



Effect of neural stem cell transplantation combined with erythropoietin injection on axon regeneration in adult rats with transected spinal cord injury

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ABSTRACT. We investigated the effect of neural stem cells (NSC) and erythropoietin (EPO) on axon regeneration in adult rats with transected spinal cord injury, and provided an experimental basis for clinical treatment. Forty Wistar rats with T10-transected spinal cord injury were randomly divided into four groups of ten rats: a control group (group A), an NSC-transplant group (group B), an NSC-transplant and EPO group (group C), and an EPO group (group D). Biotinylated dextran amines (BDA) anterograde corticospinal cord neuronal tracing and Fluoro-Gold (FG) retrograde tracing were carried out at the 8th week after operation

to observe the regeneration of nerve fibers. The Basso, Beattie, and Bresnahan (BBB) locomotor score was used to evaluate restoration. 1) BDA and FG immunofluorescence staining: in group C, a large number of regenerated axons were observed and some penetrated the injured area. In group B, only a small number of regenerated axons were observed and none penetrated the injured area. In group D, only sporadic regenerated nerve fibers were observed occasionally, while in group A, no axonal regeneration was observed. In group C, a small number of cones and axons emitted yellow fluorescence, and no FG-labeled cells were observed in the other groups. 2) The BBB scores for group C were higher than those for the other groups, and the differences were statistically significant ($P < 0.05$). NSC transplantation combined with EPO intraperitoneal injection may benefit axon regeneration in rats with transected spinal cord injury, and accelerate the functional recovery of the hindlimb locomotor.

Key words: Neural stem cells; Erythropoietin; Axon regeneration; Cell transplantation; Spinal cord injury