

The effect of olfactory ensheathing cell transplantation on bladder function and bladder fibrosis after spinal cord injury

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Objective: To investigate the effect of olfactory ensheathing cell transplantation on bladder function and bladder fibrosis after spinal cord injury.

Methods: 230-250g healthy SD rats were selected to be fed according to the standard of cleanliness. They were completely assigned in different groups: ①Blank group (N=24) - Only opened the lamina without spinal cord injury, and then sutured after hemostasis. ②Cell transplantation group (N = 24)- The vertebral plate of them was adopted to establish the level of SD rat L2 impact model of spinal cord injury using the improving Alien's heavy fall device, besides, a certain volume of OECs suspension was transplanted to the injury location before hemostasis and layered suture; ③Control group (N=24)-After the model was established according to the above method, the same volume of culture medium was injected into the same position with the cell transplantation group. Measuring postoperative 4 weeks bladder urine flow mechanics parameters of rats according to the above groups, part of the frozen section of the urinary bladder was used for immunofluorescence staining, immunohistochemical staining, Masson, Sirius red and HE staining in order to observe the bladder fibrosis degree, the rest part was used to detect protein TGF beta, CTGF and collagen I and the expression of collagen III on the Western blotting method.

Results: (1)The result of urine flow mechanics showed that compared to the blank group, the bladder capacity of rats increased and detrusor urine leakage points lower in the cell transplantation group and the control group($P < 0.05$). And in the cell transplantation group, the bladder capacity reduced and leakage points increased than in the control group ($P < 0.05$); (2) Immunofluorescence staining showed that compared to the blank group, the positive rate of TGF beta, CTGF, Icollagen and collagen III were significantly higher in the cell transplantation group and the control group($P < 0.05$), compared with control group, the positive rate of those above proteins was higher in cell transplantation group, difference was statistically significant ($P < 0.05$), cell transplantation group I/collagen type III proportion was decreased significantly, the difference was statistically significant ($P < 0.05$); (3)Immunohistochemistry, Masson, Sirius red and HE staining showed that compared with the blank group of bladder, bladder collagen fibers significantly increased in quantity and were irregular in arrangement in the cell transplantation group and control group. Between the cell transplantation group and control group, the number of collagen fibers between smooth muscle cells decreased significantly, and cells arranged more regularly in the former group than the latter one; (4) Western blotting test results showed that cell transplantation group and the control group rats bladder tissues TGF beta, the expression of CTGF and collagen I and

collagen III amount is significantly higher than blank group ($P < 0.05$), and the amount of TGF beta cell protein expression transplantation group is significantly higher than control group ($P < 0.05$), the rest of the above three kinds of protein expression were significantly lower than that of control group ($P < 0.05$).

Conclusion: The transplantation of olfactory ensheathing cells can improve bladder function and bladder fibrosis after SCI, it may be related to the improvement of sacral nerve function and inhibiting the expression of collagen fibers.