Meta-analysis: total parenteral nutrition versus total enteral nutrition in predicted severe acute pancreatitis

CRD summary
The authors concluded that total enteral nutrition was associated with decreased mortality, infectious complications, organ failure and surgical intervention rate compared with parenteral nutrition. Given the limited reporting of several aspects of the review and differences between studies, the reliability of the authors’ conclusions is unclear.

Authors’ objectives
To compare the effectiveness of total parenteral nutrition with total enteral nutrition in participants with predicted severe acute pancreatitis.

Searching
PubMed, EMBASE and the Science Citation Index were searched to September 2011. Some search terms were reported. The references of relevant studies were handsearched.

Study selection
Randomised controlled trials (RCTs) that compared total parenteral nutrition with total enteral nutrition in participants with predicted severe acute pancreatitis were eligible for inclusion. Studies had to measure mortality, hospital length of stay, infectious complications, organ failure and need for surgical intervention to be eligible for inclusion. Studies had to be fully reported with detailed information to be eligible for inclusion.

The definition of severe acute pancreatitis used in included studies was APACHE II score (greater than 6 or 8), Ranson's Score (greater than 3), C-reactive protein greater than 150mg/L, Atlanta criteria, or spiral computerised tomography or D or E grade shown on computerised tomograph scan. The presence of organ failure was defined by Atlanta criteria or the Marshall score. A variety of methods were used to determine the presence of infectious complications (such as Atlanta criteria, microbiologic examination for pancreatic complications or blood culture). The year of publication ranged from 1997 to 2010. Studies were conducted in the UK, Canada, Russia, Sweden, Spain, Greece, India and China.

The authors did not state how many reviewers performed the study selection.

Assessment of study quality
The quality of the included studies was assessed using a modified version of the Jadad scale. This three item scale measured the quality of RCTs according to randomisation, blinding and withdrawals/drop-outs. The authors also added allocation concealment to the randomisation criteria. The maximum score was five. Studies were then categorised as low-, medium- or high-risk of bias.

Two reviewers independently assessed the methodological quality of included studies. Disagreements were resolved through discussion.

Data extraction
For dichotomous data, the number of events in each group was extracted and used to calculate relative risks (RR) with their corresponding 95% confidence intervals (CI). For continuous data, the mean difference was calculated with 95% confidence intervals.

Two reviewers independently extracted the data.

Methods of synthesis
For dichotomous data, pooled relative risks were calculated with corresponding 95% confidence intervals. For continuous data, standardised mean differences (SMD) with corresponding 95% confidence intervals were calculated.
Statistical heterogeneity was assessed using $I^2$. Where significant statistical heterogeneity was detected, a random-effects model was used. Where there was no evidence of significant statistical heterogeneity, a fixed-effect model was used.

**Results of the review**
Eight RCTs were included (381 patients). Five scored 3 on the Jadad scale. Three studies scored 2. None of the studies met the criteria for blinding.

Total enteral nutrition was associated with significantly decreased mortality (RR 0.37, 95% CI 0.21 to 0.68; eight studies, 381 patients), infectious complications (RR 0.46, 95% CI 0.27 to 0.78; eight studies, 381 patients) and organ failure (RR 0.44, 95% CI 0.22 to 0.88; six studies, 293 patients) when compared with total parenteral nutrition. Statistical heterogeneity was low for mortality ($I^2=7\%$) but moderate for infectious complications ($I^2=64\%$) and organ failure ($I^2=49\%$). Total enteral nutrition was also associated with a decreased surgical intervention rate (RR 0.41, 95% CI 0.23 to 0.74; five studies, 298 patients) compared with total parenteral nutrition. There was moderate statistical heterogeneity for this outcome ($I^2=46\%$).

There were no significant differences between total enteral and total parenteral nutrition in length of hospital stay or duration of nutrition. However, these outcomes only had one RCT.

**Authors' conclusions**
Total enteral nutrition was associated with decreased mortality, infectious complications, organ failure and surgical intervention rate compared with parenteral nutrition.

**CRD commentary**
The review addressed a clear question with well-defined inclusion criteria. Three relevant databases were searched. However, a search did not appear to have been carried out for unpublished data. It was unclear whether language restrictions were applied to the search, so publication and language bias could not be ruled out. Appropriate steps were taken during the data extraction and quality assessment processes to minimise the risk of reviewer error and bias. It was unclear whether similar steps were taken during the study selection process.

The quality of the included studies was assessed using a basic tool. The Jadad scale reflected completeness of reporting rather than evaluating risk of bias. Therefore the possibility of bias that may impact on the reliability of results was unclear. Limited information was available about the characteristics of included studies, which made it difficult to determine the suitability or generalisability of included studies. Appropriate methods were used to combine study results. Statistical heterogeneity was assessed and moderate levels of heterogeneity were found for most outcomes. The possible sources of heterogeneity were not investigated further.

Given the limit reporting of several aspects of the review and differences between studies, the reliability of the authors' conclusions is unclear.

**Implications of the review for practice and research**
The authors did not state any implications for practice or research.

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