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# TRANSPLANTATION OF OLFACTORY MUCOSA FOLLOWING SPINAL CORD INJURY IMPROVES VOIDING EFFICIENCY BY SUPPRESSING DETRUSOR-SPHINCTER DYSSYNERGIA IN RAT

Hypothesis / aims of study
Several recent animal studies have shown that the spinal transplantation of olfactory ensheathing cells promote extensive regeneration of the spinal cord, and improves the motor function (hindlimb movement). In this study, we examined whether olfactory mucosa transplantation (OMT) from adult donor rat improves neurogenic bladder dysfunction following spinal cord injury.

Study design, materials and methods
In adult female Sprague-Dawley rats weighing 200-250g,spinal cord injury was performed by excision of 2mm region of the spinal cord at Th9 to 10. Immediately after spinalization, olfactory mucosa dissected from a donor rat was inserted into the cavity made in the spinal cord to fill it. Control animals received gelatine sponge filling into the injured spinal cavity.4 weeks after spinalization,5 OMT rats and 5 control rats were examined by cystometrograms (CMGs) to evaluate the intravesical pressure, inter contraction interval,voided urine volume and voiding efficiency.Electromyograms (EMGs) of the external urethral sphincter (EUS) were also performed during CMGs,to evaluate the ratio of silent periods to bursting periods during voiding bladder contractions.

Results
Maximum intravesical pressure in OMT group was 49.7±8.4 cm$H_2O$ and in control 65.0±16.3cm$H_2O$. Inter contraction intervals in OMT group was 7.7±1.7 min and in control 6.6±1.5 min.Voided urine volume in OMT group was 0.62±0.14 ml and in control 0.53±0.12 ml. There were no significant differences between the groups. However, residual urine volume in OMT was 0.20±0.12 ml and in control was 0.37±0.11ml.Therefore, the voiding efficiency was significantly high in the olfactory mucosa transplant group (77.3±12.7 %) compared to the control group(59.4±5.8 %). The ratio of silent periods to bursting periods during voiding was significantly higher in OMT group (67.3±8.3 %) than in control group (52.7±9.0 %).

Interpretation of results
Our results indicate that olfactory mucosa transplantation following spinal cord injury improves voiding efficiency by suppressing detrusor-sphincter dyssynergia.

Concluding message
Olfactory mucosa has potential value to improve bladder function after spinal cord injury.

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| ***Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?*** | **Yes** |
| ***Name of ethics committee*** | **the Animal Committee of Osaka University Graduate School of Medicine** |