAVAGE

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□ **Abstract—Background:** Previous reports suggest that gastric lavage holds many risks and is not routinely indicated for decontamination of the overdose patient. **Objective:** To present a case of overdose with concurrent accidental hypothermia where gastric decontamination was utilized. **Case Report:** A 50-year-old hypothermic, comatose patient was transported to the Emergency Department with a concurrent, massive medication ingestion diagnosed incidentally on a routine abdominal computed tomography scan. Both active and passive rewarming measures, in conjunction with gastric lavage and retrieval of multiple pill fragments, were performed, and the patient survived to hospital discharge without sequelae. Interestingly, the patient admitted to an intentional ingestion of both labetalol and lorazepam. **Conclusion:** Due to hypothermia-mediated changes in metabolism, including gastric atony and decreased hepatic metabolism, gastric lavage may provide additional benefit in the management of severely hypothermic patients with potentially lethal, massive pill ingestions. © 2011 Elsevier Inc.

□ **Keywords—**gastric lavage; gastric decontamination; hypothermia; beta-blocker; labetalol; lorazepam; benzodiazepine; overdose; gastric atony; computed tomography; Ewald

#### INTRODUCTION

Gastric lavage for overdose is uncommonly performed with limited indications. However, an unusual case of a

hypothermic patient transported to the emergency department (ED) found to have very large amounts of gastric pill fragments on abdominal computed tomography (CT) scan treated with gastric lavage is discussed. This clinical presentation may potentially broaden the indication for use of this mode of gastric decontamination.

#### CASE REPORT

A 50-year-old woman was transported to the ED by paramedics after being found unresponsive, with a Glasgow Coma Scale (GCS) score of 3, on the side of the road on a sub-freezing day in midwinter. Her car was parked nearby without damage. The patient was endotracheally intubated using rapid sequence intubation in the field and transferred to a Level I trauma center.

Upon arrival, the primary survey revealed a GCS 3T; she was intubated and mechanically ventilated with 100% inspired oxygen. Initial vital signs were: rectal temperature 29°C, pulse 60 beats/min, blood pressure 96/58 mm Hg, pulse oximetry 100%, and respiratory rate 12 breaths/min. Secondary survey was intact and demonstrated no outward signs of trauma. Both active rewarming measures (intravenous [i.v.] warmed normal saline infusion, warmed bladder, and gastric irrigation) as well as passive measures (external passive rewarming device and heat lamps) were instituted. Chest and pelvic radiographs

were unremarkable and demonstrated proper endotracheal tube placement. Initial abnormal laboratory values included:  $K^+$  2.7 mEq/L (range, 3.5–5.3), glucose 222 mg/dL (range, 70–99), creatinine phosphokinase 415 IU/L (range, 0–200), and lactate 7.5 mEq/L (range, 0.5–1.3). Arterial blood gas upon arrival on 100% inspired oxygen revealed: pH 7.35 (range, 7.35–7.45),  $PCO_2$  31 mm Hg (range, 35–45),  $PaO_2$  274 mm Hg, and  $HCO_3^-$  17 mEq/L (range, 22–26). Both urine drug screens of abuse and qualitative acetaminophen, salicylate, and ethanol levels were undetectable. Electrocardiogram showed a prolonged QRS with Osborn waves, indicative of hypothermia. CT scans of the head, spine, chest, abdomen, and pelvis were performed with i.v. contrast screening for occult trauma. No visceral or bony injury was demonstrated. However, a large amount of gastric pill fragments was identified on abdominal CT (Figure 1).

The CT findings were discussed with a medical toxicologist and, due to the exceedingly large amount of intact pill fragments found and the gravity of the patient's condition, gastric lavage was performed with an Ewald tube. Approximately 20 capsules, many of them intact, were removed. Unfortunately, the pill fragments were not specifically identified and were discarded. The patient's hypothermia resolved, and she was extubated on hospital day 2 without complication. During psychiatric interview, however, she admitted to intentionally ingesting large amounts of both her husband's labetalol and her son's lorazepam tablets. She was voluntarily admitted to a psychiatric hospital on day 3 without sequelae.

## DISCUSSION

The patient described suffered from severe hypothermia, as defined by a core temperature  $< 32^\circ\text{C}$  (1). Accord-



**Figure 1.** Abdominal computed tomography scan reveals multiple gastric pill fragments.

ingly, a combination of both active core and passive external rewarming was indicated (2). Complicating the profound hypothermia was the potentially lethal ingestion of labetalol and lorazepam, which certainly may have contributed to her critical condition. The metabolic effects of hypothermia on the gastrointestinal tract are numerous, and several are important to note in overdose situations. Studies have shown that intestinal motility decreases below  $34^\circ\text{C}$  and ceases altogether at  $28^\circ\text{C}$  (3). Hepatic enzymatic function is also decreased in both hypothermia and by acidemia. Lactate buildup in times of metabolic stress can directly cause acidemia. As lactate's own metabolism is hepatic-mediated, the global hepatic enzymatic dysfunction of hypothermia may lead to worsening lactate-mediated acidemia and result in further inhibition of hepatic metabolism (4).

Performance of gastric lavage after 1 h of overdose is not routinely indicated, and its utility in any patient is debatable (5). According to the position statement of the American Academy of Clinical Toxicology and the European Association of Poison Centres and Clinical Toxicologists, "gastric lavage should not be employed routinely, if ever, in the management of poisoned patients. . . . There is no certain evidence that its use improves . . . outcome and it may cause significant morbidity" (5). Multiple articles have suggested that after 1 h, digestive processes will have already dissolved the coating around ingested tablets, thus rendering gastric lavage less useful (6,7). In healthy human volunteer studies, recovery of ingested markers has been shown to be 90% at 5 min, 45% at 10 min, and only 30% at 19 min (8–10). Also, most drug absorption occurs in the small bowel (3). If a toxic ingestion occurs, then gastric decontamination must be undertaken early before the toxic substance can traverse the pyloric sphincter. It has been suggested that gastric lavage itself may actually propel gastric contents beyond the pylorus, thereby enhancing absorption and toxicity (11). In addition, case reports of gastric lavage causing esophageal perforation, aspiration pneumonia, and peritoneal contamination have been identified in the literature (12–15).

However, in this particular patient, the benefits of gastric lavage were felt to outweigh the risks because the patient was already intubated, and orogastric lavage with frequent irrigation was already being performed due to profound hypothermia. Furthermore, the presence of gastric atony theoretically maximized retrieval ability of the pills in question. Activated charcoal administration, a far safer alternative for gastric decontamination, would theoretically be ineffective in this patient due to the need for continuous lavage as well as charcoal's inability to adsorb the intact pills demonstrated on CT scan (16). A secondary benefit of lavage is possible identification of the pills to direct targeted antidotal therapy.

In retrospect, it is difficult to quantify the ultimate benefit of gastric lavage in this case. Normally, lorazepam toxicity is treated with supportive care alone (17). However, it is known that benzodiazepenes inhibit the thermoregulatory center of the brain (18). It is possible that our efforts to withdraw this offending substance from the stomach allowed for more rapid rewarming, which may have shortened the patient's hospitalization. Labetalol, a short acting beta-blocker, may have further exacerbated hypotension and bradycardia, although evidence suggests that most cardiac function is resistant to pharmacologic therapy at such low temperatures (19). However, upon rewarming, these effects may have become more pronounced.

## CONCLUSION

Although rarely indicated, severe hypothermia with ensuing gastric atony in the setting of drug overdose may represent a unique indication for performance of gastric lavage and pill retrieval to help attenuate compounding drug toxicity.

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