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Effects of mesenchymal stem cells transplantation on cognitive deficits in animal models of alzheimer's disease

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Introduction & Purpose: Alzheimer's Disease (AD) is a globally prevalent neurodegenerative disease, clinically characterized by progressive memory loss and gradual impairment of cognitive functions. Mesenchymal Stem Cells (MSCs) transplantation has been considered a possible therapeutic method for AD. However, no quantitative data synthesis of MSCs therapy for AD exists. We conducted a systematic review and meta-analysis to study the effects of MSCs on cognitive deficits in animal models of AD.

Method: We identified eligible studies published from January 1980 to January 2017 by searching four electronic databases (PubMed, Medline, Embase, CNKI). The endpoint was the effects of MSCs on cognitive performance evaluated by the Morris Water Maze (MWM) test including escape latency and the number of platform crossing and time in the target quadrant.

Result: Nine preclinical studies incorporating 225 animals with AD were included for the meta-analysis. The studies indicated that MSCs based treatment significantly improved the learning function through measurements of the escape latency (SMD=-0.99; 95% CI=-1.33 to -0.64; P<0.00001). Additionally, we observed that transplantation of MSCs significantly increased the number of platform crossing in six experiments (SMD=0.78; 95% CI=0.43 to 1.13; P<0.0001). What's more, the times in the target quadrant were increased in five studies indicated that transplantation of MSCs could ameliorate the cognitive impairments (SMD=1.06; 95% CI=0.46 to 1.67; P=0.0005).

Conclusion: The current study showed that MSCs transplantation could reduce cognitive deficits in AD models. These findings support the further studies to translate MSCs in the treatment of AD in humans.

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