Use of ultrasound to detect residual gastric content after adequate fasting and stomach suction

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Abstract
Aspiration of gastric contents leads to significant morbidity and mortality. Gastric content volume is a risk factor for perioperative aspiration, and it is associated with adverse outcomes. Nasogastric/orogastric tube placement and gastric suctioning are helpful but not completely effective in emptying the stomach. We report a case of substantial gastric contents despite adequate fasting time, and of persistent gastric contents postintubation.

Case Presentation
A ten-year-old, 37 kg previously healthy boy presented with an elbow fracture after a fall in school the previous day, for closed reduction with percutaneous pinning under general anesthesia.

Intraoperative Course
Parents reported fasting time of 12 hours for solids and 9 hours for clear liquids. Supine gastric ultrasound revealed a full stomach.

Following uneventful intravenous induction and endotracheal intubation, another gastric ultrasound exam was performed, this time in right lateral decubitus position. Then a 16-French Salem Sump orogastric tube was placed and we suctioned 60 mL of viscous orange-pink fluid. The stomach was re-examined and remained full. We were unable to suction any further contents despite placing a new orogastric tube (for possible clog) and changing patient’s position from right lateral decubitus to supine. At the end of the case, 2 more milliliters of thick contents were suctioned. The case concluded without complications.

Recently, gastric ultrasound has been described as a useful noninvasive technique. Several studies suggest that the gastric antrum is more amenable to ultrasound examination. Gastric suctioning is useful, but may not guarantee a completely empty stomach. In our case, ultrasound showed large residual gastric contents after appropriate fasting. Despite careful suctioning, we were unable to remove all gastric contents. Providers should be aware of aspiration risk even after appropriate fasting time and suctioning.

Learning Points
- Adequate fasting time by current guidelines may not ensure an empty stomach before surgery.
- Preoperative evaluation of fasting status should assess factors that may delay stomach emptying, e.g. acute pain, distress and anxiety, and opioid intake.
- Bedside ultrasound examination of the stomach can provide essential information and guide induction and airway management plan.
- Intraoperative gastric suctioning may not guarantee an empty stomach.

Discussion
Gastric contents shape anesthetic management during induction, maintenance, and emergence. Literature suggests that more than 0.8 mL/kg of gastric contents combined with other risk factors, e.g. difficult airway, bucking or coughing, and incompetent lower esophageal sphincter can increase aspiration risk. The respiratory consequences of aspiration are related to the aspirate’s volume and characteristics such as acidity and solidity. There is no validated standardized method to evaluate residual gastric contents in the perioperative period.

References