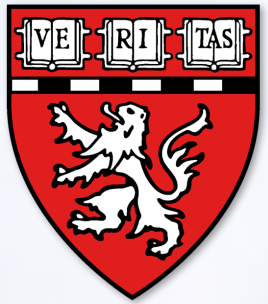
Antepartum point-of-care gastric ultrasound in fasted obstetric patients undergoing non-delivery surgical procedures

Department of Anesthesiology, Pain and Perioperative Medicine
Brigham and Women's hospital, Harvard Medical School

Saranya Lertkovit MD, Bushra W. Taha MD, Jean M. Carabuena MD, Noor Raheel MD, Michaela K. Farber MD MS



Introduction: Aspiration Risk During Pregnancy

- Enlarging uterus → compresses the stomach
- Hormone changes → relaxation of lower esophageal sphincter, gastroesophageal reflux

What is the risk of aspiration in obstetric patients undergoing anesthesia for non-delivery procedures?

Goal: evaluate gastric contents in *fasted obstetric patients* undergoing non-delivery procedures.

Materials and Methods

Prospective cohort study

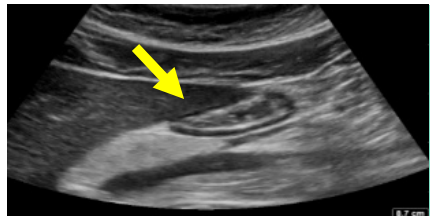
- ≤ 24 weeks' gestation
- Scheduled, non-delivery obstetric procedures

Fasting Definition

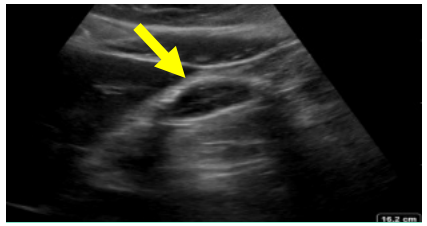
6-8 hours for solid food

2 hours for liquids

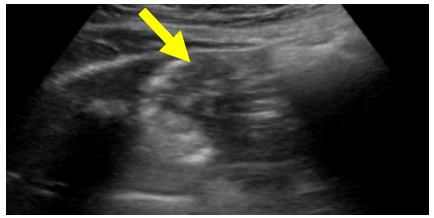
Empty



Fluid



Solid



Calculations:

Gastric Antral Cross-Sectional Area (CSA)
Gastric Volume (GV)

$$CSA\ (cm^2) = \frac{\pi\ x\ D1\ x\ D2}{4}$$

GV (ml/kg) = 27 + 14.6*(RLD-CSA) – 1.28*(age)

LOW RISK (LR)
GV ≤ 1.5 mL/Kg

HIGH RISK (HR)
GV >1.5 mL/kg
Solid food

Reliability? Inter-observer variability

Associated factors? Logistic regression

Results

99 patients enrolled
- 78 dilatation and evacuation or curettage
- 19 cerclage placement

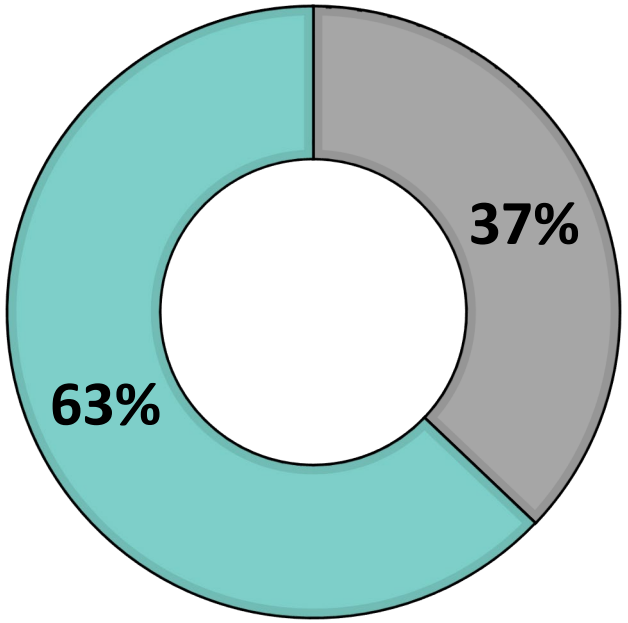
Intra-observer variability 16% ± 15

	Grade 0 n= 18	Grade 1 n = 28	Grade 2 n = 10	Solids n = 41	All n = 97
Age, years	32 (6)	33 (5)	33 (5)	32 (6)	33 (6)
BMI ≥ 40, kg/m^2	2 (22)	2 (22)	2 (22)	2 (22)	9 (9)
Gest. age, weeks	11.2 (3)	12.8 (5)	11.5 (5)	**10.9 (5)**	11.6 (4)
1st trimester	10 (17)	14 (24)	7 (12)	**27 (47)**	58 (60)
2nd trimester	8 (21)	14 (36)	3 (7)	14 (36)	39 (40)

	Grade 0 n= 18	Grade 1 n = 28	Grade 2 n = 10	Solids n = 41	All n = 97	P-value
Fasting, solids (hours)	14 (3.7)	14 (2.6)	17 (4.1)	14 (3.1)	14 (3.3)	0.049
Fasting, liquids (hours)	7 (5.4)	8 (5)	7 (3.8)	9 (5.2)	8 (5)	0.493
Gastric antral CSA (cm^2)	4.9 (1.4)	8.9 (3.2)	12.2 (4.5)	NA	8.2 (3.9)	***<0.0001***
Predicted GV (mL)	55.7 (19.1)	114.9 (46.0)	163.1 (66.4)	NA	104.5 (57.7)	***<0.0001***
Predicted GV (mL/kg)	0.8 (0.3)	1.5 (0.5)	2.0 (0.8)	NA	1.4 (0.7)	***<0.0001***

Results: Aspiration Risk

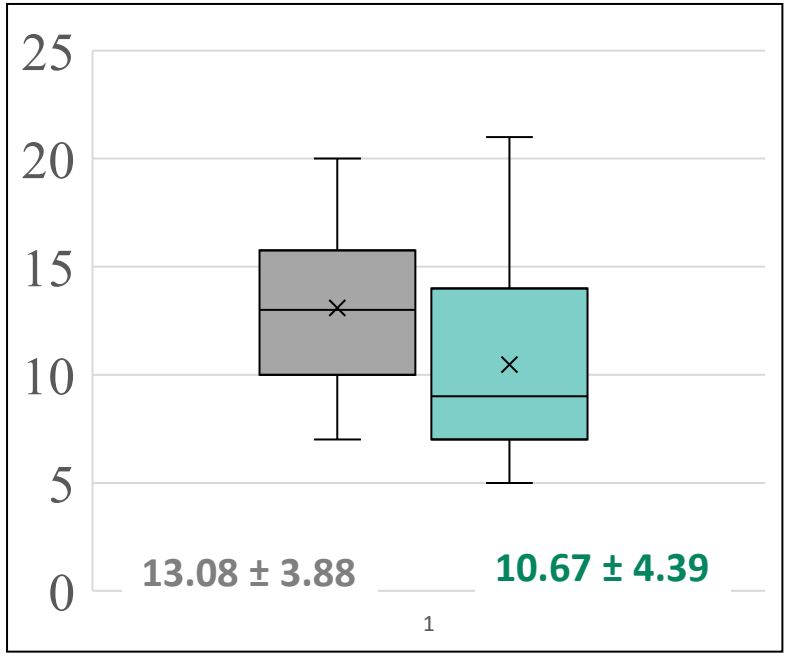
Overall



Low Risk (GV ≤ 1.5 mL/kg

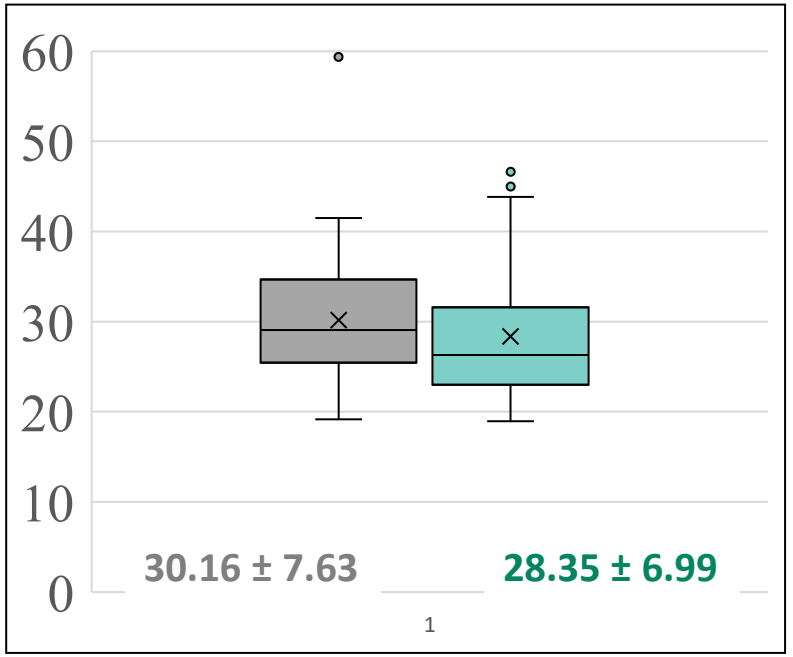
High Risk (GV > 1.5 mL/kg or solid contents

Gestational Age (weeks)



OR = 0.64, CI = 0.41–1.02, ***p ≈ 0.05***

Body Mass Index (kg/m²)



OR = 0.32, CI = 0.109–0.95, ***p < 0.05***

Conclusions: Pre-procedural Gastric Ultrasound

1. A majority of patients had ‘full stomach’ by current GUS guidelines, **despite compliance with preoperative fasting guidelines.**

2. Gastric ultrasound may allow us to **plan our anesthetics with increased safety** for fasted obstetric patients who are at higher risk for aspiration.