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## INVESTIGATION TO RESTORE INNERVATION OF THE LOWER URINARY TRACT OF SPINAL CORD INJURED PATIENTS: A EUROPEAN SINGLE-CENTER RETROSPECTIVE STUDY WITH LONG-TERM FOLLOW-UP

### Hypothesis / aims of study

SCI of the upper motor neuron often leads into detrusor-sphincter-dyssynergia causing renal failure and QoL impairment. Standard treatment includes catheterization and pharmacotherapy to reduce detrusor pressure. Successful bladder innervation using nerve rerouting(NR) in SCI patients has been currently reported only by few centers in China. We evaluated the effectiveness of lumbar to sacral ventral root (VR) somatic-automatic-reflex pathway nerve rerouting in SCI patients with upper motor neuron disease.

### Study design, materials and methods

We retrospectively reviewed data from an institutional-review board-approved database for 8 patients who underwent NR at a University clinic between 2/2005-8/2007 in an approved individual treatment attempt. Patients gave written informed consent. Mean time between SCI trauma and surgery was 82.9(range 4-288) months. After hemilaminectomy and identification of dedicated VRs by intraoperative VU and electrophysiology, an intradural nerve anastomosis L5-S2 VR was performed. Patients were advised to scratch/squeeze the corresponding dermatome to stimulate the newly-established somatic-autonomic-reflex pathway. Patient post-operative follow-up were requested at 1,3,6,12,18 months and annually thereafter. Primary measurements were voluntary micturition and detrusor pressure normalization. Secondary were VU parameters, urinary tract infections(UTI), bladder/stool diary parameters.

### Results

Eight patients(mean age 30(21-44y)) received nerve-rerouting surgery with a mean operating time of 202 minutes(SD+49) without intraoperative complication. Intraoperative testing indicated successful NR surgery. Postoperative VUs were performed through the ipsilateral dermatomes to identify and record even the weakest initial reactions. VU follow-up is available in 6 of 8 patients. No patients with lower urinary tract dysfunction improved within the follow-up of mean 5.9 years. Two patients reported slight improvement of bowel movement and reduced UTI frequency. No significant VU and bladder diary parameters improvements were recorded. The clinical follow-up was 71(56-86)months. The long-term follow-up indicated no significant differences in the presence of DSD or other data points.

### Interpretation of results

Patients were not able to reproduce the encouraging results of the initiator group. New animal studies investigating uni-vs.bilateral rerouting after spinal cord transection, followed by standardized treatment protocols in a highly-controlled study environment, are necessary to further investigate and validate sacral NR potential as previously published.

### Concluding message

Human study results should be accumulated and reported. Until the effectiveness of this surgical approach can be confirmed in clinical trials, this procedure should not be suggested to or performed on any further SCI patients.

### Disclosures

**Funding:** None **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** University of Tuebingen Ethics Committee **Helsinki:** Yes **Informed Consent:** Yes