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URINE CULTURE CHANGED AFTER BOTULINUM TOXIN A DETRUSOR INJECTIONS IN 26 PATIENTS WITH NEUROGENIC DETRUSOR OVERACTIVITY CAUSED BY SPINAL CORD INJURY: A SINGLE-CENTER LONGITUDINAL PERSPECTIVE STUDY

Hypothesis / aims of study

Botulinum toxin A (BoNTA) detrusor injections is an effective method to treat neurogenic detrusor overactivity (NDO) and decrease detrusor pressure[1], but whether this method can suppress urinary tract infection (UTI) is still in dispute and there was rare report. Recently, some scholars provided evidences that BoNTA detrusor injections significantly decreased the incidence of symptomatic UTI in patients with NDO[2], but the mechanisms were unclear. It's speculated that BoNTA detrusor injections induced inhibition of detrusor overactivity and decrease of detrusor pressure were responsible for the decrease of symptomatic UTI[2]. However, the root of UTI is the existence of microorganisms in urine. In this report, we try to explore whether BoNTA detrusor injections could change urine microorganisms in patients with NDO.

Study design, materials and methods

In a single-center of longitudinal perspective study for the past 2 years, 26 patients with NDO caused by spinal cord injury (SCI) were collected and the periods for observation were 6 months for pre- and post- operative, respectively. All the patients were verified detrusor overactivity by Video-Urodynamic (VUD) examine and never received BoNTA detrusor injections before. 300 units of BoNTA was dissolved in 15 ml normal saline and was injected into the detrusor at 30 different sites (10 units in 0.5 ml normal saline, per site), sparing the trigone. Intermittent catheterization was done during 12 months of observation. Patients who received antibiotic treatment during observation were excluded except Levofloxacin prophylactic usage for 3 days while BoNTA detrusor injections and VUD examine. Outcome measures: urine analysis and urine culture for each month; one time of VUD examine for 3 months pre- and post-operative, respectively. Pared Samples T test assessed differences between pre- and post-operative in bladder capacity and detrusor pressure. Percentage was used to reflect the change of urine culture for post-operative.

Results

1) Post-operative, patients' bladder capacity increased from 64.9±44.3 ml to 199.9±58.6 ml , whereas detrusor pressure decreased from 73.2±79.1 cmH2O to 44.7±16.0 cmH2O at detrusor leak-point. Pared Samples T test showed that there were significantly differences between pre- and post-operative in bladder capacity and detrusor pressure (t= - 10.608, P=0.000; t=2.243, P=0.034, respectively).
2) Pre-operative, positive rate of urine culture was 77.6% (121/156), however, the rate decreased to 53.8% post- operative (84/156)(table 1). Microorganisms of urine cultures also changed after BoNTA detrusor injections: Escherichia coli and Staphylococcus epidermidis increased, Enterococcus faecalis, Proteus mirabilis, Acinetobacter baumannii and Pseudomonas aeruginosa decreased (Table).

Interpretation of results

In our study, we found BoNTA detrusor injections not only significantly reduced detrusor pressure and increased bladder capacity, but also changed urine culture. Microbial flora changes in the urine might be one reason for the decrease of symptomatic UTI after BoNTA detrusor injections. Keeping the perineum dry and less usage of urine pads after BoNTA detrusor injections might influence the microorganism's perineal colonization, thus change the microorganisms of the urine cultures. BoNTA detrusor injections reduced detrusor pressure, thus might change the micro-enviroment of urine microorganisms and alter the urine culture.

Concluding message

BoNTA detrusor injections could change urine culture in patients with NDO caused by SCI.

Table 1 . Urine culture changed after BoNTA detrusor injections

Organism	**Pre-operative (%)**	**Post-operative (%)**
Negative rate	35/156 (22.4%)	72/156 (46.2%)
Positive rate	121/156 (77.6%)	84/156 (53.8%)
Escherichia coli	75/121 (62.0%)	61/84 (72.6%)
Staphylococcus epidermidis	1/121 (0.8%)	8/84 (9.5%)
Klebsiella pneumonia	7/121 (5.8%)	5/84 (6.0%)
Staphylococcus aureus	4/121 (3.3%)	2/84 (2.4%)
Enterococcus faecalis	12/121 (9.9%)	4/84 (4.8%)
Proteus mirabilis	10/121 (8.3%)	3/84 (3.6%)
Acinetobacter baumannii	7/121 (5.8%)	0/156(0)
Pseudomonas aeruginosa	5/121 (4.1%)	1/84 (1.2%)

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Disclosures

Funding: National Natural Science Foundation of China, no.81070607 **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** the Ethics Committee of Beijing BOAI Hospital **Helsinki:** Yes **Informed Consent:** Yes