

**TITLE:** THE EFFECT OF LIQUID H<sub>2</sub> ANTAGONISTS ON GASTRIC VOLUME AND pH  
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**INTRODUCTION:** Pulmonary aspiration of gastric contents is a potentially fatal complication in the perioperative period. Oral tablet formulations of H<sub>2</sub> antagonists can decrease gastric volume and increase gastric pH in elective surgical patients (1-3). However, no studies have compared effects of liquid H<sub>2</sub> antagonists. We evaluated liquid oral formulations of cimetidine, ranitidine and famotidine on gastric volume and pH in elective outpatients.

**MATERIALS AND METHODS:** 43 ASA I or II adult outpatients undergoing elective surgical procedures were enrolled in the study. Patients were randomized to receive either 5 ml sterile water (P, n=9), 15 ml sodium citrate (B, n=9), 10 ml (150 mg) liquid ranitidine (R, n=8), 5 ml (300 mg) liquid cimetidine (C, n=11) or 5 ml (40 mg) liquid famotidine (F, n=6). No other medications were given prior to induction. Collection of gastric contents was performed using an 18 French orogastric (OG) tube placed following induction. Confirmation of OG tube placement was by either direct palpation or air injection and auscultation over the stomach. Gastric samples were collected immediately following induction and then every 30 minutes for two hours or until the termination of surgery. Patients at risk for aspiration pneumonia were defined as having both volume > 0.4 ml/kg and pH < 2.5. Statistical analysis was performed utilizing chi square analysis with Fisher's exact test or ANOVA with Duncan's post hoc test, where appropriate.

**RESULTS:** Data is reported as mean  $\pm$  SEM. There was no statistical difference between the groups in age, weight or sex distribution. 35 patients were female and 8 were male. Mean age was 36.4  $\pm$  2.0 years and mean weight was 70.7  $\pm$  2.5 kg. Time from administration of study agent

to collection of the first sample was 75.2  $\pm$  9.8 min with no differences between the groups. All groups had patients at risk for aspiration pneumonia at the time of induction (table 1). However, there were no significant differences between any treatment group and placebo at any time for the incidence of aspiration risk (table 1). There were no significant differences between any treatment group and placebo for the incidence of gastric volume > 0.4 ml/kg at any time (induction 20.1%, 30 min 3.6%, 60 min 4.2%, 90 min 4%, 120 min 4%). However, there was a significant reduction in the number of patients with a pH < 2.5 by cimetidine at induction, 30 and 60 min, by ranitidine at 30 and 60 min and by sodium citrate at 60 min.

**DISCUSSION:** A single dose of either liquid cimetidine, ranitidine, famotidine or sodium citrate did not significantly reduce the risk of acid aspiration pneumonia or decrease volume < 0.4 ml/kg at any time when compared to 5 ml of sterile water. The incidence of gastric volume > 0.4 ml/kg was not reduced by any treatment. Only cimetidine was more effective reducing the number of patients with gastric pH < 2.5 at the time of induction. Famotidine was no more effective than placebo at any time in altering pH. There were no significant differences in gastric pH between any treatment group and placebo at 90 and 120 minutes.

Table 1 % at risk for aspiration

	P	B	C	F	R
Induction	22.2	22.2	9.1	33.3	12.5
30 min	0	0	9.1	0	0
60 min	11.1	0	0	0	0
90 min	0	0	0	0	0
120 min	0	0	0	0	0

Table 2 % with pH < 2.5

	P	B	C	F	R
Induction	77.8	40	11.1*	83.3	33.3
30 min	75	33.3	11.1*	75	0*
60 min	85.8	0*	0*	60	0*
90 min	20	16.7	0	50	0
120 min	33.3	0	0	50	0

\* p < 0.05 compared to P

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A30

**TITLE:** EVALUATION OF OUTPATIENTS RECEIVING PROPOFOL OR OTHER ANESTHETIC AGENTS FOR EXTRACORPOREAL SHOCK WAVE LITHOTRIPSY (ESWL): A QUALITY ASSURANCE ANALYSIS

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Renal calculi are frequently treated by ESWL.<sup>1</sup> Nausea and vomiting has been reported in up to 50% of ESWL patients after general anesthesia.<sup>2</sup> Decreased incidence of postoperative nausea and/or vomiting (NV) and rapid emergence have been documented with propofol.<sup>3</sup> We investigated the efficacy of propofol/N<sub>2</sub>O compared to thiamylal or etomidate induction with N<sub>2</sub>O/narcotic or inhalation anesthesia maintenance for postoperative NV, associated hospital admissions, length of stay in recovery (RR) and outpatient (OP) areas.

**Methods:** With IRB confirmation, a retrospective patient chart review of ESWL cases was performed. The study was limited to a single anesthesiologist's cases over a 6 months period (n=30). Subjects receiving a narcotic premedication were excluded. Subjects in group 1 (n=9) had received either thiamylal 3-5 mg·kg<sup>-1</sup> or etomidate 0.3 mg·kg<sup>-1</sup> induction with N<sub>2</sub>O/fentanyl 2-4 ug·kg<sup>-1</sup>, or isoflurane 1-2%, both using muscle relaxant, vecuronium 0.1 mg·kg<sup>-1</sup>. Group 2 subjects (n=21) received a propofol induction 1.5-2.5 mg·kg<sup>-1</sup>, and maintenance with either intermittent bolus of propofol 0.5-1.0 mg·kg<sup>-1</sup> every 5-10 minutes as needed with N<sub>2</sub>O 60-70%, or a continuous infusion of propofol 75-175 ug·kg·min<sup>-1</sup> with N<sub>2</sub>O 60-70%. Muscle relaxants were not used with propofol. All subjects were intubated, and

ventilation was controlled. Data included the subject age, weight, pre- and postoperative vital signs, duration of anesthesia, anesthetic technique, duration of RR and OP area stay, hospital admissions, NV in RR and OP areas. Statistical analyses used t-Test, with p  $\leq$  0.05 considered significant.

**Results:** The groups were similar in age, weight, pre- and postoperative vital signs, and duration of anesthesia. Vital signs in RR and OP were similar between groups. The mean duration of stay in RR for group 1 was 90 minutes as compared to group 2 of 60 min (p=0.05). The duration of OP stay for group 1 was 176 min, as compared to 116 min. The mean of the complete postoperative stay was statistically different with group 2 leaving sooner (p=0.05). On entry to RR, none of the propofol subjects had NV, as compared to 2 subjects of group 1. On entry to OP, group 1 had 29 % NV as compared to group 2 with 14% NV (p=0.08). One propofol subject was admitted for NV, having received multiple doses of morphine for pain in RR and OP.

**Discussion:** There was a significant difference in length of RR and combined duration of stay between groups. Propofol provides cost effective management for ESWL procedures in outpatients. While NV appears reduced with propofol, a larger study is underway to assess postoperative NV associated with anesthetic type in ESWL outpatients.

#### References:

1. Gravenstein JS, Peter K. ESWL for renal stone disease. Stoneham, Ma.: Butterworth Publ 1986
2. Ann R Coll Surg Engl 70(2):69-73, 1988
3. Anaesthesia 43(3): 239-40, 1988

Table 1. Duration of Postoperative Stay

	n	minutes(mean)	SEM
Group 1	21	177	$\pm$ 25
Group 2	7	249	$\pm$ 25