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Review

Local anaesthesia versus spinal anaesthesia in inguinal hernia repair: A systematic review and meta-analysis

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ABSTRACT

Background: Inguinal hernias are a significant cause of morbidity. The purpose of this systematic review and meta-analysis is to determine the totality of evidence regarding the effectiveness of local anaesthesia when compared to spinal anaesthesia in individuals undergoing open inguinal hernia repair.

Methods: A systematic literature search was conducted. Inclusion criteria were randomised controlled trials (RCTs) comparing spinal and local anaesthesia on clinical and self-reported outcomes, in patients undergoing open inguinal hernia repairs. The methodological quality was assessed using the Cochrane risk of bias tool. The mode of analysis used was the difference in outcomes between the groups post-surgery and at follow-up time points. Statistical heterogeneity was assessed using the I^2 statistic.

Results: Ten original RCTs were included, with a total of 1379 patients. There was no significant difference in operative time between the groups [Random Effects Model, MD −0.70 min (95% CI, −5.80 to 4.40 min), $p = 0.79$, $I^2 = 84\%$]. Patients in the local anaesthetic group experienced significantly less pain than those in the spinal group [Fixed Effects Model, SMD −0.63 (95% CI, −0.81 to −0.46), $p < 0.01$, $I^2 = 49\%$], lower rates of urinary retention [FEM, RR 0.03 (95% CI 0.01–0.08), $p < 0.01$, $I^2 = 0\%$], decreased rates of anaesthetic failure [FEM, OR 0.17 (95% CI 0.06–0.45), $p < 0.01$, $I^2 = 0\%$], and increased satisfaction with the anaesthetic [FEM, OR 3.40 (95% CI 2.09–5.52), $p < 0.01$, $I^2 = 0\%$]. The methodological quality of studies was variable.

Conclusion: Our findings support the use of local anaesthetic in adult patients undergoing open repair for a primary inguinal hernia.

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Background

Groin hernia complaints are the leading one-third cause of gastro-intestinal visits to a health care setting, and inguinal hernias comprise of 96% of these groin hernia complaints.[1] The prevalence of inguinal hernia in the United States is 5–10% in the general population.[2] Men are eight times more likely to develop an inguinal hernia, and twenty times more likely to require a surgical intervention, when compared to women.[3,4] Complications following groin hernia repair are relatively common and associated morbidity varies from minimal effects to significant adverse outcomes. The incidence of complications is higher following emergency repairs and recurrent hernia repairs, when compared to elective repair.[1] Mortality in both sexes within 30 days of groin hernia repair is 0.1% when completed as an elective procedure.[2,3] However, mortality increases significantly to between 2.8% and 3.1% when the procedure is performed as an emergency repair.[3,4]

While the surgical technique used to conduct inguinal hernia repair has advanced considerably in recent years, the route of anaesthesia administered is still debated, to the extent that there is no established preferred anaesthetic practice.[5–9] A systematic review of five randomised controlled trials (RCTs) that compared local anaesthesia to general anaesthesia in 895 adults undergoing inguinal hernia repair was conducted by Reece-Smith et al. in 2009.[10] The authors reported no significant difference between the two groups with respect to levels of nausea, urinary retention, return to work, return to normal activity, operating time and theatre time.[10] A number of primary research studies have been conducted comparing the use of local anaesthetic as opposed to spinal anaesthetic in adult patients undergoing an open inguinal hernia repair.[5,7,11–17] To date, no systematic review has been completed to examine the totality of evidence with respect to the effectiveness of spinal when compared to local methods of anaesthesia in patients undergoing inguinal hernia repair. Therefore, the aim of this study is to complete a systematic review and meta-analysis of randomised controlled trials that explore the use of local anaesthetic when compared to spinal anaesthetic in individuals undergoing open inguinal hernia repair.

Methods

Study design

This is a systematic review and meta-analysis of randomised controlled trials. The PRISMA (Preferred Reporting Items for Systematic Reviews And Meta-Analysis) guidelines for reporting systematic reviews were followed to ensure the standardised conduct and reporting of the research.[18]

Study identification

A systematic literature search was conducted in February 2015 in the following databases: Pubmed, Cochrane, EMBASE, OVID and CINAHL. A combination of the following keywords and MeSH terms were used: "inguinal hernia OR groin hernia" AND "repair OR surgery" AND " local" AND "spinal OR regional OR neuraxial" AND "anesthesia OR anaesthesia OR anesthetic OR anaesthetic". The search was supplemented by hand searching references of retrieved articles and searching Google Scholar. A copy of the search string is available on request. No restriction was placed on language or year of publication.

Study selection and data extraction

Studies were included if they met the following inclusion criteria:- population: adults undergoing open inguinal hernia repair for a unilateral hernia (where ≥80% of the study population was >18 years of age); intervention: local anaesthetic used for the repair; comparison: spinal anaesthetic used for the repair; outcomes: the primary outcome was operative time, defined as the time from the first skin incision to the last skin suture. This outcome was the most commonly reported outcome across all the included studies.

Secondary outcomes included measures of impairment (pain, wound haematoma, wound infection, urinary retention) and quality of life (patient satisfaction with anaesthesia). Only randomised controlled trials were included.

Two reviewers (DP, RG) read the titles and/or abstracts of the identified papers and eliminated irrelevant studies. Studies considered to be eligible for inclusion were read in full and their suitability for inclusion was determined independently by two reviewers (DP, RG). Disagreements were managed by consensus. Data were extracted independently by two reviewers (DP, LH) based on study design and setting, patient demographics and inclusion criteria, details of the intervention and comparison, length of follow-up and outcome measures used. Supplementary information was sought out by contacting the authors electronically when there was insufficient information provided in the publication. In this study, no unpublished data or personal communications have been used.

Methodological quality assessment

Quality assessment of the included studies was independently performed by two reviewers (DP, SD) using the Cochrane Collaboration tool for assessing risk of bias.[19] The types of components of the tool used were (i) sequence generation, (ii) allocation concealment, (iii) blinding of participant, personnel and outcome assessor for both, self-reported and objective outcomes, (iv) incomplete outcome data, (v) selective reporting and (vi) other sources of bias such as funding or early stopping bias. A study was considered to have a low risk of bias if all of the criteria were met, an unclear risk of bias when one or more of the criteria were partially met, and a high risk of bias when one or more of the criteria were not met.

Statistical analysis

The statistical analysis was conducted using Review Manager 5 [Version 5.3 Cochrane Collaboration 2015]. The mean difference (MD) in outcomes between the local anaesthetic group and the spinal anaesthetic group post-surgery and at follow-