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Effect of dexmedetomidine on sleep architecture in postoperative patients: a meta-analysis

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 05 March 2024 and was last updated on 05 March 2024.

INTRODUCTION

Review question / Objective In this paper, the effects of postoperative dexmedetomidine on postoperative sleep structure were evaluated by meta-analysis of postoperative polysomnography (PSG) data.

Condition being studied Sleep disorders can occur in the perioperative short- or long-term and affect many surgical patients. Sleep disorders are common in perioperative patients, approximately 8.8-79.1% of patients have sleep disorders before surgery, and postoperative sleep disorders may last for a long time. Dexmedetomidine changes sleep patterns are one of the potential mechanisms to improve sleep quality after surgery. Sleep cycles can be divided into non-rapid eye movement (NREM) sleep and rapid eye movement (REM) sleep. NREM can be divided into N1, N2, and N3 . Surgery and anesthesia can negatively affect sleep quality by altering the sleep parameters. REM and N3 sleep were significantly reduced in patients undergoing surgery, whereas N1 sleep was prolonged. The effect of postoperative Dex application on the postoperative sleep parameters of patients remains controversial and requires further study.

METHODS

Participant or population Adult patients undergoing elective surgery.

Intervention Dexmedetomidine was used after operation.

Comparator Placebo (normal saline), other sedatives, or analgesics.

Study designs to be included Randomized controlled trial.

Eligibility criteria Studies were included according to the following criteria; (1) Subjects: adult patients undergoing elective surgery; (2) Intervention: postoperative administration of Dex; (3) control: placebo (normal saline), other sedatives or analgesics; (4) Results: Sleep quality should be objectively evaluated by PSG or its derivative methods, including at least one of the following indicators: sleep efficiency, the percentage of N1, N2, N3 and REM sleep. (5) Study design: randomized controlled study; (6) The study should be published or accepted for publication in a peer-reviewed journal; (7) The research content should be thesis or dissertation, and the full text should be provided. Exclusion criteria: (1) non-randomized controlled trials; (2) no Dex application or non-intravenous intervention; (3) no postoperative sleep monitoring.

Information sources Search literature database: PubMed, Embase, The Cochrane Library, Web of science, China National Knowledge Infrastructure (CNKI), Chinese Biomedical Journal Database (CMJD) and Wanfang database.

Main outcome(s) Effect of dexmedetomidine on the first postoperative night sleep efficiency and the percentage of N3 sleep.

Quality assessment / Risk of bias analysis Two researchers independently evaluated the methodological quality of the included study using the Cochrane bias risk assessment tool. If the evaluation results are controversial, the third researcher will evaluate the quality. The bias risk of each randomized controlled study covers seven areas: random sequence survival, hidden allocation scheme, blind method, outcome evaluation, outcome data integrity, selective reporting and other bias. The bias risk of each item is rated as "high", "low" or "unclear". Differences are resolved by consensus. The risk of inter study bias (publication bias, small sample volume bias) will be assessed in the form of funnel chart.

Strategy of data synthesis Data synthesis and statistical analysis will be performed using Review Manager (RevMan, version 5.4) software (Cochrane Library, Oxford, UK). Extracted data from literature in the present review are continuous variables, we therefore will calculate the weighted mean differences (WMD) and 95% confidence interval (CI). Statistical differences will not be regarded as significant if the 95% CI included zero for the MD. Forest plots will be used to present the pooled results and corresponding 95% CIs. Cochrane Q test (P50% means a significantly high heterogeneity and the corresponding outcome will be analyzed with random effect model, contrarily the fixed effect model will be applied.

Subgroup analysis Subgroup analysis will be performed according to severity of illness, injection method and dosage of dexmedetomidine, type of surgery and so on. Discovered heterogeneity will be resolved by subgroup analysis when two or more studies are included in each subgroup.

Sensitivity analysis In addition, based on the results of quality evaluation, a sensitivity analysis will be performed by excluded the article with significant high risk of bias.

Country(ies) involved China.

Keywords Dexmedetomidine, Perioperative sleep, sleep structure, polysomnography, sleep efficiency.

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