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Introduction

Botulinumtoxin A (BoNT-A) injections into the external urethral sphincter (EUS) is an established therapeutic procedure to reduce bladder outlet obstruction in neurogenic patients with detrusor-sphincter-dyssynergia (DSD) due to spinal cord injury (SCI).

Given the paucity of data in patients with DSD but without SCI, we aimed to assess the efficacy of transperineal electromyography (EMG) directed EUS injections with BoNT-A in a cohort of patients with suprapontine cerebral lesions.

Design and Methods

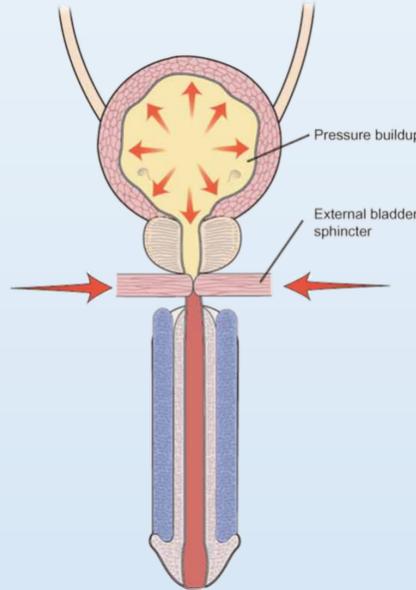


Fig. 1. Detrusor-sphincter-dyssynergia (DSD)

- Centre: Clinic for neurorehabilitation and paraplegiology (REHAB) Basel (CH)
- Patients: 13 men, mean age 31 years [24 – 42 years]
 - Traumatic brain injury (n = 6)
 - Hypoxic encephalopathy (n = 3)
 - Stroke (n = 1)
 - Cerebral palsy (n = 1)
 - Other (n = 2)
 - Neurogenic detrusor overactivity (NDO)
 - Maximum detrusor pressure ($P_{det,max}$) during voiding of at least 40 cmH₂O
 - DSD
 - Confirmed by urodynamics (UDS)
- Inclusion: 2015 – 2021
- Study: Video-Urodynamics before and after Botox[®]
- Outcome:
 - Reduction of maximal detrusor pressure ($P_{det,max}$) after Botox[®]
 - Reduction of DO Leak Point Pressure (DOLPP) after Botox[®]
 - Reduction of patients with indwelling catheters after Botox[®]
- Statistics: Non-parametric (R, Version 4.0.5 for MacOS)
- Ethics: Institutional ethical approval
- Therapy: 1st administration of Botox[®] in the EUS
- Technique: EMG triggered Botox[®] injection
 - 100 Units (n = 7)
 - 150 Units (n = 6)

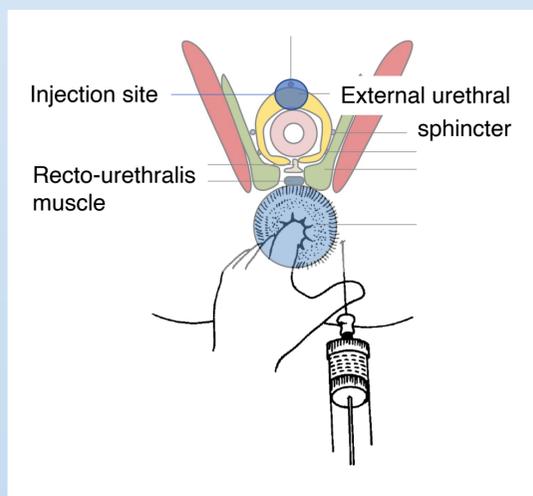


Fig. 2. Perineal EMG triggered Botox[®] injection under rectal finger guidance (Figures from Ref. 1. and 2.)



Fig. 3. Dantec™ Clavis™ device for EMG-guided injections with Bo-ject® hypodermic needle electrode

Results

Urodynamic parameters	Before	After	
$P_{det,max}$ [cmH ₂ O]	105 (85; 113, 44 – 143)	54 (49; 70, 37 – 100)	p=0.006
DOLPP [cmH ₂ O]	50 (40; 78.8, 34 – 126)	50 (36.2; 56.8, 30 – 90)	p=0.33
Incontinence volume [mL]	120 (70; 180, 0 – 360)	220 (68; 374, 30 – 572)	p <0.05
Max. Capacity [mL]	190 (120; 275, 60 – 360)	220 (108; 336, 30 – 770)	
Residual urine [mL]	0 (0; 46, 0 – 160)	0 (0; 150, 0 – 323)	

Median (lower quartile; upper quartile, minimum – maximum)

Mode of bladder drainage (before / after)

- Reflex micturion (n = 6 / n = 13)
- Indwelling catheter (n = 7 / n = 0)

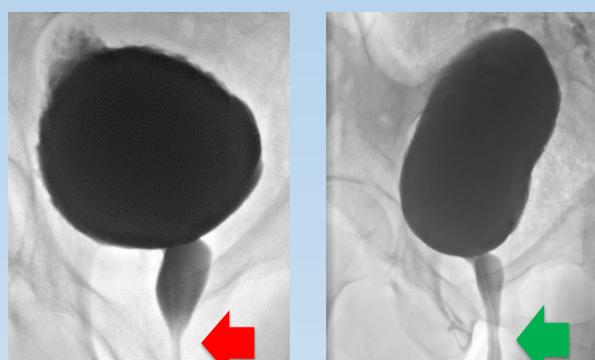


Fig. 4. Radiographic example of micturition before and after Botox[®] injection

Conclusions

Transperineal BoNT-A injections into the external urethral sphincter in male patients with NDO and DSD without underlying SCI is

- feasible
- significantly reduced bladder outlet obstruction in this cohort
- reduced number of patients with indwelling catheters to zero in our cohort

References

1. Shafik A, El-Sibai O. Botulin Toxin in the Treatment of Nonrelaxing Puborectalis Syndrome. Dig Surg 1998;15:347–351
2. De Ridder D, Rehder P. The AdVance[®] Male Sling: Anatomic Features in Relation to Mode of Action. Eur Urol Suppl 2011;10:383–389