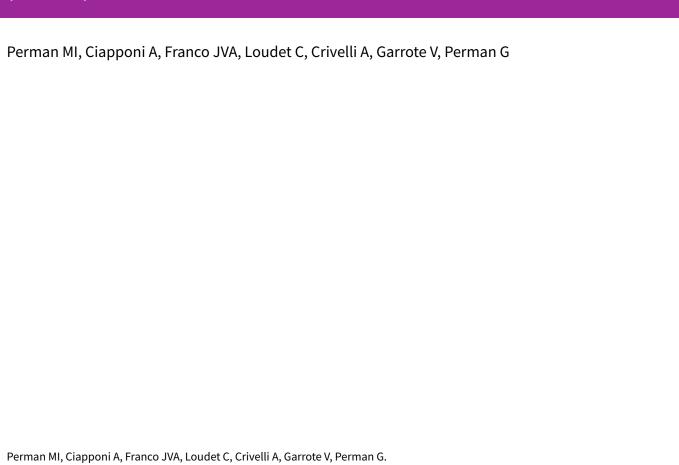


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[Intervention Review]

Prescribed hypocaloric nutrition support for critically-ill adults

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ABSTRACT

Background

There are controversies about the amount of calories and the type of nutritional support that should be given to critically-ill people. Several authors advocate the potential benefits of hypocaloric nutrition support, but the evidence is inconclusive.

Objectives

To assess the effects of prescribed hypocaloric nutrition support in comparison with standard nutrition support for critically-ill adults

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL, Cochrane Library), MEDLINE, Embase and LILACS (from inception to 20 June 2017) with a specific strategy for each database. We also assessed three websites, conference proceedings and reference lists, and contacted leaders in the field and the pharmaceutical industry for undetected/unpublished studies. There was no restriction by date, language or publication status.

Selection criteria

We included randomized and quasi-randomized controlled trials comparing hypocaloric nutrition support to normo- or hypercaloric nutrition support or no nutrition support (e.g. fasting) in adults hospitalized in intensive care units (ICUs).

Data collection and analysis

We used standard methodological procedures expected by Cochrane. We meta-analysed data for comparisons in which clinical heterogeneity was low. We conducted prespecified subgroup and sensitivity analyses, and post hoc analyses, including meta-regression. Our primary outcomes were: mortality (death occurred during the ICU and hospital stay, or 28- to 30-day all-cause mortality); length of stay (days stayed in the ICU and in the hospital); and Infectious complications. Secondary outcomes included: length of mechanical ventilation. We assessed the quality of evidence with GRADE.

Main results

We identified 15 trials, with a total of 3129 ICU participants from university-associated hospitals in the USA, Colombia, Saudi Arabia, Canada, Greece, Germany and Iran. There are two ongoing studies. Participants suffered from medical and surgical conditions, with a



variety of inclusion criteria. Four studies used parenteral nutrition and nine studies used only enteral nutrition; it was unclear whether the remaining two used parenteral nutrition. Most of them could not achieve the proposed caloric targets, resulting in small differences in the administered calories between intervention and control groups. Most studies were funded by the US government or non-governmental associations, but three studies received funding from industry. Five studies did not specify their funding sources.

The included studies suffered from important clinical and statistical heterogeneity. This heterogeneity did not allow us to report pooled estimates of the primary and secondary outcomes, so we have described them narratively.

When comparing hypocaloric nutrition support with a control nutrition support, for hospital mortality (9 studies, 1775 participants), the risk ratios ranged from 0.23 to 5.54; for ICU mortality (4 studies, 1291 participants) the risk ratios ranged from 0.81 to 5.54, and for mortality at 30 days (7 studies, 2611 participants) the risk ratios ranged from 0.79 to 3.00. Most of these estimates included the null value. The quality of the evidence was very low due to unclear or high risk of bias, inconsistency and imprecision.

Participants who received hypocaloric nutrition support compared to control nutrition support had a range of mean hospital lengths of stay of 15.70 days lower to 10.70 days higher (10 studies, 1677 participants), a range of mean ICU lengths of stay 11.00 days lower to 5.40 days higher (11 studies, 2942 participants) and a range of mean lengths of mechanical ventilation of 13.20 days lower to 8.36 days higher (12 studies, 3000 participants). The quality of the evidence for this outcome was very low due to unclear or high risk of bias in most studies, inconsistency and imprecision.

The risk ratios for infectious complications (10 studies, 2804 participants) of each individual study ranged from 0.54 to 2.54. The quality of the evidence for this outcome was very low due to unclear or high risk of bias, inconsistency and imprecision

We were not able to explain the causes of the observed heterogeneity using subgroup and sensitivity analyses or meta-regression.

Authors' conclusions

The included studies had substantial clinical heterogeneity. We found very low-quality evidence about the effects of prescribed hypocaloric nutrition support on mortality in hospital, in the ICU and at 30 days, as well as in length of hospital and ICU stay, infectious complications and the length of mechanical ventilation. For these outcomes there is uncertainty about the effects of prescribed hypocaloric nutrition, since the range of estimates includes both appreciable benefits and harms.

Given these limitations, results must be interpreted with caution in the clinical field, considering the unclear balance of the risks and harms of this intervention. Future research addressing the clinical heterogeneity of participants and interventions, study limitations and sample size could clarify the effects of this intervention.

PLAIN LANGUAGE SUMMARY

Does the prescription of low-calorie (hypocaloric) nutrition support improve the recovery of critically-ill adult patients?

Review question

Does low-calorie nutrition delivered into the stomach or small intestine (enteral), or into a vein (parenteral) improve clinical outcomes in critically-ill adults admitted to an intensive care unit (ICU), when compared with standard calorie nutrition support?

The main outcomes were death (in the hospital, in the ICU and at 30 days); length of ICU and hospital stay; infectious complications and length of time the person was mechanically ventilated (a machine used in ICU to help a person breath).

Background

Critically-ill people experience major metabolic changes (one chemical is transformed through a series of steps into another chemical) during injury or sepsis (a life-threatening condition in which the body's response to infection causes injury to its own organs). They receive nutritional support to prevent or minimize some adverse effects. Nevertheless, both overfeeding and starvation can be harmful.

There is currently no agreement about the amount of calories we should give to these critically-ill people. Normal caloric feeding provides the estimated caloric needs. Hypocaloric feeding provides an intentionally lower amount of calories.

Study characteristics

We included 15 trials with 3129 ICU surgical or medical participants from academic hospitals. Four studies used parenteral nutrition and nine studies used only enteral nutrition. The route was unclear in the remaining two studies. While the studies planned to give different amounts of calories in the experimental and control groups, the actual difference in calories was small. Most studies were funded by the US government or non-governmental associations, but three studies received funding from the industry. Five studies did not state how they were funded.

Key results



The differences in the type of nutrition and type of participants across studies did not allow us to combine study results, so we describe the range of results across the individual studies.

The number of deaths at the hospital, in the ICU and at 30 days in those who received low-calorie nutrition was similar to those in the control group. The length of hospital and ICU stay and the length of mechanical ventilation varied across studies, sometimes shorter and sometimes longer when compared to the control group. The number of infections also varied across studies. We tried to analyse subgroups of participants in order to clarify this variation, but the results were not consistent.

Quality of evidence

The overall quality of evidence for each outcome according to GRADE classification varied from very low to low. This was due to problems in the design and conduct of the studies, the variation in the study results (inconsistency between studies) and the wide range of possible results (imprecision).