INPLASY

Efficacy of pericapsular nerve group block for pain control and functional recovery after total hip arthroplasty: a systematic review and meta-analysis of randomized controlled trials

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ADMINISTRATIVE INFORMATION

INTRODUCTION

*R*eview question / Objective The participants were adults who underwent total hip arthroplasty; the intervention was the PENG block; the comparator was no peripheral analgesia or other types of peripheral analgesia; outcomes were pain control, functional recovery, and complications after surgery; and the study design was randomized controlled trial.

Condition being studied Total hip arthroplasty is one of the most effective treatments for painful, deformed, or damaged hip joints. In the United States alone, more than 262,369 such procedures were performed in 2019, and the number is expected to reach 710,000 by 2040. To control the moderate to severe pain that can occur after the procedure, peripheral analgesia is usually applied as part of a multimodal analgesic strategy. This strategy can include peri-articular injection of local anesthetic (PAI), in which analgesics are injected around the joints to control pain without weakening muscles, or it can include one of several peripheral nerve blocks, such as block of the fascia iliaca or supra-inguinal fascia iliaca nerve. The analgesic efficacy of pericapsular nerve group (PENG) block in total hip arthroplasty is controversial, so we systematically reviewed and meta-analyzed randomized controlled trials comparing pain control and functional recovery between patients who received PENG block and those who received no or another type of peripheral analgesia.

METHODS

Participant or population The participants were adults who underwent total hip arthroplasty.

Intervention The intervention was the pericapsular nerve group block.

Comparator The comparator was no peripheral analgesia or other types of peripheral analgesia.

Study designs to be included Study design was randomized controlled trial.

Eligibility criteria Studies were excluded if they combined the PENG block with another type of peripheral anesthesia.

Information sources Two independent researchers systematically searched the electronic databases of Pubmed, Web of Science, Embase, and the Cochrane Library for relevant studies using combinations of MESH terms and keywords related to pericapsular nerve group and total hip arthroplasty as well as the term "randomized controlled trial". No date or language restrictions were applied. Reference lists in relevant articles were also manually searched for additional eligible trials.

Main outcome(s) The outcomes were pain control, functional recovery, and complications after surgery.

Quality assessment / Risk of bias analysis Two researchers independently evaluated the risk of bias in the included literature according to the Cochrane Collaboration's tool for assessing bias risk in randomized trials. This tool evaluates bias risk in sequence generation, allocation concealment, blinding of participants, blinding of the outcome assessor, incomplete outcome data, reporting bias, and other types of bias. A study was categorized as being at "unclear" risk of bias risk if it failed to report relevant data for any of the seven risk areas. Discrepancies were resolved by discussion with a third researcher.

Strategy of data synthesis Outcomes of functional recovery were synthesized qualitatively because of the significant heterogeneity in how and when recovery was assessed in different studies. Outcomes for comparable data reported across studies were meta-analyzed and displayed as forest plots using R 4.3.1. Continuous data were pooled for meta-analysis using the "metacont" function in order to obtain mean differences (MDs) or standardized mean differences (SMDs). Dichotomous data were pooled for meta-analysis using the "metabin" function in order to obtain risk ratios (RRs) with 95% confidence intervals (95%CIs). All meta-analyses were performed using a random-effect model because we anticipated substantial differences across studies in the approach during total hip arthroplasty, composition of analgesic cocktails, and basic analgesic protocols. Heterogeneity across studies was assessed using the I2 test, with I2 > 50% defined as substantial heterogeneity.

Subgroup analysis Not Applicable.

Sensitivity analysis In meta-analyses where I2 > 50%, sensitivity analyses were conducted to identify potential sources of heterogeneity and evaluate the robustness of the results.

Country(ies) involved China - Luoyang Orthopedic Hospital of Henan Province, Orthopedic Hospital of Henan Province.

Keywords pericapsular nerve group; total hip arthroplasty; pain; functional recovery.

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