

LONG-TERM DEVELOPMENT TOWARD HYPOCONTRACTILITY AND OVERDISTENSION IN VALVE BLADDER DOES NOT CORRELATE WITH INCREASED RENAL OUTPUT

Aims of Study

Even after complete resolution of obstruction at birth, boys with posterior urethral valve (PUV) may show urodynamic abnormalities, varying from a overactive bladder, within the first two years of life, to myogenic detrusor failure. The urodynamic pattern had been shown to change during time, with an increasing incidence of detrusor underactivity/acontractility pattern in older children and possible overdistended bladder after pubertal growth. It can be argued that the overdistension depends only from a high urine output (caused by renal insufficiency), not infrequently encountered at that age. Another possibility is that (similarly to bladder dysfunction in BPH where, after relief of obstruction, detrusor underactivity and residual may continue) the bladder dysfunction itself is the cause of overdistension. The clinical entity of large bladders with huge postvoid residual in postpubertal boys, who underwent urethral valve resection in infancy, is clearly recognised (indwelling overnight catheterism may be required); but, the cause and possible prevention of the condition are still unidentified.

To evaluate the relationship between long-term renal failure and the development of detrusor underactivity/acontractility in PUV boys, we compared renal and bladder function evolution from birth into adolescence, focusing on those patients who were clinically and urodynamically evaluated before and after puberty.

Methods

During the last 20 years, 128 patients with PUV had been observed. Serial studies had been performed, regardless of symptoms, when aged 1-2 (n=9), 3-5, 6-10, 11-13 (n=15 pts.) and 14-18 years (n=9). Methods, definitions and units used for urodynamic evaluation were conform to the standard recommended by ICS, except where specifically noted. Detrusor underactivity was defined as maximum voiding pressure ≤ 25 cmH₂O and post-voiding residual urine >50 ml. Of these, 23 have sufficient long-term clinical (mean 14.2 years) and urodynamic (mean 12.6 years) follow-up. Urodynamic pattern changed from overactive or normal detrusor (at mean 8.6, range 6-10 years) to underactive (at mean 1.9, range 9-16 years) in 12 patients; of these, 4 developed overdistended bladder after puberty. The remaining 11 patients maintained a normal bladder function. No structural urethral obstruction or vesico-ureteral reflux were documented in patients investigated between 11-13 and 14-18 years. Patients with underactive detrusor discontinued anticholinergic medication at least two years before investigation. Plasma creatinine (threshold 1.2 mg/dl) and urine density (threshold ≤ 1010) were assessed retrospectively from clinical reports, and renal function compared with changes in urodynamics in the 9 patients investigated before and after puberty.

Results

No linear correlation has been found between detrusor underactivity evolution and the pattern of overdistended bladder after puberty on one side and glomerular and tubular renal insufficiency with increased renal output on the other side. In 2/5 patients with renal failure and also in 2/4 with normal renal function, after puberty the bladder capacity exceeded 800ml. A underactive or acontractile detrusor was found in 3/4 patients with normal renal function and in 4/5 with renal impairment.

Pts.	Age (years)		Creat ^ (mg/dl)		Urine Dens * (£ 1010)		CystomCapac° (ml)		Max Detr Press (cmH ₂ O)		PVR # (ml)	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
1	11	14	1.2	0.65	1025	1025	383	500	11	25	120	120
2	10	14	0.78	0.60	1003	1003	340	815	34	25	0	215
3	11	14	0.74	0.95	1015	1010	357	970	34	24	40	350
4	11	14	0.75	0.95	1010	1012	250	415	41	63	10	0
5	10	15	0.80	1.41	1015	1005	361	420	77	33	35	70
6	13	16	1.36	1.75	1003	1007	283	994	69	18	0	300
7	12	17	1.40	1.40	1005	1004	493	870	20	20	10	500
8	11	14	1.90	2.50	1005	1004	250	400	35	20	13	75
9	12	14	3.50	4.20	1005	1003	640	480	32	25	0	20

^ Plasma Creatinine; * Urine Density; °Cystometric Bladder Capacity; # Postvoiding Residual Urine

Conclusions

In our series, the natural evolution by age toward detrusor underactivity and myogenic failure has been confirmed. No clear relation with renal impairment and high renal output has been found. Therefore, other factors must be considered, such as the bladder function itself and/or the prostate gland development or residual bladder neck dysfunction/obstruction. Thus, careful bladder emptying training (i.e. double/triple micturition regimen), drugs acting on bladder outlet, CIC or overnight indwelling catheterism in some instances, are advocated to treat this condition, in order to prevent further renal function impairment.