

Title: SAFETY AND EFFICACY OF CIMETIDINE AND ANTACID IN REDUCING GASTRIC ACIDITY BEFORE ELECTIVE CESAREAN SECTION

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Introduction. Doubt has been thrown on the adequacy of antacids alone for the prevention of Mendelson's Syndrome by the report¹ that 12 of 13 parturient deaths occurred despite adequate antacid prophylaxis during labor and before anesthesia. The use of the H₂ antagonist, cimetidine, presents a different, alternative and additional approach to decreasing gastric acidity. The objectives of this study were to evaluate the safety of cimetidine in mother and neonate and to assess its effectiveness in reducing gastric acidity.

Methods. Informed consent was obtained from the 126 parturients participating in this study which was approved by the Institutional Review Board. All were expected to deliver a single normal fetus, were between 17 and 40 years of age, had a serum creatinine below 3.5 mg% and had not received anticholinergic drugs in the previous 24 hours. The patients were allocated in a random, double blind manner to either a cimetidine or an antacid treatment group. On the evening prior to elective cesarean section, they received either one 300 mg tablet of cimetidine with 30 ml of a placebo mixture identical in appearance to Mylanta II[®] or one placebo tablet and 30 ml of Mylanta II[®]. One to three hours prior to induction of anesthesia, 300 mg of cimetidine IM with 30 ml of the placebo mixture or 30 ml of Mylanta II[®] and an IM injection of placebo was given. Evaluation of the effect of the two treatments on gastric volume and acidity was made by emptying the stomach continuously from induction of anesthesia and after tracheal intubation until the patient responded to oral commands. Maternal safety was assessed by recording all inta-partum and postpartum complications, by performing hematologic tests (RBC total and differential W.C.C and platelet counts) hepatic function tests (serum bilirubin, alkaline phosphatase and SGOT) and urinalysis (S.G., sugar, protein and microscopy) 24 hours preoperatively and on post partum days two and four. The effect on the neonate was assessed by the Apgar score at 1, 5 and 15 min after birth, measurement of gastric acidity at birth and at three days of age and an Early Neonatal Neurobehavior Scale² assessment at 2 to 4 hours and 3 days of age. Maternal and umbilical venous levels of cimetidine were measured.

Results. A physician unaware of the treatment administered excluded 37 of the 126 case records from the assessment of effects on gastric acidity but not from safety evaluation because either the code had been broken or general anesthesia had not been induced within 1 to 3 hours of the morning administration of the appropriate medication. The maternal gastric volume and acidity after cimetidine and antacid are shown in Table 1. No maternal or neonatal complication was attributed by the blinded investigator to treatment and a similar incidence followed both cimetidine and antacid therapy.

The maternal laboratory tests were within normal limits except that 6 cimetidine and 5 antacid patients had a slight increase in SGOT values (<80 units/l), 1 cimetidine and 2 antacid patients had serum bilirubin levels of 1.4 to 1.9 mg/dl and 2 cimetidine and 4 antacid patients had 2 plus albuminuria postoperatively. The maternal serum level of cimetidine was $1.31 \pm 0.12 \mu\text{g/ml}$ while the umbilical venous level was $0.78 \pm 0.05 \mu\text{g/ml}$. The Apgar scores and the neonatal gastric acidity at birth and on the third day showed no statistical difference at $p < .05$. The 2 individual scores on the Early Neonatal Neurobehavioral Scale were separately divided into high and low scores and analyzed statistically by the Chi-Square and Fisher's exact probability test for both days 1 and 3. All tests were non-significant at $p < .05$ level.

Discussion. Antacid therapy cannot always protect against Mendelson's Syndrome. It should be regarded as only one of several preventative measures which include the use of cimetidine. This study presents evidence that cimetidine can effectively reduce gastric acidity and volume, is safe to the mother and baby and does not depress the Apgar Score and neonatal neurobehavior.

Table 1.—Maternal gastric volume and acidity during the 30 min after induction and 30 min prior to response to verbal commands.

	30 min After Induction		30 min Prior to Response to Verbal Commands	
	Cimetidine	Antacid	Cimetidine	Antacid
Gastric volume	$11 \pm 2^*$	$33.4 \pm 5.2^*$	$3.2 \pm 0.6^*$	$11.9 \pm 4.2^*$
Gastric pH	$6.3 \pm 0.2^*$	$5.5 \pm 0.3^*$	$6.6 \pm 0.4^*$	$6.2 \pm 0.4^*$
Zero volume	12.5%	0%	30.6%	17.2%
Volume < 10 ml	66.7%	27.5%	96.2%	75.9%
pH > 2.5	100%	89.7%	94.4%	91.7%
Zero volume or pH > 2.5	100%	89.7%	96.2%	93.1%

* Mean and SE

References

1. Tomkinson J, Turnbull A, Robson Y et al.: Report on confidential enquires into maternal deaths in England and Wales 1973-1975. London. H.M.S.O. p.80-81 1979.
2. Scanlon JW, Brown WU, Weiss JB et al.: Neurobehavioral responses of newborn infants after maternal epidural anesthesia. *Anesthesiology* 40:121-128, 1974.