



Review

Preoperative chlorhexidine reduces the incidence of surgical site infections in total knee and hip arthroplasty: A systematic review and meta-analysis



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HIGHLIGHTS

- To assess the incidence of surgical site infection between chlorhexidine skin preparation and traditional skin preparation.
- Only high quality studies were selected.
- Preoperative chlorhexidine skin preparation appears to reduce the risk of infection and incidence of revision surgery.

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ABSTRACT

Objective: This meta-analysis aims to assess the incidences of surgical site infection of patients who applied preadmission chlorhexidine skin preparation, versus those who applied the traditional skin preparation before undergoing total knee and hip arthroplasty.

Methods: A systematic search is carried out through Medline (1966–2016.11), PubMed (1966–2016.11), Embase (1980–2016.11), ScienceDirect (1985–2016.11) and the Cochrane Library. Only high quality studies are identified. Meta-analysis is conducted with the use of Stata 11.0 software.

Results: One RCT and five retrospective studies, published between 2010 and 2016, are included in the present meta-analysis. The present meta-analysis indicates that there are significant differences in surgical site infection rate (RD = -0.02 , 95% CI: -0.02 to -0.01 , $P < 0.00001$), revision surgery rate (RD = -0.01 , 95% CI: -0.01 to -0.01 , $P < 0.00001$) and length of stay (MD = -0.29 , 95% CI: -0.48 to -0.11 , $P = 0.002$) between groups.

Conclusion: Preoperative chlorhexidine skin preparation appears to reduce the risk of infection, the incidence of revision surgery, and the length of stay for patients undergoing total knee and hip arthroplasty. No adverse effects, such as DVT or PE, appear to be related to chlorhexidine preparation. Due to the limited quality of the evidence currently available, high quality RCTs with better study designs, larger sample sizes and longer follow-ups are needed.

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1. Introduction

Total joint arthroplasty (TJA) is a popular surgical procedure which provides excellent functional results and reduces pain in patients who suffer from osteoarthritis of the knee and hip. However, periprosthetic joint infection is a devastating complication that is a deep concern for patients and surgeons alike. Infection may lead to prolonged hospital stays, delayed recoveries and

subsequent revision surgeries which are a financial burden. It has been reported that the infection rate of total knee arthroplasty (TKA) is 1%–3% and 0.7%–2.5% for total hip arthroplasty (THA) [1–6]. With the aging population, the number of joint arthroplasty surgeries is expected to rise which is to say that more patients will be at risk for periprosthetic infection. Avoiding infectious complications is therefore a pressing issue at hand.

Periprosthetic infection following a TJA may find its source in operating room air and skin flora [7–10]. A multiple strategies have been reported to decrease the risk of surgical site infections following TKA and THA. Over the past few years, we have focused on laminar airflow, positive air pressure and body exhaust suits,

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each have been reported to have positive effects. Unfortunately, these methods cannot reduce potential risk factors from skin flora. Chlorhexidine is a broad-spectrum biocide that has bactericidal functions, and guards against Gram-positive and Gram-negative bacteria. Previous studies have reported that preoperative chlorhexidine showers can significantly reduce surgical site infection when compared to no chlorhexidine shower [11–13]. However, some reports criticized chlorhexidine showers for reducing chlorhexidine concentration on the skin because the solution is washed off. Thus, a 2% chlorhexidine gluconate no-rinse cloth has been introduced, which has a potentially superior bacterial effect and higher patient compliance.

Despite this previous research, whether preoperative chlorhexidine skin preparation is superior to standard skin preparation in terms of infection rate remains unclear due to a lack of published studies and limited sample sizes. Therefore, we have performed the present systemic review and meta-analysis to assess the incidences of surgical site infection of the patients undergoing TKA and THA

who applied preadmission chlorhexidine skin preparation versus those who applied traditional skin preparation.

2. Methods

2.1. Search strategy

We systematically searched electronic databases including Embase (1980–2016.11), MEDLINE (1966–2016.11), PubMed (1966–2016.11), ScienceDirect (1985–2016.11), Web of Science (1950–2016.11) and Cochrane Library for potentially relevant articles. Grey academic studies were also identified from the references of identified studies. There was no language restriction. The following terms were used as key words in combination with Boolean operators AND or OR: “Total knee replacement OR arthroplasty”, “Total hip replacement OR arthroplasty”, “chlorhexidine”, and “infection”. The retrieval process is presented in Fig. 1.

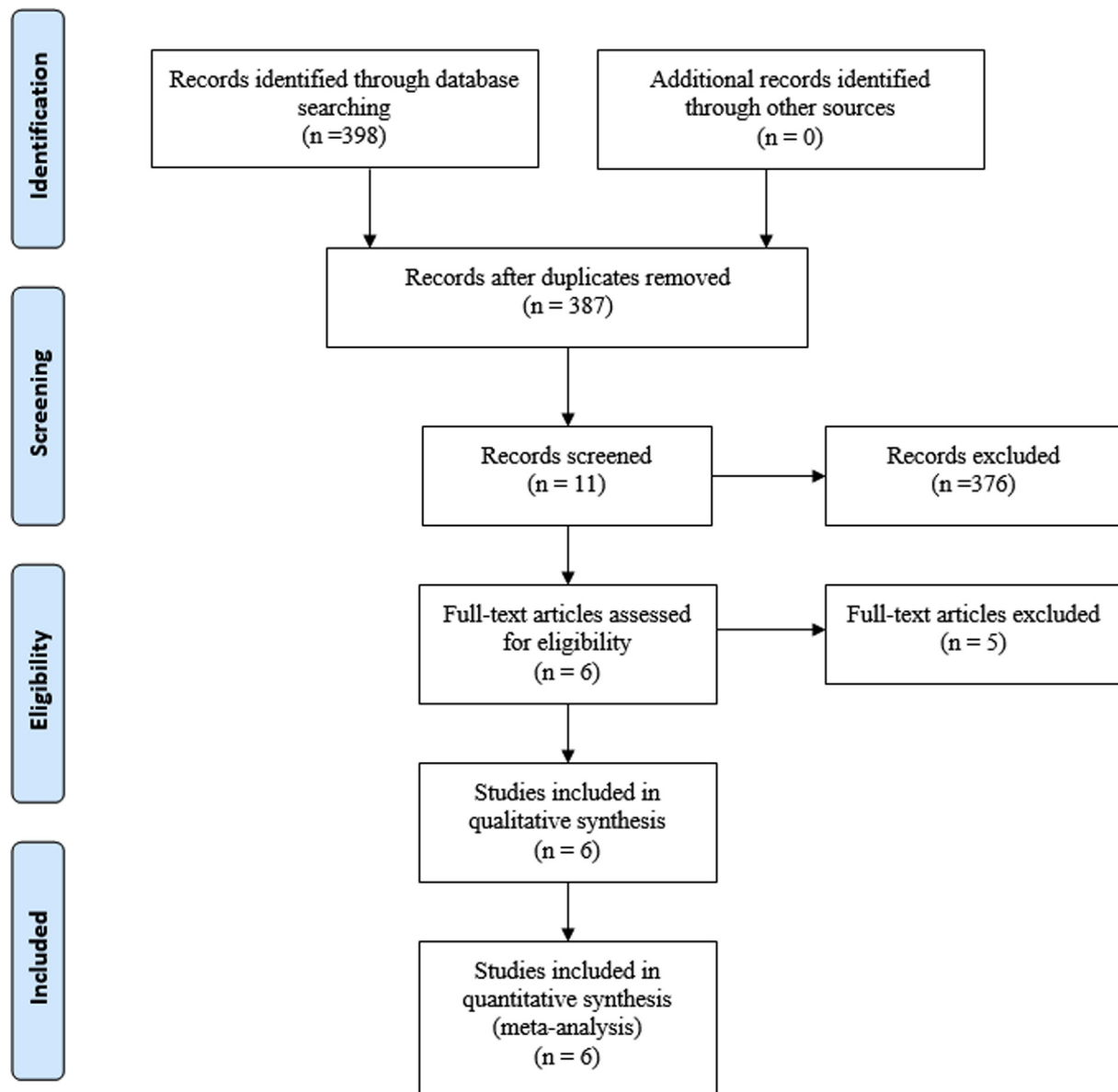


Fig. 1. Search results and the selection procedure.

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