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The effects of bolus and continuous nasogastric feeding on gastro-oesophageal reflux and gastric emptying in healthy volunteers: a randomised three-way cross-over study

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Nasogastric tube feeding may result in gastro-oesophageal reflux with an increased risk of aspiration, which may be more pronounced when feeds are administered via a bolus than by infusion. The aim of the present study was to measure gastric emptying time and gastro-oesophageal reflux in healthy volunteers given a liquid feed via an oral bolus (OB), a nasogastric tube bolus (TB) and a nasogastric tube drip (TD).

The study was a prospective three-way single-centre unblinded randomised cross-over study with twelve healthy male volunteers, aged 19–23 years. Each volunteer participated in all three separate studies (OB, TB and TD) in random order, each at least 3 d apart. The feed consisted of 220 ml Ensure Plus (6.3 kJ (1.5 kcal)/ml), labelled with 12 MBq Tc^{99m} diethylenetriaminepentaacetic acid. The OB and TB were given over 5 min and the infusion rate for the TD was 55 ml/h for 4 h. Gastric emptying time was measured using γ-scintigraphy. Gastro-oesophageal reflux was monitored continuously until the stomach was empty, using a multichannel intraluminal impedance–pH catheter (MII-pH) placed 5 cm above the upper border of the lower oesophageal sphincter.

Mean T_{50} gastric emptying time for the OB and TB studies was 41.3 (95% CI 36.5, 46.2) and 36.2 (95% CI 30.6, 41.8) min respectively ($P=0.19$; Student's paired *t* test). The stomach emptied at a rate equal to the infusion rate in the TD studies. Median numbers of reflux episodes for the OB, TB and TD phases of the study were 4.5 (IQR 2.0–6.0), 3.0 (IQR 2.0–4.75) and 2.0 (IQR 0.25–6.25) respectively. Median total duration of reflux (s) for the OB, TB and TD phases of the study were 38 (IQR 20–242), 49 (IQR 17–71) and 36 (IQR 1–125) respectively. These differences were not statistically significant.

The lack of any difference in reflux episodes between bolus and continuous feeding indicates that in healthy volunteers both methods are equally safe with respect to the risk of aspiration.