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Review

Is postoperative cell salvage necessary in total hip or knee replacement? A meta-analysis of randomized controlled trials

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HIGHLIGHTS

- 19 RCTs enrolling 3482 patients were identified and included in the meta-analysis.
- Postoperative cell salvage can significantly reduce the allogeneic blood transfusion requirement in THR and TKR.
- No significant differences were founded regarding the incidence of febrile reaction, wound infection and DVT.

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ABSTRACT

Objective: The purpose of this study was to determine whether there are hematological or clinical differences with the use of postoperative cell salvage after total knee (TKR) and hip replacement (THR).
Methods: A systematic literature review based on PubMed, EMBASE, the Cochrane Library Database in any language regarding postoperative cell salvage following TKR or THR was performed. High quality of randomized controlled trials were identified. The data was analyzed using Rev Man 5.2.
Results: 19 randomized controlled trials (12 in TKR, 4 in THR and 3 in both) about 3482 patients were identified and included in this meta-analysis. Postoperative cell salvage significantly reduced the allogeneic blood transfusion requirement after TKR (RR = 0.46, 95% CI = 0.30 to 0.72) and THR (RR = 0.46, 95%CI = 0.32 to 0.68). It also demonstrated a higher level of postoperative Hemoglobin (MD = 0.26 g/dL, 95%CI = 0.15 to 0.37) with the use of postoperative cell salvage. No significant differences were detected regarding length of hospital stay, the incidence of febrile reaction, wound infection and deep vein thrombosis.
Conclusion: The results strengthen the fact that postoperative cell salvage is effective and safe to reduce the rate of transfusion after TKR and THR. As the relatively poor methodological quality and heterogeneity, further research is needed to confirm its safety and cost-effectiveness.

Contents

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1. Introduction

Primary total hip (THR) and knee replacement (TKR) are among the most frequent elective procedures requiring allogeneic blood transfusion (ABT) to correct acute postoperative anemia [1–3], as these procedures are associated with substantial blood loss, leading to a significant postoperative reduction in hemoglobin level [4,5]. But ABT itself is not free from risks [6–8]. So, this remains a concern both for patients and healthcare providers.

In order to minimize blood loss and ABT requirement, the concept of patient blood management (PBM) has been introduced with more emphasis on preventative measures [9], including pharmacological agents and autologous blood retransfusion [10–12]. Postoperative cell salvage (PCS) collects the blood drainage via a filter, and then the blood is returned via a standard setting within 6 h postoperatively; while the blood drainage collected by standard suction drain (SSD) is discarded. A large amount of studies have examined the advantage of PCS over SSD following THR or TKR, with varying results [13–15].

We conducted the meta-analysis to investigate whether there are hematological or clinical differences following THR/TKR when comparing PCS with SSD in terms of: 1) reduction in the proportion of transfused patients (transfusion-avoiding effect); 2) other clinical results including post-operative Hemoglobin (Hb) level, length of hospital stay, complications and function outcomes.

2. Materials and methods

2.1. Literature search

We searched the electronic database including PubMed (1966 to February 2015), Cochrane Central Register of Controlled Trials (January 2015), Embase (1974 to February 2015), Web of Science (1995 to February 2015), adopting a search strategy as follows: (total knee arthroplasty OR total knee replacement) OR (total hip arthroplasty OR total hip replacement) AND (autologous blood transfusion) AND (cell salvage). We further screened the reference lists of citations for any eligible studies. There were no limitations on language or publication type.

2.2. Selection criteria

We retrieved all the randomized controlled trials (RCTs) comparing PCS with SSD in patients after total joint replacement (TJR). Proper RCTs would be included in the analysis if they provided adequate data on target outcomes. Studies would be excluded if 1) other transfusion alternatives were used such as preoperative autologous blood donation or intra-operative cell salvage; 2) there was no sufficient information even though contacting the authors. After exclusion of duplicates, one reviewer

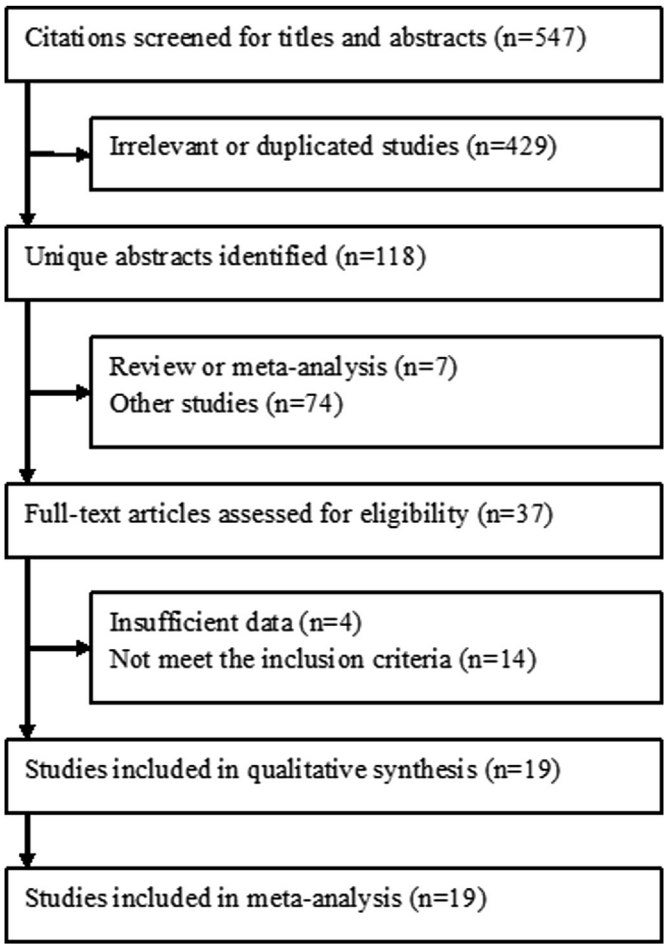

Fig. 1. Flowchart shows how studies were identified and selected.