INPLASY PROTOCOL

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Conflicts of interest:
None declared.

The safety of perioperative dexamethasone in surgical patients with diabetes mellitus: a systematic review and meta-analysis

Pang, QY[1]; Liu, HL[2].

Review question / Objective: **We conducted a meta-analysis and compared blood glucose changes, hyperglycemia, and wound healing in surgical patients with DM between dexamethasone usage and no usage, and tried to figure out the safety and feasibility of dexamethasone in surgical patients with DM.**

Information sources: **The data bases of Pubmed, Embase, Cochrane Library, Google Scholar, and CNKI were searched from 1990 to June 2022. The key words and medical subject headings (MeSH) included dexamethasone, steroids, surgery, surgical, operation, operative, diabetes mellitus, diabetic, diabetes, antiemesis, antiemetic, emesis, emetic, postoperative nausea and vomiting, PONV, glucose, glucose response, hyperglycemia, adverse events, wound infection and wound healing. The conference abstracts with enough data were considered for potentially eligibility. Moreover, the references in the retrieved literatures were checked to determine any potential eligible trials.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 01 July 2022 and was last updated on 01 July 2022 (registration number INPLASY202270002).

INTRODUCTION

Review question / Objective: **We conducted a meta-analysis and compared blood glucose changes, hyperglycemia, and wound healing in surgical patients with DM between dexamethasone usage and no usage, and tried to figure out the safety and feasibility of dexamethasone in surgical patients with DM.**

Condition being studied: **Dexamethasone is commonly used to prevent postoperative nausea and vomiting, and is recommended as the first-line antiemetic [1]. Dexamethasone can promote gluconeogenesis, reduce peripheral and**

hepatic insulin sensitivity, and induce hyperglycemia [2]. The immune function can be impaired by dexamethasone and hyperglycemia, which then leads to wound infection, delayed wound healing, dehiscence, and other complications [3,4]. A single dose of dexamethasone in non-cardiac surgery can increase blood glucose till 24 hours after surgery [5]. One recent meta-analysis showed that dexamethasone significantly increased blood glucose in non-diabetic surgical patients compared with control within 12 hours of surgery [6]. With the rising of diabetes mellitus(DM) globally, dexamethasone usage in surgical patients with DM will be a big challenge for perioperative blood glucose control. Recent studies compared the effect of dexamethasone on glucose changes between DM and non-DM, but the results were inconsistent [2,7,8,9,10], and it is difficult to distinguish whether the disparity results from different sensitivity to dexamethasone or different response to surgical stress between DM and non-DM. So, it is urgent to elucidate the effect of dexamethasone usage and no usage on blood glucose and wound healing, so as to confirm its safety in surgical patients with DM.

METHODS

Participant or population: Adult patients with diabetes mellitus undergoing non-cardiac surgery.

Intervention: Dexamethasone was administered intravenously for antiemesis.

Comparator: Perioperative dexamethasone intravenous.

Study designs to be included: RCT and retrospective study.

Eligibility criteria: The inclusion criteria included: (a) studies comparing perioperative dexamethasone with control (no dexamethasone treatment or saline) in adult patients with diabetes mellitus undergoing non-cardiac surgery; (b) dexamethasone was administered intravenously for antiemesis; (c) data about the relationship between dexamethasone and glucose responses with or without wound healing and infection. The exclusion criteria included: (a) studies comparing different doses of dexamethasone without control; (b) dexamethasone administered only postoperatively; (c) dexamethasone with large dosage for other purposes(not for antiemesis); (d) reviews or case reports.

Information sources: The data bases of Pubmed, Embase, Cochrane Library, Google Scholar, and CNKI were searched from 1990 to June 2022. The key words and medical subject headings (MeSH) included dexamethasone, steroids, surgery, surgical, operation, operative, diabetes mellitus, diabetic, diabetes, antiemesis, antiemetic, emesis, emetic, postoperative nausea and vomiting, PONV, glucose, glucose response, hyperglycemia, adverse events, wound infection and wound healing. The conference abstracts with enough data were considered for potentially eligibility. Moreover, the references in the retrieved literatures were checked to determine any potential eligible trials.

Main outcome(s): The primary outcome was glucose responses, which included glucose changes after dexamethasone administration, peak glucose level, and development of hyperglycemia.

Additional outcome(s): The secondary outcomes included insulin requirement, wound healing and infection.

Quality assessment / Risk of bias analysis: The quality of RCTs was assessed using the Jadad scoring system. The evaluated items included size calculation, generation of allocation sequence, allocation concealment, methods of randomization, blinding, and descriptions of protocol deviations, withdrawals, and dropouts. The highest score was 7, and the trial with a quality score less than 3 were excluded. The quality of the observational studies was assessed using the Newcastle-Ottawa scale, the evaluated items included selection criteria, comparability and outcome(cohort) or exposure(case-control). The maximum score was 9, and

the trial with a score less than 7 was excluded.

Strategy of data synthesis: The meta-analysis was conducted using STATA software. The unit of glucose level was standardized to mmol/L, the calculations of effect size for continuous data were MD or SMD with 95% confidential index(CI). The effect size for dichotomous data were presented as odds ratio(OR) with 95% CI. The between-study heterogeneity was determined by I2 value, the levels of heterogeneity was defined as low when I2≤25%, moderate when I2 ranges 25-50%, and high when I2>50%. The fixed-effect model was used when I2≤50%, and the random-effect model was used when I2>50%.

Subgroup analysis: Subgroup Analysis was performed to explore the source and size of heterogeneity among studies when necessary.

Sensitivity analysis: Sensitivity analysis was performed to explore the source and size of heterogeneity among studies when necessary.

Country(ies) involved: China.

Keywords: dexamethasone, diabetes mellitus, surgery, glucose.

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