Nutrition support in patients with cancer: what do the data really show?
Klein S, Koretz R L

Authors' objectives
To assess the clinical efficacy of parenteral and enteral nutrition support in patients with cancer.

Searching
The authors do not provide details of the sources searched or the strategies used. All the assessed studies had to be published in an English language periodical or presented at an English-speaking symposium.

Study selection
Study designs of evaluations included in the review
Prospective, randomised controlled trials (RCTs) in which at least half the patients had been clinical diagnosed with cancer. The type of cancer therapy administered was either surgery, chemotherapy, radiation therapy, or bone marrow transplantation.

Specific interventions included in the review
Parenteral and enteral nutrition support.

Parenteral nutrition support was defined as intravenous nutrition containing both amino acids and a minimum of 20 nonprotein calories/kg for at least 24 hours.

Enteral nutrition support was defined as oral or enteric tube liquid-formula feeding, either alone or in conjunction with the patient's regular diet for at least 24 hours.

The control nutrition support was regular diet or a 5% dextrose infusion.

Participants included in the review
Patients with cancer at various disease sites, including bladder, colorectal, gastric, oesophageal, breast and pancreatic sites.

Outcomes assessed in the review
Morbidity, mortality, duration of hospitalisation, treatment toxicity, and tumour response were assessed. The morbidity was defined as a major post-operative complication. The mortality related to the post-operative deaths occurring in hospital, or survival.

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
The authors do not state that they assessed quality.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative review.

How were differences between studies investigated?
The studies were grouped according to the type of cancer therapy, and whether nutrition support was parenteral or enteral. Methodological differences were reported narratively.

Results of the review
The studies were grouped according to the treatment given for the cancer.

Surgery: 22 trials (greater than 1,784 patients) evaluated parenteral nutrition and 7 (400 patients) trials evaluated enteral nutrition.

Chemotherapy: 18 trials (752 patients) evaluated parenteral nutrition and 7 trials (340 patients) evaluated enteral nutrition.

Radiation therapy: 4 trials (166 patients) evaluated parenteral nutrition and 7 trials (260 patients) evaluated enteral nutrition.

Bone marrow transplantation: 2 trials (198 patients) evaluated parenteral nutrition; in one of these trials, the comparator group was given enteral nutrition.

Surgery.

Data from the trials that provided at least 7 days of pre-operative parenteral nutrition suggested that the rate of major peri-operative complications could be decreased by approximately 5%. However, the cost of providing pre-operative parenteral nutrition for 7 to 10 days to 20 patients, to eliminate one post-operative complication, may not be economical. The majority of the trials suggested that there was no significant difference between the treatment groups in terms of the length of hospital stay. Enteral nutrition by tube feeding was associated with gastrointestinal intolerance (nausea, vomiting, abdominal pain, distention and diarrhoea) in up to 50% of the patients. Catheter dysfunction occurred in 20 to 25% of the patients fed by needle-catheter jejunostomy. Peri-operative mortality and the duration of hospital stay were similar in both the treatment and control groups. The rate of peri-operative complications that were not associated with tube feeding was 15% less in patients given enteral feedings than in the control groups.

Chemotherapy.

Parenteral nutrition had no obvious effect on survival. The tumour response rates tended to be worse in patients receiving parenteral nutrition, and there was no apparent beneficial effect on haematologic or gastrointestinal toxicity. In the majority of the trials (8 out of 9), the infection rates were higher in patients receiving parenteral nutrition; this trend was statistically significant in 3 trials. Studies examining enteral nutrition were difficult to evaluate because of heterogeneous nutrition therapy and methodological flaws. Enteral nutrition had no obvious therapeutic benefit with respect to survival, tumour response, or chemotherapy toxicity.

Radiation therapy.

There was no difference in survival between patients receiving parenteral nutrition and those in control groups. One study suggested that parenteral nutrition resulted in a decrease in gastrointestinal side-effects, whereas 2 other studies indicated that it was associated with an increase in gastrointestinal or haematologic side-effects. The infection rates were higher with parenteral nutrition in the one study that reported this outcome. Enteral nutrition did not improve survival and its effect on haematologic or gastrointestinal side-effects was unclear.

Bone marrow transplantation.

The effect of parenteral nutrition on survival was unclear, but it appears that there is unlikely to be a difference between patient groups receiving nutrition support and control groups. In the trial that compared both parenteral
nutrition and enteral nutrition, the infection rates were higher in the former. The cost of maintaining enteral nutrition was less than half the cost of parenteral nutrition.

**Cost information**
Yes. However, the information taken from the included studies was minimal.

**Authors' conclusions**
Many of the trials had serious shortcomings in study design which made it difficult to draw definitive conclusions from the data. In general, the data failed to demonstrate the clinical efficacy of providing nutrition support to most patients with cancer. Therefore, the indications for using nutrition therapy should be the same as those for patients with benign disease.

**CRD commentary**
The authors' conclusions appear to correctly reflect the findings of the individual studies reviewed. However, it is not possible to determine how complete the review is from the authors' description of the methods. The resources searched and the search terms used were not given in the text. These are an important part of a systematic review since the methods used should be explicit to allow reproducibility. In addition, the authors limited the studies for inclusion to those written in the English language, which is likely to have resulted in several relevant studies being omitted.

Considering the heterogeneity between some groups of studies, it would have been useful if validity criteria had been applied to assess the quality of studies.

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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.