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Assessment of Endoscopic Radiofrequency Ablation for Sacroiliac Joint Pain: A Systematic Review and Meta-Analysis

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ADMINISTRATIVE INFORMATION

Support - No external financial support.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

INPLASY registration number: INPLASY202450011

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 04 May 2024 and was last updated on 04 May 2024.

INTRODUCTION

Review question / Objective To investigate the efficacy of endoscopically visualized radiofrequency for treating sacroiliac joint pain. The PICO of this study was as follows: P: human participants experienced low back pain and were diagnosed as sacroiliac joint pain origin, I: endoscopically visualized radiofrequency ablation, C: placebo treatment or baseline clinical status, O: change in pain symptom scores and functional outcomes.

Rationale Radiofrequency ablation, a non-surgical procedure, has shown enhanced treatment efficacy in specific studies compared to epidural steroid injections. This procedure involves the blockade of the lateral branches that stem from the dorsal rami of L5 to S3, which provide innervation to the sacroiliac joint. Various navigation techniques, including fluoroscopy, computed tomography, ultrasound, and endoscopy, have been suggested to improve the accuracy of ablation positioning. Yeung and Gore suggested that endoscopically guided visualization could enhance the confirmation of nerve ablation or transection, particularly valuable in identifying the most frequently affected branches of the dorsal ramus during foraminal and dorsal rhizotomy procedures. In 2016, endoscopic radiofrequency ablation was initially employed for treating the sacroiliac joint complex. Choi et al. suggest that this novel technique could potentially function as an alternative approach for addressing chronic low back pain associated with the sacroiliac joint complex.

Several systematic reviews and meta-analyses have been conducted to date to investigate the efficacy of radiofrequency treatment for low back pain originating from the sacroiliac joint (SIJ) and

lumbar facet joint (LFJ), which respectively account for 40% and 15-40% of low back pain etiologies. The studies systematically gathered and analyzed various approaches to radiofrequency treatment of various joint diseases, with a specific focus on their effectiveness. The precise effectiveness of radiofrequency targeting for sacroiliac joint pain using an endoscopic approach has not been extensively examined. This meta-analysis aimed to comprehensively investigate the efficacy of endoscopic radiofrequency ablation for the management of sacroiliac joint pain.

Condition being studied Low back pain is a prevalent issue in modern society, affecting up to 90% of adults at some point in their lives. It occurs in more than 80% of the general population. The major cause of this condition is sacroiliac joint (SIJ) pain, accounting for 40% of cases. Management of sacroiliac joint (SIJ) pain encompasses a range of interventions, including surgical options like fusion surgery, as well as non-surgical approaches. Nevertheless, a consensus regarding the most effective intervention for achieving optimal therapeutic outcomes remains elusive.

METHODS

Search strategy Two authors will conduct independent electronic searches in the PubMed, Embase, Cochrane CENTRAL, and Web of Science databases using the following keywords and combinations ("radiofrequency therapy" OR “denervation” OR “nerve block” OR “rhizotomy”) AND (“arthralgia” OR “sacroiliac joint pain” OR “sacroiliac joint” OR “low back pain”) AND (endoscope OR arthroscope).

Participant or population P: human participants experienced low back pain and were diagnosed as sacroiliac joint painorigin.

Intervention I: endoscopically visualized radiofrequency ablation.

Comparator C: placebo treatment or baseline clinical status.

Study designs to be included Due to the interventions, simply include RCTs will not be practical. Case series, observation studies, single-arm studies must be considered.

Eligibility criteria 1) studies investigating the quantitative evaluation of pain symptoms and consequential disability or impairment in functional outcomes, and 2) studies with available data of pre- and post-intervention assessments of pain symptom scores and functional outcomes.

Information sources Electronic databases, contact with authors, and trial registers.

Main outcome(s) The primary focus of the study was on pain symptom scores and functional outcomes at two specific time points: 6 months and 12 months following the endoscopic radiofrequency ablation.

Additional outcome(s) Any severe adverse effects post-intervention.

Data management Two independent authors will extract data from the evaluated studies. Each included study will provide the following data: first author, publication year, country, study design, number of treated patients and their gender distribution, follow-up period, metrics for clinical outcomes, levels of operation, baseline clinical status, and postoperative adverse events. To avoid misinterpretation, the two evaluators pay special attention to the effect direction of the scale used in each study.

Quality assessment / Risk of bias analysis The strength of evidence in the studies was evaluated utilizing the Joanna Briggs Institute Critical Appraisal Tool (Joanna Briggs Institute, 2014).

Strategy of data synthesis The data were derived by calculating the ratio of the difference between groups to the standard deviation (SD) of the pooled results, as follows: (measurements after performing operation - measurements at baseline without performing operation) / (Pooled SD). The pooled SD was determined to be the square root of {([Number of participants - 1] × [SD of baseline measurements without performing operation]^2 + [Number of participants - 1] × [SD of measurements at target intervals after performing operation]^2) / (2[Number of participants - 1])}.
A negative effect size value signifies a favorable outcome from endoscopic radiofrequency ablation relative to the baseline. The one-arm study also used the above formulas and methods.

Subgroup analysis Subgroup analyses were performed based on two postoperative time points, specifically at 6 months and 12 months. The distinction between the two subgroups was measured utilizing Cochran's Q test. A p-value lower than 0.05 in Cochran's Q test indicates statistically significant differences among the related subgroups.

Sensitivity analysis To confirm the robustness of this meta-analysis, sensitivity analyses were performed using the one-study removal method to determine whether there was a statistically significant change in the summary effect size after removing a particular trial from the analysis. If the study numbers are less than 5, this method may not be precise enough. Therefore, a more effective alternative would be to discuss each reason leading to a change in the outcome based on the Included Study Characteristics Table.

Language restriction Any full-text peer-review articles could be considered. No language limit.

Country(ies) involved Taiwan.

Other relevant information Publication bias: guidelines from the Cochrane Handbook for Systematic Reviews of Interventions were used to evaluate for potential publication bias. Funnel plots were generated and visually inspected for symmetry. Egger's regression tests were conducted when 10 or more datasets were available.

Keywords sacroiliac joint; endoscopy; radiofrequency ablation; ablation techniques; endoscopic radiofrequency ablation; low back pain; arthroscope.

Dissemination plans Publish in peer-review journals.

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