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[Intervention Review]

Preoperative carbohydrate treatment for enhancing recovery after elective surgery

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ABSTRACT

Background

Preoperative carbohydrate treatments have been widely adopted as part of enhanced recovery after surgery (ERAS) or fast-track surgery protocols. Although fast-track surgery protocols have been widely investigated and have been shown to be associated with improved postoperative outcomes, some individual constituents of these protocols, including preoperative carbohydrate treatment, have not been subject to such robust analysis.

Objectives

To assess the effects of preoperative carbohydrate treatment, compared with placebo or preoperative fasting, on postoperative recovery and insulin resistance in adult patients undergoing elective surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (2014, Issue 3), MEDLINE (January 1946 to March 2014), EMBASE (January 1947 to March 2014), the Cumulative Index to Nursing and Allied Health Literature (CINAHL) (January 1980 to March 2014) and Web of Science (January 1900 to March 2014) databases. We did not apply language restrictions in the literature search. We searched reference lists of relevant articles and contacted known authors in the field to identify unpublished data.

Selection criteria

We included all randomized controlled trials of preoperative carbohydrate treatment compared with placebo or traditional preoperative fasting in adult study participants undergoing elective surgery. Treatment groups needed to receive at least 45 g of carbohydrates within four hours before surgery or anaesthesia start time.

Data collection and analysis

Data were abstracted independently by at least two review authors, with discrepancies resolved by consensus. Data were abstracted and documented pro forma and were entered into RevMan 5.2 for analysis. Quality assessment was performed independently by two review authors according to the standard methodological procedures expected by The Cochrane Collaboration. When available data were insufficient for quality assessment or data analysis, trial authors were contacted to request needed information. We collected trial data on complication rates and aspiration pneumonitis.

Main results

We included 27 trials involving 1976 participants Trials were conducted in Europe, China, Brazil, Canada and New Zealand and involved patients undergoing elective abdominal surgery (18), orthopaedic surgery (4), cardiac surgery (4) and thyroidectomy (1). Twelve studies were limited to participants with an American Society of Anaesthesiologists grade of I-II or I-III.

A total of 17 trials contained at least one domain judged to be at high risk of bias, and only two studies were judged to be at low risk of bias across all domains. Of greatest concern was the risk of bias associated with inadequate blinding, as most of the outcomes assessed by this review were subjective. Only six trials were judged to be at low risk of bias because of blinding.

In 19 trials including 1351 participants, preoperative carbohydrate treatment was associated with shortened length of hospital stay compared with placebo or fasting (by 0.30 days; 95% confidence interval (CI) 0.56 to 0.04; very low-quality evidence). No significant effect on length of stay was noted when preoperative carbohydrate treatment was compared with placebo (14 trials including 867 participants; mean difference -0.13 days; 95% CI -0.38 to 0.12). Based on two trials including 86 participants, preoperative carbohydrate treatment was also associated with shortened time to passage of flatus when compared with placebo or fasting (by 0.39 days; 95% CI 0.70 to 0.07), as well as increased postoperative peripheral insulin sensitivity (three trials including 41 participants; mean increase in glucose infusion rate measured by hyperinsulinaemic euglycaemic clamp of 0.76 mg/kg/min; 95% CI 0.24 to 1.29; high-quality evidence).

As reported by 14 trials involving 913 participants, preoperative carbohydrate treatment was not associated with an increase or a decrease in the risk of postoperative complications compared with placebo or fasting (risk ratio of complications 0.98, 95% CI 0.86 to 1.11; low-quality evidence). Aspiration pneumonitis was not reported in any patients, regardless of treatment group allocation.

Authors' conclusions

Preoperative carbohydrate treatment was associated with a small reduction in length of hospital stay when compared with placebo or fasting in adult patients undergoing elective surgery. It was found that preoperative carbohydrate treatment did not increase or decrease postoperative complication rates when compared with placebo or fasting. Lack of adequate blinding in many studies may have contributed to observed treatment effects for these subjective outcomes, which are subject to possible biases.

PLAIN LANGUAGE SUMMARY

Does giving patients carbohydrate supplements before planned surgery lead to improved recovery?

Review question

We reviewed the evidence on effects of carbohydrate supplements on the recovery of people undergoing planned surgical procedures. We found 27 studies investigating this question.

Background

Carbohydrate (sugar-containing) nutritional supplements have become a routine part of the package of care for people undergoing planned surgical procedures. We wanted to discover whether carbohydrate supplements are a useful part of care packages used by doctors to improve recovery after planned surgical procedures.

Study characteristics

The evidence is current up to March 2014. We identified 27 studies and included the outcomes of 1976 participants. Studies investigated the outcomes of patients undergoing planned surgical procedures on the abdomen (18), the bones or joints (4), the heart (4) or the thyroid gland (1).

Eighteen studies compared carbohydrate supplements versus an identical appearing placebo drink that did not contain carbohydrates; in six of these studies, an additional group of patients had nothing to eat or drink for at least six hours before surgery. In nine studies, taking carbohydrate supplements was compared with having nothing to eat or drink for six hours before surgery.

The primary outcomes of length of hospital stay and complication rate were reported by 19 and 14 studies, respectively.

Key results

Patients given carbohydrates before planned surgical procedures went home between 0.04 and 0.56 days sooner than those receiving a placebo drink or having nothing to eat or drink before surgery. Carbohydrate supplements had little or no effect on complication rate or on how people feel in-hospital during recovery from surgery.

Quality of the evidence

The overall quality of the evidence varied from very low to high. The quality of evidence in support of carbohydrate supplements resulting in a shorter hospital stay was very low because the included studies had important flaws in their design, a very wide range of results was described and evidence revealed that studies showing no differences in length of hospital stay may not have been published. When we looked only at well-conducted studies, we found that carbohydrate supplements had little or no effect on length of hospital stay.

The quality of evidence to support the effects of carbohydrate supplements on complication rate was low because issues with study design were identified and results were not similar across studies.