

Title : CIMETIDINE FOR PROPHYLAXIS OF ASPIRATION PNEUMONITIS:
COMPARISON OF INTRAMUSCULAR AND ORAL DOSAGE SCHEDULES

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Introduction. Aspiration of gastric contents into the tracheobronchial tree is a major cause of anesthesia related morbidity and mortality. Silent regurgitation of gastric contents occurs more frequently than is realized, even with an endotracheal tube in place. A pH value of less than 2.5 is generally considered the critical level for the development of pulmonary damage. Routine antacid prophylaxis is established practice in obstetric anesthesia, and has been advocated for all anesthesia. Cimetidine, a new histamine H_2 receptor antagonist increases gastric pH and decreases gastric volume. A number of studies have recently evaluated the efficacy of oral doses of cimetidine premedication at raising gastric pH.^{1,2,3} The aim of this study was to compare intramuscular with oral doses of cimetidine along with routine premedication for elective surgery with respect to increasing gastric pH.

Methods. Twenty-six consenting adult patients, ASA classification I or II, scheduled for 8 a.m. elective surgery requiring endotracheal intubation were studied. All patients fasted after midnight and were premedicated with morphine sulfate 0.1 to 0.2 mg/kg at 6:30 a.m. Patients were randomly assigned to three groups. Groups were similar with regard to weight, age, and sex. Group 1 received no additional premedication. Group 2 received cimetidine 300 mg orally at bedtime and 300 mg orally at 6:30 a.m. with less than 30 ml of water. Group 3 received cimetidine 300 mg orally at bedtime and 300 mg intramuscularly at 6:30 a.m.

To evaluate the necessity for a bedtime dose, 10 additional patients (group 4) received oral cimetidine 300 mg 90 minutes prior to surgery without a preceding dose. Anesthesia was induced with thiopental, and tracheal intubation was accomplished with the aid of succinylcholine. A number 16 nasogastric tube was passed immediately following intubation and all available gastric contents evacuated. The pH of the gastric contents were measured.

All pH values were measured with a Beckman 76008 Digital pH meter and number 39183 probe combination electrode. The three groups were compared with respect to pH by a one-way analysis of variance and a multiple comparison test.^{1,3} Group 4 was compared to group 1 with respect to pH by an unpaired T-test.^{1,4} The level of statistical significance used was less than or equal to 0.05.

Results. The distribution of pH values are shown in the figure. Group 2 ($pH = 5.1 \pm 0.61$) and group 3 ($pH = 7.3 \pm 0.31$) had gastric aspirates with pH significantly higher than the control group ($pH = 2.92 \pm 0.49$) when measured 90 minutes later ($p < .05$). Group 4, receiving only cimetidine 300 mg p.o. at 6:30 a.m. had gastric aspirates ($pH = 4.4 \pm 0.74$) that were not significantly different from the pH of the control group.

Discussion. The peak effect of cimetidine on gastric pH occurs 4 to 6 hours after oral

administration. Stoelting¹ found that 300 mg p.o. given 90 minutes before induction increased gastric pH to levels above 2.5 in some but not all patients. Keating et al² supplemented the preanesthetic medication with a bedtime oral dose of cimetidine but 7 of 31 patients had gastric pH values of less than 2.5.

Comparing the availability of oral and parenteral cimetidine, a 300 mg intramuscular dose produced blood levels at 90 minutes that were almost twice those achieved by an equivalent oral dose.

To increase the number of patients with an adequate response to cimetidine, that is, a gastric pH above 2.5, we administered the drug by mouth at bedtime and as an intramuscular injection 90 minutes prior to induction of anesthesia. This was more effective in raising gastric pH levels than oral cimetidine, although the number of patients is small. Our results suggest that premedication with intramuscular cimetidine produces a greater and more consistent rise in gastric pH than does oral cimetidine.

References.

1. Stoelting RK: Gastric fluid pH in patients receiving cimetidine. *Anesth Anal* 57:675-677, 1978.
2. Keating PJ, Black JF, Watson DW: Effects of glycopyrrolate and cimetidine on gastric volume and acidity in patients awaiting surgery. *Br J Anaesth* 50:1247-1250, 1978.
3. Husemeyer RP, Davenport ITT, Rajasekarian T: Cimetidine as a single oral dose for prophylaxis against mendelson's syndrome. *Anaesthesia* 33:775-778, 1978.

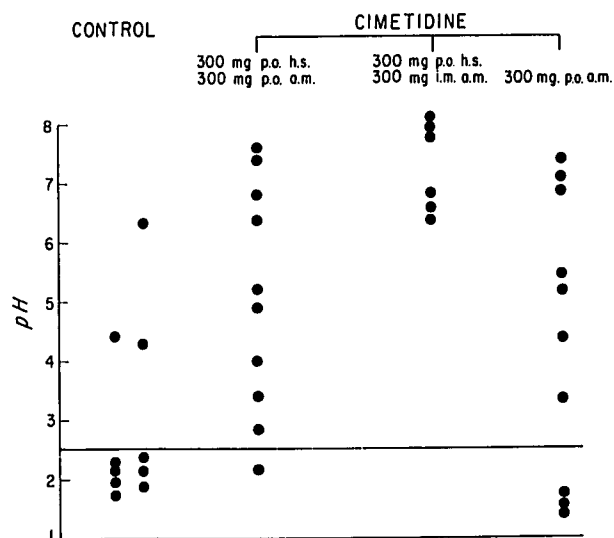


Figure 1. Distribution of gastric aspirate pH values in control and cimetidine treated patients.