PARENTERAL RANITIDINE: ONSET AND DURATION OF ACTION

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SUMMARY

Ranitidine 50 mg or an equivalent volume of 0.9% saline were given i.v. to 12 healthy volunteers. pH and volumes of the gastric aspirate were measured at intervals. In all subjects ranitidine provoked a rapid and sustained increase in pH and a concomitant reduction of volume secretion when compared with control.

Pulmonary acid aspiration syndrome has been recognized as a major hazard in the practice of emergency anaesthesia (Edwards et al., 1956; Banister and Grenvik, 1962). This risk has been associated with a gastric fluid pH of less than 2.5 units (Teaubaut, 1952).

The histamine H2-receptor antagonist cimetidine is likely to be effective in reducing the pulmonary complications following acid aspiration, although this has not been entirely proved (Coombs, Hooper and Colton, 1979; Dobb, Jordan and Williams, 1979).

Recently a new H2-antagonist, ranitidine, has been introduced which is said to be several times more potent, on a molar basis, in inhibiting human gastric acid secretion (Simon et al., 1980; Walt et al., 1981). This study was designed to investigate the onset and duration of action of parenteral ranitidine in healthy volunteers.

SUBJECTS AND METHODS

Twelve healthy male volunteers (mean age 24, range 20–26 yr) were studied.

After an overnight fast a nasogastric tube was placed in the stomach, the gastric contents were aspirated and the starting pH was determined.

The subjects then received ranitidine 50 mg as an i.v. bolus. In six of them an equal volume of 0.9% saline was given i.v. also, as placebo, in a randomized fashion. Gastric juice was aspirated continuously over a test period of 6 h.

pH of the gastric aspirates was measured using a Radiometer pH electrode and meter. Gastric fluid volumes were collected in 1-h fractions.

This investigation was approved by the medical centre’s committee on human experimentation and all subjects gave their written consent.

Statistical analyses were made using the Wilcoxon-test.

RESULTS

pH of gastric aspirate before administration of ranitidine and placebo (0.9% saline) was about 1.9 (range 1.60–2.60).

Ranitidine as a single bolus injection of 50 mg induced a rapid increase in gastric pH. Forty-five minutes after ranitidine all 12 subjects had a gastric aspirate pH of more than 5 remaining at this value over the whole test period (fig. 1) (P<0.05). By contrast, in the six controls the pH values ranged between 1.30 and 1.90 over the whole 6-h test period.


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Gastric volume secretion in the ranitidine experiments was reduced from 60 ml h⁻¹ in the first period of collection to volumes less than 35 ml h⁻¹ (45-50% inhibition). In the six volunteers receiving placebo, volume secretion remained considerable (first hour of collection: 67.3 ± 5.8 ml; third hour of collection: 68.4 ± 6.2 ml; sixth hour of collection: 49.6 ± 4.8 ml (±SEM) (P<0.05).

Administration of ranitidine was well tolerated and no complication was discerned.

**DISCUSSION**

Our data show that ranitidine 50 mg as an i.v. bolus induces an immediate increase (within 30 min) in gastric aspirate pH and a concomitant marked reduction of volume secretion in each subject. This rapid onset of action would allow a short time interval between administration of this H₂-blocker and induction of anaesthesia.

The prolonged activity of ranitidine (more than 6 h) indicates that, at the time of extubation, even after prolonged procedures, the pH of gastric contents would still be high.

In addition to its inhibitory effects on gastric acid secretion, parenteral ranitidine increases the tone of the lower oesophageal sphincter in man (Bertaccini et al., 1981). This may be of further benefit in patients at risk from acid-induced pulmonary damage.

Ranitidine, unlike cimetidine, does not inhibit hepatic drug metabolism (Simon, Müller and Dammann, 1981; Knodell et al., 1982) which is of clinical importance especially in critically elderly patients receiving a large number of drugs.

**REFERENCES**


