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Review

The efficacy of dexamethasone reducing postoperative pain and emesis after total knee arthroplasty: A systematic review and meta-analysis

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ABSTRACT

Background: Total knee arthroplasty (TKA) is gradually emerging as the treatment of choice for end-stage osteoarthritis. In the past, Perioperative dexamethasone treatment is still a controversial subject in total knee arthroplasty. Therefore, we write this systematic review and meta-analysis to evaluate the efficacy of dexamethasone on pain and recovery after Total knee Arthroplasty.

Materials and methods: Embase, Pubmed, and Cochrane Library were comprehensively searched. Randomized controlled trials, cohort studies were included in our meta-analysis. Eight studies that compared dexamethasone groups with placebo groups were included in our meta-analysis. The research was reported according to the preferred reporting items for systematic reviews and meta-analysis (PRISMA) guidelines. Randomized controlled trials were included in our meta-analysis.

Results: Our study demonstrated that the dexamethasone group was more effective than the placebo group in term of VAS score at 24 h($P < 0.00001$), 48 h($P = 0.0002$); Opioid consumption ($P < 0.00001$); postoperative nausea ($P < 0.00001$); and Inflammatory factors of CPR at 24 h ($P = 0.003$).

Conclusion: Our meta-analysis demonstrated that dexamethasone decreased postoperative pain, the incidence of POVN, and total opioid consumption effectively which played a critical role in rapid recovery to TKA. However, we still need large sample size, high quality studies to explore the relationship between complications and dose response to give the final conclusion.

1. Introduction

Total knee arthroplasty (TKA) is a best choice for the treatment of end-stage osteoarthritis due to degeneration of articular cartilage [2]. However, pain management remains an unresolved problem. Furthermore, many patients suffer postoperative nausea and vomiting after total knee arthroplasty. Inadequate management of postoperative pain is relevant with a series of undesirable effects, including progression to a persistent pain, delayed functional recovery, and increased the economic burden [3]. Moreover, pain and POVN are associated with patient dissatisfaction [4]. Thus, relieving postoperative pain and preventing PONV are the main components in promote recovery after TKA.

Glucocorticoids, which have potent anti-inflammatory and antiemetic effects, have been extensively used in various perioperative settings for instance, gynecologic, cardiac et al. [5,6], for reducing postoperative pain, decreasing inflammatory markers, and preventing nausea and vomit [7,8]. In recent years, although dexamethasone has been widely used in TKA, the safety and effectiveness of glucocorticoid is extremely controversial, especially care about the side of potential effects. A recently published study demonstrated that perioperative systemic steroid was beneficial to relieve perioperative pain and decrease the risk of POVN [1,9], and some studies suggested superior outcome in postoperative thrombogenic marker and in function rehabilitation with glucocorticoids [7,10]. On the contraty, some studies showed that there are no significant of steroid in decreasing VAS scores and reducing the incidence of PONV [11,12].

It is unclear that whether the application of dexamethasone is safe and effective in decreasing VAS score and reducing opioid consumption in TKA. What's more, limited studies have demonstrated the effectiveness of dexamethasone for TKA and no consensus has been reached on

Abbreviations: RCT, randomized controlled trial; VAS, visual analogue scale; LOS, length of stay; TKA, total knee arthroplast [1]

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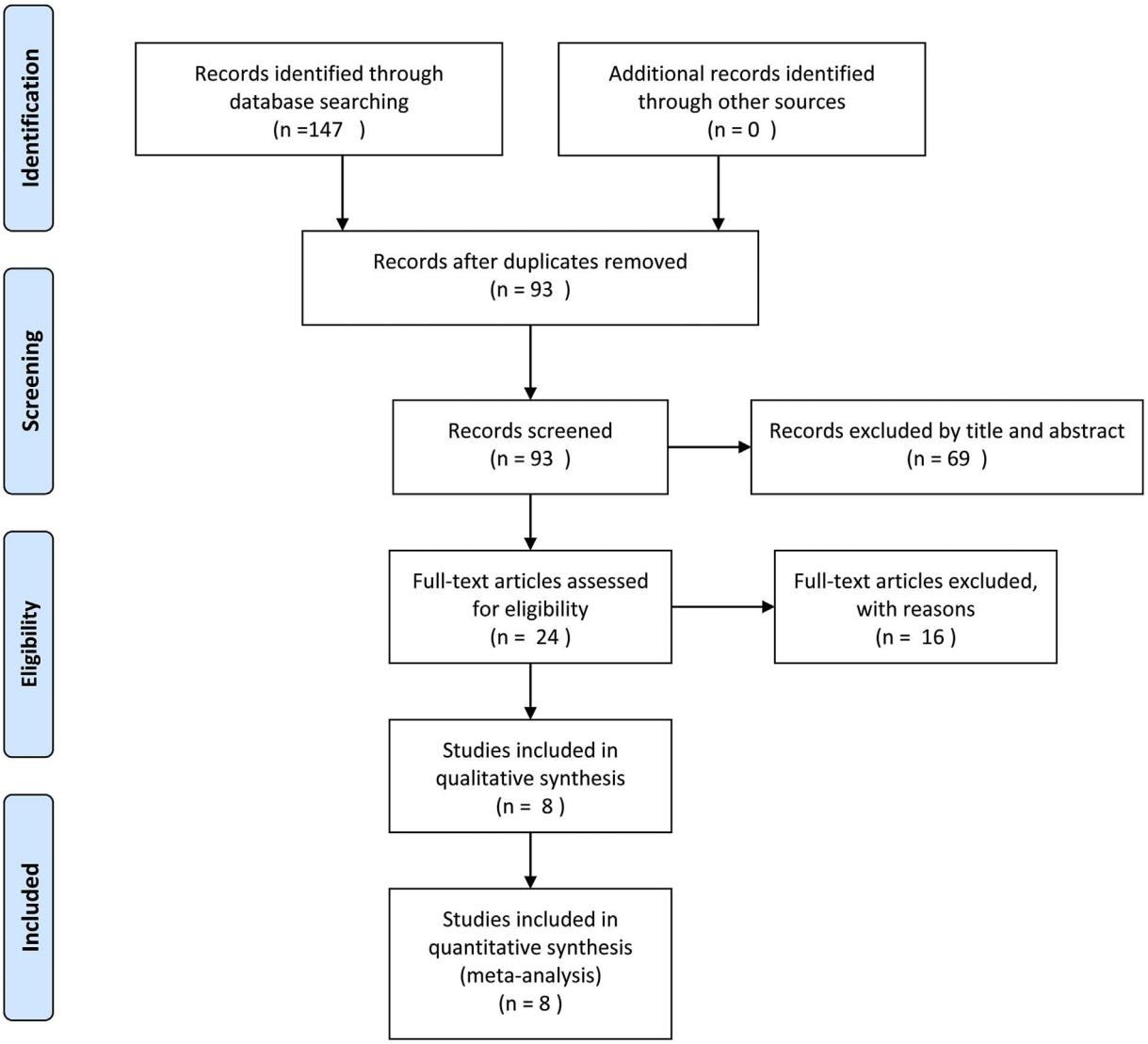

Fig. 1. Search results and the selection procedure.

the application of dexamethasone for TKA. Therefore, it is necessary to carry out the meta-analysis to evaluate the safety and efficiency of dexamethasone in total knee arthroplasty.

2. Methods

Our meta-analysis was reported according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) checklist. The study was approved by the ethics committee of our Hospital.

2.1. Search strategy

Randomized controlled trials (RCTs), cohort studies, and controlled clinical trials (CCTS) by searching electronic databases, including PubMed, Embase, and Cochrane Library up to December 2017. A structured search was performed using the following search string: “dexamethasone” OR “hexadecadrol” AND (“TKA” OR “TKR” OR “total knee arthroplasty” OR “total knee replacement” OR “Arthroplasty, Replacement, knee[Mesh]”). No restrictions were imposed on language. The retrieval process is presented in Fig. 1.

2.2. Inclusion criteria

Studies were considered eligible for meta-analysis if they met the PICOS (population, intervention, comparator, outcome, study design) criteria. Population: patients were scheduled for TKA. Intervention: intravenous or topical injection of dexamethasone for pain management. Comparison: placebo or nothing controlled multimodal analgesia method. Outcomes: visual analogue scale (VAS) at 24, 48 h, total morphine consumption at 24 h, length of hospital stay, postoperative nausea, Serum C-reactive protein at 24 h. Study design: RCTs, CCTs, cohort studies.

2.3. Literature selection

All searched studies were imported into Endnote X7 and duplicate documents were excluded. Next, two researchers independently excluded studies according to titles and abstracts. At last, the irrelevant literatures were removed that did not satisfy the PICOS. By Discussion with a third reviewer, disagreements were resolved.

2.4. Data extraction and assessment of study quality

The relevant data was extracted from the included studies by using a