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THE ROLE OF DOPAMINE RECEPTORS ON LOWER URINARY TRACT FUNCTION IN PARKINSON'S DISEASE PATIENTS

Hypothesis / aims of study

The different role of D1 and D2 dopamine receptors on lower urinary tract (LUT) behavior has been demonstrated in few animal studies. In particular, Seki et al. showed that D2 selective agonists and D1 selective antagonists produce a reduction of the bladder capacity and of the volume threshold for the micturition reflex in conscious rats (1). Thus, the author concludes that D2 receptors could be involved in the facilitation of micturition reflex, while D1 could exert a tonic inhibition of bladder voiding. This finding has never been confirmed in human studies. Thus, the aim of our study was to investigate the role of D1 and D2 agonists/antagonists on LUT behavior in Parkinson's disease (PD) patients.

Study design, materials and methods

13 patients (5 females, 8 males), after signing an informed consent, were evaluated. Mean age was 61± 7.32 years. All patients were affected by idiopathic PD according with the Brain Banck Criteria (2) with an Hohen and Yahr score lower than 2.5 and a mean disease duration of 3.5 ± 1.3 years. UPDRS(section III) mean score in off condition was 32.34 ± 3.6. All subjects presented with overactive bladder symptoms. Patients were evaluated with urodynamic studies performed in four conditions: in off status (therapy withdrawal since at least 7 days if treated with L-DOPA (LD) agonists or 21 days if treated with LD); 45 minutes after oral administration of 250 mg of LD (D1-D2 agonist); 45 minutes after simultaneous administration of 250 mg oral LD and 20 mg Domperidone (D2 peripheral antagonist); 45 minutes after simultaneous administration of 250 mg oral LD and 150 mg intramuscular Sulpiride (D2 central antagonist). No patient was assuming drugs with effects on LUT. Urodynamic evaluation was constituted by a 50 ml/min filling cystometry followed by a pressure/flow study with perineal floor EMG. The following urodynamic parameters were evaluated: first sensation of bladder filling, detrusor neurogenic overactive contractions (DNOC) threshold and amplitude, bladder capacity, maximum flow (Qmax), detrusor pressure at maximum flow (Pdet@Qmax), post-void residual urine, presence of detrusor/sphincter pseudodyssynergia (DSPD). Results obtained in the four previously specified conditions were collected and statistically compared by means of ANOVA test and post-hoc Tukey test.

Results

Results are reported in table.

	Mean (SD)						
Pats.=13	Off	LD	p+	LD+Dom	p*	LD+Sul	p*
First sensation (ml)	130 (55)	110 (75)	ns	125 (78)	ns	216±85	**0.006**
DNOC threshold (ml)	255 (140)	168 (104)	0.07	175 (112)	ns	310±78	**0.03**
DNOC amplitude (cmH2O)	66 (39)	76 (41)	0.07	73 (39)	ns	48±36	**0.01**
Bladder capacity (ml)	347 (125)	269 (105)	**0.02**	283(111)	ns	412±94	**0.04**
Q max (ml/s)	17 (9)	17 (6)	ns	17 (5)	ns	16 (6)	Ns
Pdet@Qmax (cmH2O)	38 (19)	48 (28)	ns	47 (25)	ns	41 (20)	Ns
Residual urine (ml)	11 (21)	7 (5)	ns	12 (8)	ns	13 (28)	Ns
DSPD (y/n)	2/11	2/11	-	2/11	-	2/11	-

Legend: Dom: Domperidone; Sul: Sulpiride; +LD vs. Off status; * LD+Dom and LD+Sul vs. LD.

Interpretation of results

The administration of a D1/D2 agonist (as LD) seems to produce a worsening of neurogenic detrusor overactivity; the same result is obtained when a peripheral D2 antagonist as Domperidone is given simultaneously. On the other hand, the administration of a D2 central antagonist as Sulpiride seems to reverse the effect of LD, with non significant improvement in comparison to off status.

Concluding message

Our study seems to confirm that D2 receptors of the central nervous system could be involved in the facilitation of micturition reflex in human as well as what found in animal models.

References

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