A meta-analysis of selective versus routine nasogastric decompression after elective laparotomy
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Authors' objectives
To compare selective versus routine nasogastric decompression after elective laparotomy.

Searching
MEDLINE and Current Contents were searched. The bibliographies of clinical trials were reviewed to identify other appropriate studies.

Study selection
Study designs of evaluations included in the review
Prospective randomised, non-randomised, case-control and uncontrolled studies were included. Uncontrolled case reports were excluded. Clinical trials involving both elective and emergency procedures were excluded when the outcome data for elective laparotomy patients alone were not available. Trials that evaluated gastrostomy were excluded unless they contained data regarding selective versus routine decompression.

Specific interventions included in the review
Pre-operative or intra-operative insertion of nasogastric tubes for gastric decompression. Routine nasogastric decompression - nasogastric decompression beginning pre-operatively or intra-operatively and continuing until an unspecified point in the patient's post-operative course.

Selective nasogastric decompression - either no nasogastric decompression or intra-operative decompression that was discontinued in the operating or recovery room and re-instituted only if the patient developed a clinical need for decompression in the post-operative period.

Participants included in the review
Patients undergoing elective laparotomy were included.

Outcomes assessed in the review
Frequency of nasogastric tube placement or replacement (in the case of patients treated with routine decompression).

Patient clinical outcomes: incidence of fever, atelectasis, pneumonia, aspiration, nausea, vomiting, abdominal distension, wound infection, wound dehiscence, anastomotic leak.

Other outcomes: total length of hospital stay, days to first oral intake and 30-day mortality.

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 authors performed the selection.

Assessment of study quality
A quality score for grading papers was designed for the review. This quality score was modified from Chalmers et al (1981) and is based on study design, statistical analysis and data presentation. The methods and results sections of each paper were extracted, blinded and then reviewed by two of the authors who assigned a quality score using criteria adopted from Chalmers et al (1981). Discrepancies were resolved through joint review of the study.

Data extraction
The data were extracted by two reviewers (blinded to the authors and source of the paper) onto a standardised data extraction form. Any discrepancies were resolved through a joint review of the study. Attempts were made to obtain missing data from the authors.

**Methods of synthesis**

How were the studies combined?
The outcome data were pooled and analysed for significant differences using the Mantel-Haenszel estimation of combined relative risk (RR). Student's t-test was used to assess significant differences in total hospital length of stay and the number of days to first oral intake. A p value of <0.51 was considered significant.

How were differences between studies investigated?
All studies compared patients treated either with or without nasogastric decompression after elective laparotomy and patent outcome measures were similar across the studies. A sensitivity analysis was carried out examining the effect of study quality. Overall complication rates were plotted as described by L'Abbe et al to identify trials in which outcome differences might be related to confounding factors rather than treatment effect. The calculated study quality score was also used to determine the appropriateness of combining individual trials.

**Results of the review**

There were 26 clinical trials with a total of 3,964 patients: 15 randomised controlled trials (RCTs), 2 non-randomised trials and 9 case-control studies.

Twenty of the 26 identified trials included in the study achieved a score of more than 50 out of 100 (included 2,915 patients). These included 15 prospective randomised trials and 5 case-control studies.

When all studies were included in the meta-analysis, it was found that the patients treated with routine nasogastric decompression had a significantly greater number of complications. Fever, atelectasis and pneumonia were significantly less common and the number of days to first oral intake were significantly fewer in patients treated without nasogastric tubes. Selectively decompressed patients also had fewer wound complications (infection and dehiscence) and a shorter hospital length of stay, although the differences did not achieve statistical significance.

Sensitivity analysis was carried out. This entailed a meta-analysis of the 20 trials (15 RCTs and 5 case-control studies) that scored more than 50 out of 100 on the quality assessment. This analysis showed that fever, atelectasis, and pneumonia remained significantly less common in the selectively decompressed patients. However, abdominal distension and vomiting were significantly more common in the selectively decompressed patients. 7.29% of patients in the selective decompression group required nasogastric tube insertion, while only 2.8% of the routinely decompressed patients has tubes reinserted.

**Cost information**

No

**Authors' conclusions**

For each patient managed selectively who subsequently requires nasogastric tube placement for nausea, vomiting or abdominal distension, at least 20 patients can be managed without a nasogastric tube.

Routine nasogastric decompression after elective laparotomy results in a significantly increased incidence of pulmonary complications (fever, atelectasis and pneumonia) and does not decrease the incidence of wound complications (infection and dehiscence).

Routine use of nasogastric decompression after elective operations is not supported by meta-analysis of the literature.

**CRD commentary**
Although the authors have carried out a comprehensive analysis of the data, they do not give sufficient details of the literature search to allow us to conclude that they have accessed all the available literature. The literature search is not well defined and does not list the years searched or the search terms used. Also, the search was limited to literature published in the English language.

However, the authors do address the issue of publication bias and estimate that an additional 14-37 trials (the number depending on the complication being considered) that show no difference would need to be found to change the conclusions of the meta-analysis.

**Bibliographic details**

**PubMedID**
7748028

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Elective Surgical Procedures; Humans; Intubation, Gastrointestinal; Laparotomy; Postoperative Care; Postoperative Complications; Sensitivity and Specificity

**AccessionNumber**
11995001320

**Date bibliographic record published**
31/07/1996

**Date abstract record published**
31/07/1996

**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.