



Review

Percutaneous compression plate versus dynamic hip screw for treatment of intertrochanteric hip fractures: A overview of systematic reviews and update meta-analysis of randomized controlled trials



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HIGHLIGHTS

- Compared with DHS, PCCP significantly decreased the blood loss, transfusion volume and complications.
- PCCP can be used to treat intertrochanteric hip fractures as an alternative minimally invasive method.
- More high-quality RCTs are needed to further evaluate the efficacy of PCCP and DHS.

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ABSTRACT

Purpose: Intertrochanteric hip fractures lead to high morbidity and mortality rates. As a minimally invasive technique, many studies reported the efficacy of PCCP for the treatment of intertrochanteric fractures, but the controversy still existed in some outcomes. The purpose of this study was to evaluate the efficacy of PCCP and DHS by a overview of systematic reviews and well-designed, comprehensive update meta-analysis.

Methods: PUBMED, SCOPUS, CCRCT, WANFANG and CNKI database were searched in all languages published up to April 2016. Systematic reviews and randomized controlled trials reporting outcomes of PCCP and DHS for intertrochanteric fractures were included. Meta-analyses comparing the two techniques were performed according to the Cochrane Handbook.

Results: Five original trials and four systematic reviews met the inclusion criteria. Meta-analyses showed that the blood loss [SMD = -2.35, 95%CI(-4.26–-0.44)], transfusion volume [SMD = -0.26, 95%CI(-0.47–-0.06)] and complications [RR = 0.33, 95%CI(0.14–0.77)] was statistically less in PCCP group than DHS group while there was no significant difference between two groups in mortality rate, transfusion rate and length of hospital day.

Conclusions: PCCP is recommended to treat intertrochanteric hip fractures as an alternative minimally invasive method. More high-quality, randomized controlled trials that are adequately powered are needed to further evaluate the efficacy of PCCP and DHS.

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1. Introduction

Hip fractures has only a small proportion of all fractures [1], but they can cause serious health problems, resulting in devastating consequences in the geriatric population [2]. Hip fractures lead not

only high rate of morbidity and mortality in the patients, but also high costs in healthcare system in the world [1]. According to the systematic study conducted by Haentjens, the relative hazard for all-cause mortality following hip fractures in the first 3 months was estimated to be 5.75 times as high as that control in female participants, and 7.95 times in male participants [3]. The relative hazards has been reduced during the last ten years after fracture but were still significantly higher than the age-matched control population in both genders of hip fractures [3]. The most common site was the intertrochanteric region which approximately

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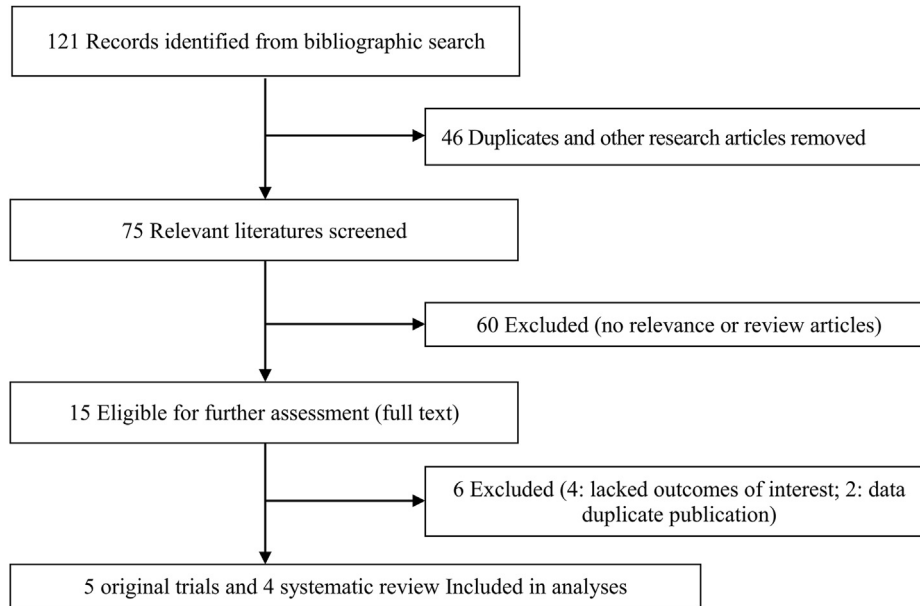


Fig. 1. Flow diagram for study selection process in this meta-analysis.

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Cheng 2014	+	+	?	?	●	+	?
Janzing 2002	+	+	?	?	+	+	?
Kosygan 2002	+	+	?	?	+	+	?
Peyser 2007	+	+	?	?	+	+	?
Yang 2011	+	+	?	+	+	+	?

Fig. 2. The summary risk of bias of including studies.

accounted for 50% [4]. To gain the safe mobility in early time, operative intervention, which can provide strength and stability of the fracture fixation, is the primary goal of treatment [5].

Based on the fracture patterns, different fixation methods are

currently used including slide or dynamic hip screw(DHS), intramedullary nail or fixed angle plate [5]. For stable intertrochanteric hip fractures, DHS is the most common device and has been considered as the standard implant [6]. However, this conventional surgical procedure can cause considerable bleeding, significant soft-tissue damage and severe complications [7]. Besides, the high failure rates were reported for the unstable intertrochanteric fractures [8,9]. To reduce the adverse events and complications, Gotfried developed a new device named percutaneous compression plate(PCCP) [10]. PCCP could be inserted under a minimally invasive technique which was reported to be associated with less blood loss and soft-tissue damage [10,11]. Several randomized controlled clinical trials compared the efficacy of PCCP and DHS in the treatment of intertrochanteric hip fractures. However, the results were inconsistent and different [12–16]. To assess the accurate conclusion, four meta-analysis and systematic reviews were conducted to summarize the efficacy of PCCP and DHS [17–20]. However, differences in statistical method, systematic review quality and publication time can cause great confusion and make it difficult for researchers to evaluate the evidence [21].

The objective of this study was to assess the effect of PCCP by a well-designed, comprehensive meta-analysis and systematic review, which strictly complied with the recommendations from the Cochrane Collaboration and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement(PRISMA) [22]. Meanwhile multiple systematic reviews were thoroughly collected to evaluate the methodological quality and the results.

2. Methods

2.1. Search strategy

We searched the literature in the following databases until Apr 2016: PUBMED, SCOPUS, the Cochrane Central Register of Controlled Trials(CRCT), WANFANG and CNKI. The search process was conducted to find out all trials or systematic review involving terms: “Intertrochanteric hip fractures”, “dynamic hip screw”, “percutaneous compression plate”, “randomized controlled trial”, “systematic review”, “meta-analysis” and multiple synonyms for

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