



Review

Topical use of topical fibrin sealant can reduce the need for transfusion, total blood loss and the volume of drainage in total knee and hip arthroplasty: A systematic review and meta-analysis of 1489 patients



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HIGHLIGHTS

- We conducted a meta-analysis to compare the effectiveness and safety of FS for blood loss after TKA and THA.
- Only high quality studies were selected.
- FS can decrease blood loss without increasing infection after TKA and THA.

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ABSTRACT

Objective: To evaluate the efficacy and safety of fibrin sealant for the reduction of postoperative blood loss and transfusion requirements in patients undergoing total hip arthroplasty (THA) and total knee arthroplasty (TKA).

Methods: Electronic databases including PubMed, Embase, CENTRAL (Cochrane Controlled Trials Register), Web of Science and Google Scholar were searched from database inception to February 2016. All randomized controlled trials evaluating the efficacy and safety of topical administration of fibrin glue during primary THA or TKA were included in our meta-analysis. Transfusion requirements, total blood loss, length of hospital stay and the occurrence of infection were calculated using Stata 12.0 software.

Results: A total of nineteen clinical trials with 1489 patients (405 hips and 1084 knees) were finally included for meta-analysis. The results indicated that the topical administration of fibrin sealant can decrease the need for transfusion (RR = 0.33, 95%CI 0.28–0.40, $P < 0.001$), total blood loss (MD = -138.25, 95% CI -203.49 to -75.00), blood loss in drainage (MD -321.44, 95% CI -351.96 to -290.92, $P < 0.001$) and hospital stay length (MD -0.98, 95% CI -1.35 to -0.62, $P < 0.001$) without increasing the occurrence of infection (RR = 0.87, 95% CI 0.33 to 2.27, $P = 0.775$).

Conclusion: The topical use of fibrin sealant can effectively reduce the need for transfusion, total blood loss and the volume of drainage without increasing the rate of infection.

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1. Introduction

Total knee and total hip arthroplasty are commonly used to reduce pain, correct deformity, and improve quality of life and have become an ideal solution for patients with end-stage knee osteoarthritis, rheumatoid arthritis and femoral head necrosis [1]. The

amount of blood loss after total knee arthroplasty (TKA) has been reported to vary from 900 mL to 2000 mL, whereas for total hip arthroplasty it ranges from 700 mL to 1700 mL [2–4]. The anemia and heart disease caused by blood loss as well as the transfusion reactions and the transmission of viral diseases such as human immunodeficiency virus, hepatitis and cytomegalovirus through blood transfusions remain a challenge for surgeons who perform arthroplasty [5]. Several methods have been used to reduce blood loss and to decrease the complications of blood loss, including autologous blood donation, minimally invasive procedures and

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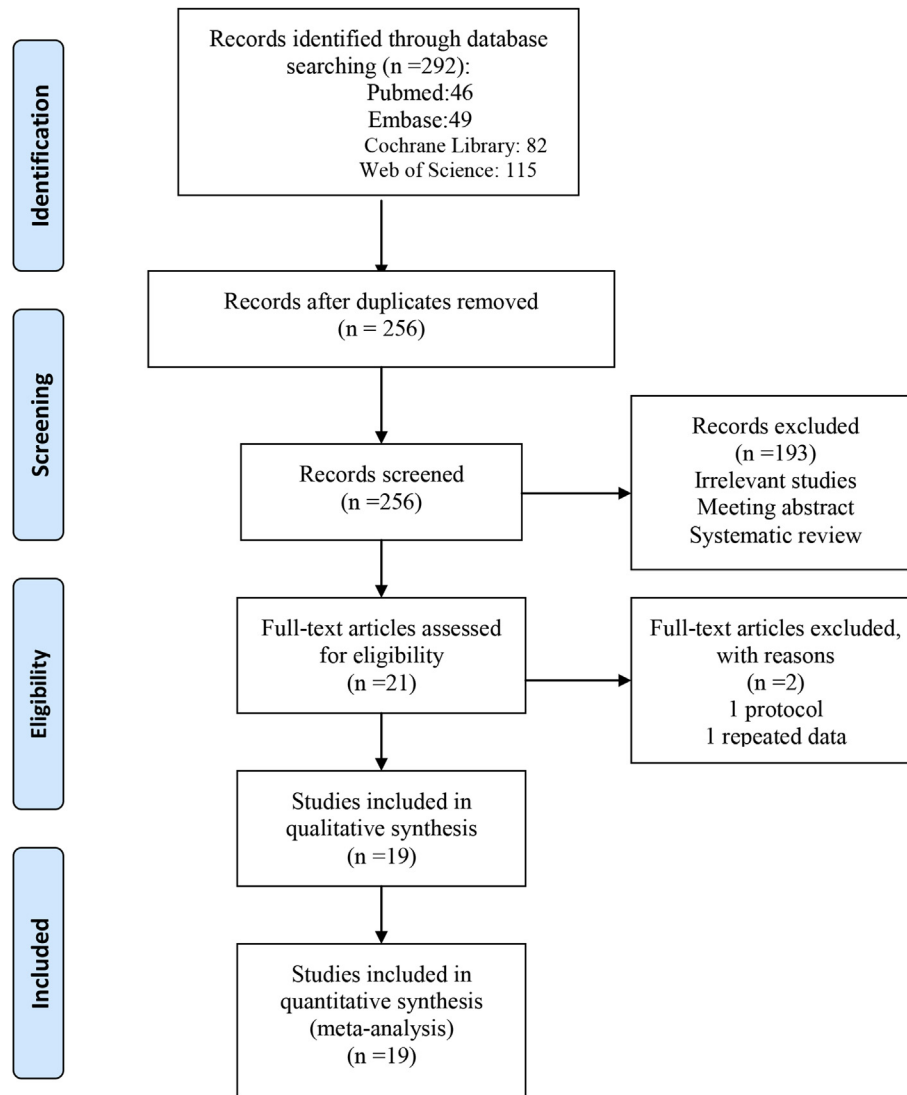


Fig. 1. The flow diagram of the included studies.

intraoperative tourniquet use. These methods are associated with disadvantages such as higher economic costs and increased risk of thrombosis. Therefore, finding an ideal method for reducing both blood loss and the length of hospital stay is critically important for surgeons.

Fibrin sealant is a complex compound of fibrinogen, thrombin and tranexamic acid that has been used for many years in orthopedic surgery to reduce blood loss and decrease the need for blood transfusion. Although three published meta-analyses have shown that fibrin sealant is safe and effective for reducing blood loss after TKA, there is no evidence regarding its effectiveness in total hip arthroplasty and total knee arthroplasty. This large sample study will further clarify the effect of fibrin sealant in joint replacement surgery.

2. Materials and methods

Ethical approval for this study was deemed unnecessary because it was a review and meta-analysis of existing literature and

did not involve any handling of individual patient data.

2.1. Search strategy

The electronic databases including PubMed, Embase, CENTRAL (Cochrane Controlled Trials Register), Web of Science and Google Scholar were used to search for relevant academic trials involving comparisons between the topical administration of fibrin sealant versus placebo in the management of blood loss after TKA from the database inception to February 2016. To maximize the search specificity and sensitivity, the key words and medical subject heading (MeSH) search terms included: fibrin sealant, fibrin glue, fibrin tissue adhesive, total knee arthroplasty, total knee replacement, total hip replacement, total hip arthroplasty, TKA, TKR, THA and THR. These key words and their corresponding MeSH terms were combined with the Boolean operators AND or OR. Furthermore, the reference lists of all of the full-text articles were reviewed to identify any initially omitted studies; there were no restrictions on the language of the publication. The search strategy is presented

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