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NERVE GROWTH FACTOR BLADDER TISSUE LEVELS IN PATIENTS WITH BENIGN PROSTATIC HYPERPLASIA AND DETRUSOR OVERACTIVITY TREATED WITH TAMSULOSIN

Hypothesis / aims of study

Following Bladder Outlet Obstruction (BOO) in experimental models, Nerve Growth Factor-dependent plasticity in the autonomic nervous system may be responsible for the genesis and maintaining of detrusor overactivity. Actually, there are no consistent information on how these mechanisms specifically interact in humans.
We measured Nerve Growth Factor (NGF) concentrations in bladder tissues biopsies taken from patients affected by BOO and detrusor overactivity due to Benign Prostatic Hyperplasia, before and during treatment with tamsulosin. We also compared NGF content with urodynamic data.

Study design, materials and methods

10 patients underwent urodynamics with recording of uninhibited detrusor contractions (UDC) threshold and UDC maximum pressure (pmax), detrusor pressure at maximum flow rate (pDetQmax) and maximum flow rate (Qmax), and endoscopy with biopsy specimens before and 1 month after the beginning of treatment with Tamsulosin (0.4 mg once daily).
NGF levels were measured in tissues homogenate by ELISA (Promega, Madison-WI) following the immunoprecipitation of IgG by the addition of IgM (1/10 by vol). The sensitivity was 15.6 pg/ml of NGF. Data were expressed as ng/mg protein (mean of duplicate samples).

Results

On urodynamics, we detected a significant increase in UDC threshold ($p<0.05$), a significant reduction in pDetQmax ($p<0.05$) and a significant increase in Qmax ($p<0.05$) at 1 month as compared to baseline. A significant reduction in bladder NGF content was observed at 1 month, as compared to baseline values (see Table below).

		Vaseline (mean ± SD)	**1 month (mean ± SD)**	**p**
UDC threshold	(ml)	197.5 ± 91.1	242.1 ± 63	p<0.05
UDC max. pressure	(cmH_20)	34.1 ± 16.8	30.1 ± 11.8	n.s.
pDetQmax	(cmH_20)	67.8 ± 7.9	59.8 ± 6.4	p<0.05
Qmax	(ml)	9.8 ± 1.1	12.8 ± 1.3	p<0.05
NGF	(ng/mg)	50 ± 39.1	33.2 ± 4.8	p<0.05

Interpretation of results

These preliminary results confirm the efficacy of tamsulosin, an inhibitor of $alpha_1$-adrenergic contraction of prostatic smooth muscle, in reducing BOO due to benign prostatic hyperplasia.
We also confirm the hypothesis that bladder outlet obtruction is typical of hypertrophic smooth muscle disorders that are characterized by an increased expression of NGF, enlargement of area profiles for sensory and motor neurons and consequent reflex plasticity. The effects of NGF on neuronal function my be important in the development of irritative symptoms which are so frequent in BPH.

Concluding message

We demonstrated in humans that the reduction of NGF bladder tissue content, due to the relief of obstruction in BPH patients, induces a subsequent decrease of detrusor overactivity.

References

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