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Is endoscopic surgery a safe and effective treatment for lumbar disc herniation? A meta-analysis of randomized controlled trials

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 22 January 2024 and was last updated on 22 January 2024.

INTRODUCTION

Review question / Objective This meta-analysis aims to assess the safety and effectiveness of endoscopic techniques in treating lumbar disc herniation (LDH). The study focuses on comparing endoscopic discectomy (ED) with non-endoscopic discectomy (NED) across various parameters, including intraoperative blood loss, operation time, hospitalization duration, Visual Analogue Scale (VAS) pain scores, Oswestry Disability Index (ODI) scores, complication rates, and postoperative therapeutic effects. The goal is to provide a comprehensive evaluation of available evidence from both English and Chinese randomized controlled trials (RCTs) to inform clinical decision-making and advance the development of minimally invasive approaches for LDH treatment.

Condition being studied Meta-analysis on the safety and effectiveness of endoscopic techniques for lumbar disc herniation (LDH). LDH, a prevalent spinal disorder with intricate symptoms, significantly affects patients' quality of life [1-3]. Recognized for its minimally invasive approach, endoscopic surgery is intriguing due to its potential to minimize surgical trauma and expedite recovery. This study bridges gaps in current research, conducting a comprehensive review of both English and Chinese randomized controlled trials (RCTs). Key indicators encompass intraoperative blood loss, operation time, hospitalization duration, Visual Analogue Scale (VAS) pain scores, Oswestry Disability Index (ODI) scores, complication rates, and postoperative therapeutic effects. The objective is to systematically assess the safety and effectiveness of endoscopic techniques for LDH, offering insights for clinical decisions and

advancing minimally invasive approaches in this field.

METHODS

Participant or population Patients diagnosed with lumbar disc herniation.

Intervention Endoscopic techniques.

Comparator Non-endoscopic treatments.

Study designs to be included Randomized controlled trials (RCTs).

Eligibility criteria (1) Participants: Individuals aged 18 years or older, of any gender, diagnosed with lumbar disc herniation (LDH). (2) Intervention: The experimental group underwent endoscopic LDH treatment, while the control group received non-endoscopic treatments, such as traditional open surgery. (3) Study Design: Randomized controlled trials (RCTs) published in either Chinese or English. (4) Outcomes: Key indicators include intraoperative blood loss, operation time, hospitalization duration, Visual Analogue Scale (VAS) pain scores at the last follow-up, Oswestry Disability Index (ODI) scores at the last follow-up, complication rates, and the ratio of excellent and good therapeutic effects postoperatively.

Information sources We performed an exhaustive computerized search across multiple databases, including PubMed, Embase, Cochrane Library, China National Biomedical Literature Database (CBM), VIP Database, China National Knowledge Infrastructure (CNKI), and Wanfang Database.

Main outcome(s) Intraoperative blood loss, operation time, hospitalization duration, Visual Analogue Scale (VAS) pain scores at the last follow-up, Oswestry Disability Index (ODI) scores at the last follow-up, complication rates, and the ratio of excellent and good therapeutic effects postoperatively.

Quality assessment / Risk of bias analysis We employed the Cochrane 5.1.0 bias risk assessment tool to evaluate the quality of the included studies. This tool examines seven aspects, including random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, completeness of outcome data, selective reporting, and other sources of bias. Each criterion was categorized as high risk of bias, low risk of bias, or unclear.

Strategy of data synthesis We used RevMan 5.4 for meta-analysis. Categorical data were presented as risk ratios (RR) with 95% confidence intervals (CI), and continuous data as mean differences (MD) or standardized mean differences (SMD) with corresponding 95% CIs. Heterogeneity was assessed using the $\chi 2$ test. For low heterogeneity ($I2 \leq 50\%$), a fixed-effects model was applied; for substantial heterogeneity ($I2 > 50\%$), a random-effects model was used.

Subgroup analysis Subgroup analysis was conducted for identified heterogeneity sources.

Sensitivity analysis Sensitivity analysis was conducted for identified heterogeneity sources.

Country(ies) involved China.

Keywords Endoscopy; lumbar disc herniation; Meta-analysis.

Contributions of each author
Author 1 - Bo-Tao Cai.
Author 2 - Fan Yang.
Author 3 - Deng-Chao Wang.