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Silveri M[1], De Gennaro M[1], Gatti C[1], Capitanucci M L[1], Salsano L[2], Pierro M M[2]
1. Urodynamic Unit - Ospedale Pediatrico Bambino Gesù - Roma, 2. Department of Rehabilitation - Ospedale Pediatrico Bambino Gesù - Palidoro

BOTULINUM-A TOXIN TO TREAT NEUROGENIC DETRUSOR OVERACTIVITY IN PEDIATRIC PATIENTS

Aims of Study

The encouraging results obtained in treatment of detrusor sphincter dyssynergia (DSD) in spinal cord injured adult patients, such as preliminary positive experiences on pediatric patients suffering from the sequelae of a meningomyelocele (MMC) both in treatment of detrusor overactivity and control of secondary urinary incontinence, induced us to verify the effectiveness of botulinum toxin type A (BTX/A) injected into the bladder and the urethral sphincter complex of our patients with a neurogenic bladder secondary to different pathological events.

Methods

We selected 14 patients (11 males, 3 females) aged from 4 to 18 years (average age: 11.2 years ± 4.7 SD) who were submitted to 16 endoscopic injective procedures. Five of them were MMC patients, 2 occult spinal dysraphism (OSD) ones, 3 suffered a spinal cord injury (SCI) (2 thoraco-lumbar lesional level with paraplegia and 1 cervical spine injury with tetraplegia), 1 was affected by sequences of a transverse infectious myelitis, and the remaining 3 by a severe bladder dysfunction (BD) arising from a complex neuro-urological malformation in one case and secondly to a scoliosis and a cerebral palsy, respectively, in the remaning two. All of them were yet used to clean intermittent catheterisation and anticholinergic pharmacological treatment. Criteria of selection were: diagnosis of neurogenic bladder between 0 to 18 years; urodynamics features of neurogenic detrusor overactivity with or without DSD, a high maximum pressure and low bladder compliance, history of urinary tract infections and detrusor overactivity incontinence. Urodynamics data explored were: cystometric capacity (CC), reflex volume (RV), that is the filling volume at the first observation of uninhibited contraction of more than 15 cmH2O, maximum pressure (MP). DSD was detected by urodynamic plus surface-EMG or by videourodynamic. Continence was also evaluated before and after the treatment. Pharmacological treatment was not discontinued. A clinical and urodynamic evaluation was carried out at 4, 12, 24 weeks after the intervention. Follow-up ranged from 3 to 14 months (average 7.5 months) and results at 12 weeks were obtained from 12/14 patients whilst 7/14 completed our protocol follow-up (6 months).

Results

Eight patients out of the 14 studied (57 %) showed a DSD associated to neurogenic detrusor overactivity. Six of them received injections of toxin directly into the sphincter complex (Table I). The mean dosage of toxin injected was 192 ± 18.1 SD. The mean number of injections performed was 20.5 ± 7.53 SD.

CC increased by 85 % (p=0.007). The mean RV increased by 69 %. In 3/14 patients uninhibited contractions vanished at 4 weeks control, and these data were confirmed in 2 of them who completed the 12 weeks follow-up. Urinary continence improved in 5 out of the 7 patients who completed follow-up. DSD improved in the patients who received toxin into the sphincter complex (4/14 cases). An “exhaustivity” of the toxin effects was observed in 4 out of the 7 who completed the follow-up.

Patient	Age	Diagnosis	CC pre	RV pre	MP pre	DSD	N° of proc.	BTX/A dose	N° of injections	Site	CC post (4 wks)	RV post (4 wks)	MP post (4 wks)
1	17	OSD	260	no	67	Yes	2	200	4	S	350	no	31
2	8	MMC	160	40	102	No	1	200	20	B	180	70	120
3	18	MMC	500	no	15	No	2	200	30	B	490	no	72
4	7	Prune-Belly	280	50	100	Yes	1	200	20	B	140	120	90
5	18	MMC	520	no	13	No	1	200	18	B	500	no	16

6	14	OSD	180	112	7	Yes	1	200	32	B+S	360	-	10
7	8	MMC	260	no	80	No	1	150	12	B	400	no	23
8	9	SCI	300	250	18	Yes	1	200	24	B+S	360	320	16
9	13	Scoliosis	250	150	15	No	1	200	25	B	500	320	18
10	7	SCI	190	135	55	Yes	1	200	30	B	400	150	10
11	10	Myelitis	290	130	43	Yes	1	200	16	B+S	425	-	18
12	16	MMC	310	180	30	No	1	200	20	B	420	-	25
13	8	Cerebral Palsy	140	40	26	Yes	1	200	20	B+S	180	80	6
14	4	SCI	60	30	40	Yes	1	150	16	B+S	80	55	42

Table I. Our series of 14 patients treated with BTX/A (comparison of preoperative and at 4 weeks follow-up results)

Conclusions

Apart from the suggestion to use the botulinum-A toxin as a therapeutical option to obviate side effects of anticholinergics, we believe that this drug may ameliorate clinical and urodynamic features of those subjects with overactive neurogenic bladder and/or urinary incontinence related, in addition to conventional urorehabilitation strategies and with the purpose to further increase the dry-interval and to prevent upper urinary tract damage. We do not consider the temporal loss of power of the toxin a limitation to its use.