Study Protocol

Title:

Effect of perioperative intravenous dextrose administration in improving postoperative nausea and vomiting in adult patients: A meta-analysis with trial sequential analysis

Registration information:

Pre-registration site: University Hospital Medical Information Network (UMIN)
Registration number: UMIN000030901

Purpose:

Effect of intravenous administration of dextrose on postoperative nausea and vomiting (PONV) was controversial. The aim of this study is to investigate the effect of intravenous dextrose on PONV.

Methods:

This study is a systematic review and meta-analysis with trial sequential analysis.
We followed the recommendations of the PRISMA statement and Cochrane Handbook.

Search strategy

Databased searched

MEDLINE, CENTRAL, Embase, and Web of Science; the reference lists of the retrieved full articles are also searched. Further, we conduct a search of clinicaltrials.gov and the UMIN Clinical Trials Registry.

Date of search

We plan to search these databases at January 20, 2018.

The following search strategy combining free text and MeSH terms was set up for PubMed: This information is confidential.

Two authors independently scan the titles and abstracts of reports identified by the variety of search strategies described above. If eligibility cannot be determined from the title or abstract, the full paper is retrieved. Potentially relevant studies, chosen by at

least one author, are retrieved and evaluated in full-text versions. The articles that meet the inclusion criteria are assessed separately by two authors, and any discrepancies are resolved through discussion.

Inclusion and Exclusion Criteria

We search for all randomized controlled trials that tested the effect of intravenous dextrose compared with a placebo on PONV. We exclude data case reports, comments or letters to the editor, reviews, and animal studies. Eligibility is not restricted by language, type of surgery, anesthetic technique, or patient age.

Primary and secondary outcomes

The primary outcome from the present meta-analysis is the incidence of PONV during postoperative 24 hours. The secondary outcomes are the need for rescue antiemetics, incidence of hyperglycemia, postoperative blood glucose level.

Data Collection

A data collection sheet is created and included data on: (1) number of patients in study, (2) age, (3) sex, (4) ASA-Physical Status, (5) type of anesthesia, (6) type of surgery, (7) dose of dextrose (8) incidence of PONV within 24 hours after surgery, (9) number of rescue antiemetics within 24 hours after surgery, (10) side effects, (11) funding information. Values originally provided as percentages are converted back into actual numbers for analysis. If the data were reported only in graphs which indicated percentages or numbers of patients, we measure the lengths of the graphs to obtain the percentages or numbers of patients. Two authors extract the data independently from the studies included and then cross-check the data.

Assessment of risk of bias in individual studies

We assess the risk of bias as described by the Cochrane Handbook for Systematic Reviews of Interventions. We assess the risk of bias in sequence generation, allocation sequence concealment, blinding of patients, blinding of health care providers, blinding of data collectors, blinding of outcome assessors, incomplete outcome data, selective outcome reporting, and other bias.

Assessment of quality of evidence

We grade the quality of evidence of the main outcomes using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach with GRADEpro software. Judgments of the quality of evidence are based on the presence or absence of the following variables: limitations in study design, inconsistency, indirectness, imprecision of the results, and publication bias. The quality of evidence for the main outcomes was graded as very low, low, moderate, or high.

Statistical Analysis

Continuous data are summarized using mean difference (MD) with a 95% confidence interval (CI). Dichotomous data are summarized using risk ratio (RR) with a 95% CI. If the 95% CI include a value of 0 or 1 for continuous or dichotomous data, respectively, we consider the difference not to be statistically significant. Heterogeneity is quantified with the I^2 statistic. We consider that significant heterogeneity existed when the I^2 statistic exceeded 50%. We plan to conduct subgroup analysis according to the following predefined factors when the I^2 statistic exceeded 50%: (1) presence or absence of prophylactic antiemetics, (2) dose of dextrose (less than 250 ml of 5% dextrose or not), or (3) type of surgery. We use the random effect model (Dersimonian and Laird method) to combine the results. Forest plots are used to graphically represent and evaluate the effects of treatment. Small study effects is assessed using a funnel plot and an Egger's regression asymmetry test and is considered to be positive if $p < 0.1$ in the regression asymmetry test. Sensitivity analyses are performed for the primary outcomes according to the risk of bias (low vs. high or unclear). For our primary outcomes, trial sequential analysis (TSA) are performed to correct for random error and repetitive testing of accumulating and sparse data. TSA monitoring boundaries (i.e., monitoring boundaries for meta-analysis) and required information size (RIS) are quantified, and adjusted CIs are calculated. Risk of type 1 error is maintained at 5% with a power of 90%. The RR of the incidence of PONV of 0.75 (i.e., 25% relative risk reduction) was considered clinically meaningful. If the TSA-adjusted CI included a value of 1, we consider the difference not statistically significant.

Software used for statistical analysis

Statistical analyses are performed using the R statistical software package, version 3.3.0 (R Foundation for Statistical Computing, Vienna, Austria). TSA is performed using TSA viewer version 0.9.5.5 β (www.ctu.dk/tsa).