

C. McLaughlin, MD, L Gilbertson, MD, H. Lam, MD, S. Nyshadham, MD T. Austin, MD, J. Karlik, MD
Emory University School of Medicine, Children's Healthcare of Atlanta, Emory University, Atlanta, GA.

Introduction

- Several European and Canadian pediatric anesthesia societies have recently published guidelines allowing clear liquids up to one hour prior to elective anesthesia¹.
- Our institution recently adopted a NPO clear liquid policy up to 1 hour in early 2020.
- Gastric ultrasound can be used to assess gastric volume and to determine if there is evidence of a full stomach defined as greater 1.5 mL/kg of gastric fluid^{2,3}.

Objective

- The objective of this study is to use gastric ultrasound to determine if the ingestion of clear liquids up to one hour prior to an elective procedure in pediatric patients requiring general anesthesia is associated with a full stomach.

Hypothesis

- Patients who ingest clear liquid 60-119 minutes prior to an ambulatory surgical procedure will not have evidence of full stomach (<1.5 mL/kg of gastric fluid) based on gastric ultrasound assessment^{2,3}.

Methods

Design

Prospective cohort study

Inclusion Criteria

ASA 1 or 2 patients of age 1-18 who presented for ambulatory surgery.

Exclusion Criteria

Comorbidities that affect gastric emptying, diagnosed aspiration, or positive pressure ventilation > 20 cm of H₂O during induction.

5ml/kg of clear liquid (max 240mL) provided to patient for ingestion up to 1 hour prior to induction



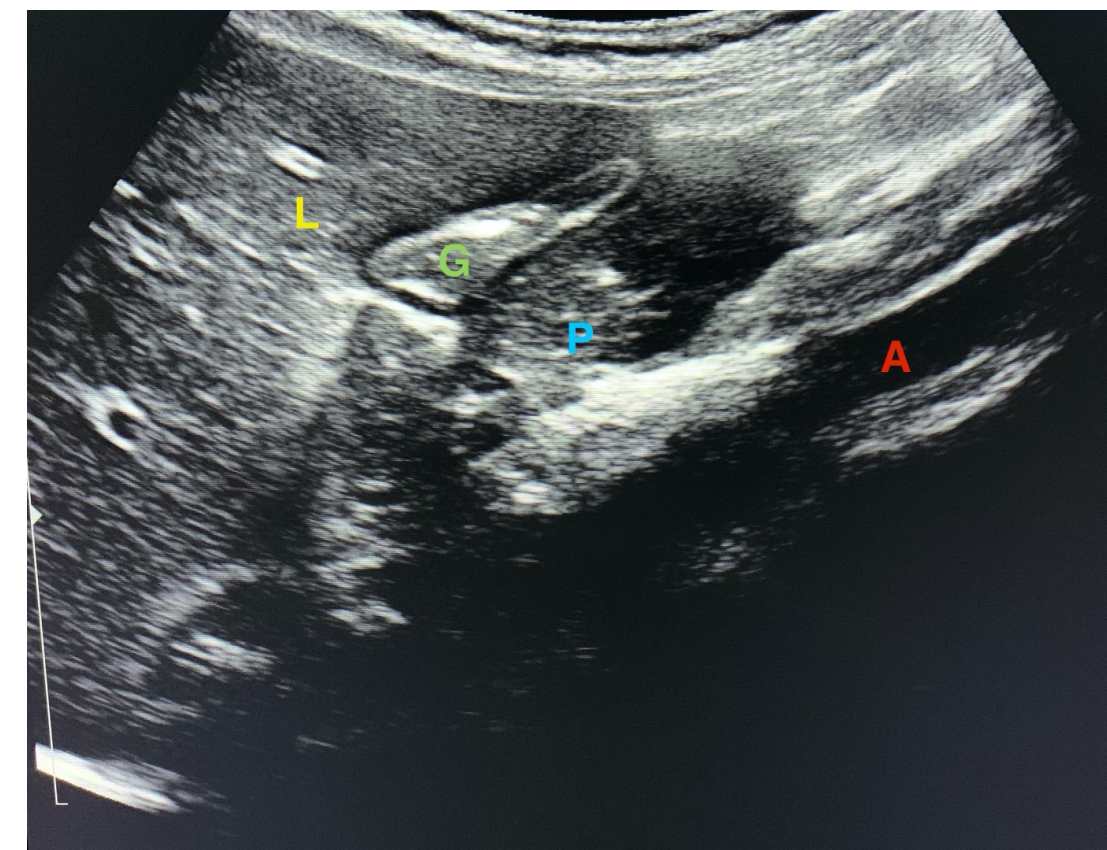
Induction of anesthesia. Study participation did not alter anesthetic or surgical plan.



Gastric ultrasound performed in supine and RLD positions.

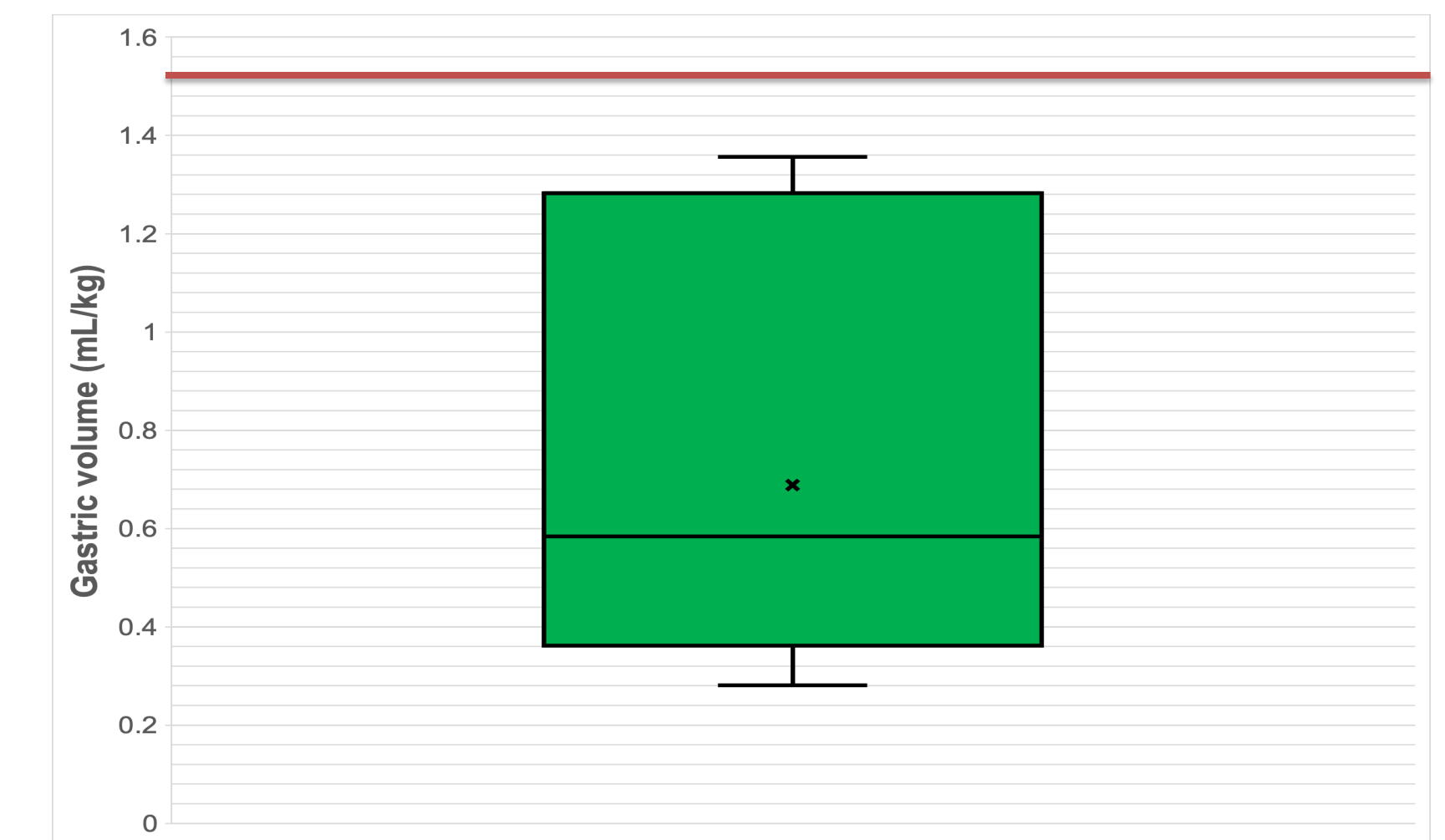


Gastric volume calculated from following formula⁴:
-7.8+(3.5 x RLD CSA) + (0.127) x Age (months)



Ex of gastric ultrasound of study patient in RLD position.
L=Liver, G=Gastric antrum, P=Pancreas, A= Aorta

Results



Box and whisker plot shows calculated gastric volumes (mL/kg). One patient was excluded (ultrasound not performed) due to vomiting on induction. Note that all gastric volumes were less than full stomach cutoff of 1.5 mL/kg (noted by red line).

Conclusion

- This pilot study suggests that 5 mL/kg of clear liquids (to a maximum of 240 mL) up to one hour prior to induction of anesthesia results in low risk ultrasound gastric antral measurements but requires further study to determine safety.
- While these initial results are overall reassuring, two high risk findings (vomiting on induction in one patient and solid matter found on ultrasound in another patient) raise safety concerns and should be investigated further.

References

1. Rosen D, et al. Canadian Pediatric Anesthesia Society statement on clear fluid fasting for elective pediatric anesthesia. *Canadian Journal of Anesthesia*. 66 (2019), 991-992.
2. Haskins, et al. Gastric Ultrasound for the Regional Anesthesiologist and Pain Specialist. *Regional Anesthesia and Pain Medicine*. 43 (2018) 689-698.
3. Spencer AO, et al. Ultrasound assessment of gastric volume in the fasted pediatric patient undergoing gastrointestinal endoscopy: development of a predictive model using endoscopy suctioned volume. *Pediatric Anesthesia*. 25 (2015) 301-308.
4. Perlas A, Mitsakakis N, Liu L, et al. Validation of a mathematical model for ultrasound assessment of gastric volume by gastroscopic examination. *Anesth Analg*. 116 (2013) 357-363.

Results

Number of Patients	12
Average Age (yrs)	Average 9.3 (range 3-16)
Gender	M: 7/12 F:5/12
Average time from PO liquid to scan (min)	98 (64-232)
Average PO volume ingested (mL)	164 (55-240)
Gastric Volume (mL/kg)	0.69 σ 0.41 (0.28-1.36)