INPLASY PROTOCOL

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None declared.

Efficacy of Transforaminal, Interlaminar, and Caudal Epidural Injections in Lumbosacral Disc Herniation: A Systematic Review and Network Meta-analysis

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Review question / Objective: **Epidural injection (EI) has been used to manage lower back or radicular leg pain from herniation of lumbar disc (HLD). Three types of EI techniques, including transforaminal (TFEI) interlaminar (ILEI), and caudal epidural injections (CEI), are being applied. We aimed to evaluate the comparative effect of TFESI, ILEI, and CEI for reducing pain or improving function in patients with HLD.**
Condition being studied: **For controlling inflammation by the HLD, various oral medications and procedures are used. Among these therapeutic methods, EI of the drugs is frequently used in clinical practice. Its positive HLD-induced pain reducing effect was reported in several previous studies. Three types of techniques, including TFEI, ILEI, and CEI, have been utilized in clinical practice. conflicting outcomes as to which technique is superior were reported in previous studies. So far, some meta-analysis studies for comparing the effects of different EI techniques on HLD were conducted. However, these previous studies conducted comparison between two procedures among TFEI, ILEI, and CEI. In the current study, using network meta-analysis, we synthesize and compare the effects of TFEI, ILEI, and CEI on pain from HLD, together.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 August 2022 and was last updated on 23 August 2022 (registration number INPLASY202280091).

INTRODUCTION

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METHODS

Participant or population: Patients with lower back and radicular leg pain due to HLD.

Intervention: TFEI, ILEI, and CEI.

Comparator: The three interventions were compared with each other to evaluate which intervention was the most effective.

Study designs to be included: The design of the studies to be included in this study was not specific and a full range of designs was considered. However, reviews, case reports, commentaries, letters, and animal studies were excluded.

Eligibility criteria: The detailed inclusion criteria for the network meta-analysis were as follows: (1) patients aged ≥ 18 years; (2) patients with low back and radicular leg pain due to HLD; (3) diagnosis of LDH on radiological evaluation, such as magnetic resonance imaging and computed tomography; (4) RCTs and non-RCTs including at least two therapeutic arms comprising TFEI, ILEI, or CEI; (5) the use of visual analogue scale (VAS) or Oswestry Disability Index (ODI), for outcome measurements; (6) written in English. Exclusion criteria were (1) they enrolled patients having a previous history of lumbar and lumbosacral surgery, nonspecific low back pain without a definite diagnosis of LDH, severe disc degeneration, intradiscal derangement or a bulging disc, spinal stenosis, or prominent spinal instability; (2) reviews, case reports, commentaries, letters, and animal studies; (3) study outcomes that were not reported or insufficient.

Information sources: PubMed, Embase, Cochrane library, and Scopus databases were searched from the earliest record to August 2022 for randomized controlled trials (RCTs) and non-RCTs. If the designated outcome variables were unavailable or incomplete in the published articles, we tried to contact the corresponding authors for the original data.

Main outcome(s): The low back pain disability index evaluated by the Oswestry Disability Index and the pain evaluated by the visual analog scale were included.

Quality assessment / Risk of bias analysis: The Cochrane Risk of Bias tool was used to assess the randomized Controlled trials (RCTs), and the Risk of Bias Assessment tool for Non-randomized Study was used to assess the non-RCTs.

Strategy of data synthesis: The analyzed data were continuous variables. Therefore, the outcome was presented as the standard mean difference (SMD) and 95% confidence intervals (CIs) on Visual Analog Scale and Oswestry Disability Index reduction in the short- and long-term. The short- and long-terms were defined as the periods between 1-week and 1-month post-treatment and between the 4-month and 6-month post-treatment, respectively. If there were several measurements within the same time frame (short- or long-term), the outcome recorded at the last follow-up was used for meta-analysis. The I^2 statistic and Cochran's Q test were used to determine the heterogeneity of direct comparisons, and significant heterogeneity was assumed in the case of I^2 value >50%

and p < 0.05. Probability ranking metrics were used to reflect clinically important relative differences in the outcomes which were shown on the ranking probability curves and the surface under the cumulative ranking area (SUCRA). The SUCRA value ranged between 0 and 1, and the treatments with a higher SUCRA value suggested better effectiveness and superior ranking. It was presented as the percentage of the mean rank of each treatment in relation to the presumed best intervention. Publication bias was examined using Egger's regression test and by inspection of the distribution pattern of the effect size on the funnel plot. All analyses were performed using the R software (R version 4.2.1). Statistical significance was set at p < 0.05.

Subgroup analysis: Not applicable.

Sensitivity analysis: Not applicable.

Language restriction: English.

Country(ies) involved: Republic of Korea.

Keywords: Disc herniation; Back pain; Radicular pain; Epidural injection.

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