

INPLASY PROTOCOL

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Evaluation of the efficacy of stem cell therapy in animal models of intervertebral disc degeneration based on imaging indicators: a systematic review and meta-analysis

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Review question / Objective: This study aimed to conduct a systematic review and meta-analysis of the effects of stem cells in animal models of intervertebral disc degeneration from imaging perspective.

Condition being studied: Stem cell therapy has received attention for its regenerative potential. Although it is still far from clinical application, in the past 20 years, several studies have confirmed the effect of stem cell therapy in animal models of intervertebral disc degeneration. But no one has yet conducted a comprehensive systematic review of this. Therefore, in order to objectively summarize and evaluate the potential effects of stem cell therapy in animal models of intervertebral disc degeneration, we designed this systematic review and meta-analysis to provide further evidence support for stem cell therapy in the treatment of IVD degeneration from the perspective of imaging.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 25 April 2022 and was last updated on 25 April 2022 (registration number INPLASY202240148).

INTRODUCTION

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METHODS

Participant or population: Animals of lumbar or caudal intervertebral disc degeneration.

Intervention: Intradiscal transplantation of stem cells or stem cells combined with other drugs.

Comparator: Intradiscal injection of other drugs, types of drugs were not limited.

Study designs to be included: Randomized controlled trials.

Eligibility criteria: All studies included in this meta-analysis met the following criteria: (1) published randomized controlled trials (RCTs) of stem cell therapy in animal models of lumbar or caudal intervertebral disc degeneration; (2) there was no restriction on animal species, modeling method, country, starting time and observation time; (3) intradiscal transplantation of stem cells or stem cells combined with other drugs was used as an intervention measure, and the source and injection dose of stem cells were not limited; (4) intradiscal injection of other drugs was used as a control measure, and the types of drugs were not limited; (4) the imaging data were complete.

Information sources: PubMed (1966-March 1, 2022), Cochrane Library (1966-March 1, 2022), ScienceDirect (1980 to March 1, 2022), Embase (1980 to March 1, 2022), CNKI (1980 to March 1, 2022) and Wanfang Database (1980 to March 1, 2022).

Main outcome(s): Disc height index; disc height; MRI index; MRI signal score; T2 signal intensities.

Quality assessment / Risk of bias analysis: Cochrane Risk Bias Tool was used for quality assessment. The tool consisted of seven assessments: how random sequences were generated, methods of allocation concealment, blinding of performers and outcome assessors, data integrity, selective reporting, and other biases. The risk of bias for each aspect was judged as low risk, high risk, or unknown risk, indicated by symbols with different colors.

Strategy of data synthesis: We used the following search terms: stem cells, mesenchymal stem cell or MSC, bone marrow-derived mesenchymal stem cell or BMSC, adipose-derived stem cell or ADSC, intervertebral disc degeneration, and used the Boolean operators AND or OR.

Subgroup analysis: Subgroup analysis according to different animal species.

Sensitivity analysis: Sensitivity analysis was carried out on all evaluation indicators by removing the literature one by one.

Country(ies) involved: China.

Keywords: animal model; intervertebral disc degeneration; meta-analysis; stem cell.

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