Early external feeding versus 'nil by mouth' after gastrointestinal surgery: systematic review and meta-analysis of controlled trials

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Authors' objectives
To determine whether a period of starvation (nil by mouth) after gastrointestinal surgery is beneficial.

Searching
PubMed, EMBASE and the Cochrane Controlled Trials Register were searched. In addition, relevant reference lists were checked and letters requesting details of unpublished trials and data were sent to pharmaceutical companies and authors of previous trials.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were included.

Specific interventions included in the review
Studies of enteral feeding (within 24 hours after surgery) compared to the traditional management of nil by mouth and intravenous fluids with the introduction of enteral fluids and diet, as tolerated, were eligible. Standard, elemental, oral or immune enhancing feeds were used in the included studies. The routes of feeding included nasojejunal tube, nasoduodenal tube, jejunostomy and oral.

Participants included in the review
Patients who had undergone elective gastrointestinal surgery were eligible. A minority of the included patients (less than 4%) underwent surgery without anastomosis.

Outcomes assessed in the review
The outcomes assessed included anastomotic dehiscence, infection of any type, wound infection, pneumonia, intra-abdominal abscess, vomiting, mortality and the length of hospital stay.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
Validity was assessed according to adequacy of concealment of allocation to treatment groups and double-blinding. Two authors independently assessed the validity of the studies and resolved any differences by consensus.

Data extraction
The data were extracted independently by two authors, checked for consistency by another author, and sent to the trialists for review. Several categories of data were extracted: the number of patients; site of surgery (pancreatic, hepatobiliary, upper gastrointestinal or lower gastrointestinal); whether an intestinal anastomosis was formed; whether the pathology was benign or malignant; the type of feed used; the method of administering the feed; and the unplanned reinsertion of a nasogastric tube.

Methods of synthesis
How were the studies combined?
The results from individual studies were combined using the relative risk (RR) and a fixed-effect meta-analysis. Data on the length of hospital stay were pooled using non-standardised mean differences. Funnel plots were used to determine the presence of publication bias and related biases, and a statistical test of funnel plot asymmetry was performed.

How were differences between studies investigated?
A chi-squared test was used to test the homogeneity of the RRs. A sensitivity analysis, in which data from patients who did not have an intestinal anastomosis were excluded, was performed. A subgroup analysis investigated whether the risk of anastomotic dehiscence differed according to whether the anastomosis was proximal or distal to the site of feeding.

Results of the review
Eleven RCTs involving 929 participants (463 early enteral feeding and 466 nil by mouth) were included.

Methodological quality: the reporting on concealment of allocation and blinding was poor. Three trials took steps to conceal allocation and only one trial reported a blind outcome assessment.

Funnel plots: these showed no clear evidence of asymmetry for any outcome (p>0.10 by regression test), except for mortality (p=0.068).

Anastomotic dehiscence (8 studies): the absolute risks ranged from 2 to 7% in the early feeding groups and from 1 to 25% in the control groups. The combined RR was 0.53 (95% confidence interval, CI: 0.26, 1.08, p=0.080) and although this indicated a risk reduction, it did not show a statistically-significant reduction in the risk of anastomotic dehiscence with early feeding. There was no evidence of heterogeneity between the trials (chi-squared 2.10, p=0.96). The results were similar when patients without anastomosis were excluded (RR 0.54, 95% CI: 0.26, 1.09).

Any infection (9 trials): the absolute risks ranged from 3 to 30% in the early feeding groups and from 5 to 47% in the control groups. The combined RR was 0.72 (95% CI: 0.54, 0.98, p=0.036), indicating a significant reduction in the risk of infection with early feeding. There was little evidence of heterogeneity between the trials (chi-squared 10.7, p=0.22).

Vomiting (6 trials): the absolute risks ranged from 21 to 50% in the early feeding groups and from 14 to 57% in the control groups. The combined RR was 1.27 (95% CI: 1.01, 1.61, p=0.045), indicating a significant increase in the risk of vomiting with early feeding. When nasogastric tubes were not placed routinely at the time of surgery, the rate of placement because of nausea and vomiting was higher in patients fed early (RR 1.21, 95% CI: 0.73, 1.99, p=0.46).

Length of hospital stay (11 trials): the mean length of stay ranged from 6.2 to 14.0 days in the early feeding groups and from 6.8 to 19.0 days in the control groups. The combined difference in means was 0.84 days (95% CI: 0.36, 1.33, p=0.001), indicating a statistically-significant reduction of about one day in the mean length of stay in hospital with early feeding. There was some evidence of heterogeneity between the trials (chi-squared 16.2, p=0.094). The results were similar when two trials with incomplete data were excluded.

Risk reductions with early feeding were also seen for wound infection (6 trials), pneumonia (7 trials), intra-abdominal abscess (5 trials) and mortality (5 trials), but these failed to reach statistical significance (p>0.10).

Two major complications of feeding were reported in the same trial in patients fed via jejunostomies.

Authors' conclusions
There seems to be no clear advantage to keeping patients nil by mouth after elective gastrointestinal resection. Early feeding may be of benefit. An adequately powered trial is required to confirm or refute the benefits seen in small trials.

CRD commentary
The review question was clearly stated and supported by appropriate a priori inclusion criteria. The search strategy was adequate with attempts to identify unpublished research. However, the authors did not provide any information on the search dates or terms used. Also, it was unclear whether language restrictions were applied. The methodological quality
of the included studies was assessed according to two appropriate criteria. The data were pooled appropriately in a quantitative synthesis and heterogeneity was investigated. Publication bias was also assessed adequately. The review appears to have been conducted in a way that would have minimised bias and errors. The authors' conclusions are consistent with the results presented, in particularly the need for an adequately powered trial.

**Implications of the review for practice and research**

Practice: The authors state that the available data are insufficient to prove the benefit of early feeding.

Research: The authors state that the results indicate the necessity for an adequately powered clinical trial to assess early enteral feeding in patients undergoing elective gastrointestinal surgery. With anastomotic dehiscence as the primary end point, such a trial would need to enrol about 1,000 patients in each arm and would therefore involve several centres.

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