

Mesenchymal Stem Cells (MSCs) As Neuroregenerative and Locomotor Recovery - Promoting Agent for Spinal Cord Injury: A Systematic Review and Meta-Analysis

Introduction Spinal cord injury (SCI) is still a complex health burden for active patients, even with decades of dedicated research. It may lead to permanent paralysis of the limbs (tetraplegia) and, with just the currently available treatments, might also result in death. Spinal cords have limited neuroplasticity, thus the discovery and development of better neuro regenerative treatments remain dreadful. Meanwhile, mesenchymal stem cells (MSCs) are transplantable cells that can modulate the injury cascade of SCI mostly through paracrine effects, thus making it a researchable treatment option.

Objectives This systematic review and meta-analysis is aimed to investigate the association between MSCs treatment and neuro regenerative effects in the SCI model-rodents by assessing the locomotor development based on Basso-Beattie-Bresnahan (BBB)/Basso Mouse Scale (BMS) locomotor rating scale.

Methods This meta-analysis was reported based on criteria from Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). A literature search was conducted with multiple electronic databases such as PubMed, ScienceDirect, Scopus, Google Scholar. Mean Difference (MD) and Standard Deviation (SD) with the confidence interval (CI) of 95% were used to determine the association between MSCs therapy and the increase in the BBB scale after SCI. Fixed and Random Effect Model was used based on heterogeneity level and p value < 0.05 was considered statistically significant. Risk of biases were assessed for each study using the Cochrane Risk of Bias (RoB) tool developed by the SYstematic Review Centre for Laboratory animal Experimentation (SYRCLE).

Siti Faizatul Aliyah¹,
Yehuda Tri Nugroho
Supranoto¹, Sekar
Arum Srigati¹,
Valentino Yosarian
Satmoko¹

¹ University of Jember

Correspondence to:

Siti Faizatul Aliyah
University of Jember, East
Java

faiza25678@gmail.com

Results Twenty studies were included in the qualitative synthesis, and eleven studies were included in the quantitative meta-analysis. The current study showed that MSCs therapy for SCI was very beneficial (pooled MD=4.71, 95% CI (3.86-5.55), $p=0.006$, $I^2=59\%$).

Conclusion This systematic review and meta-analysis provide valuable evidence suggesting MSCs as a potential treatment for SCI.