

## IMPACT OF THE CATHETER ON MAXIMUM FLOW DURING PRESSURE/FLOW STUDY IN WOMEN WITH DIFFERENT CLINICAL AND URODYNAMIC DIAGNOSES

### Aims of Study

Bladder outlet obstruction (BOO) is fundamentally diagnosed in pressure flow studies (P/F). Some reports claim the transurethral catheter impacts on flowmetric measurements. We showed 7-Fr and 9-Fr catheters may adversely affect uroflowmetry parameters in women undergoing P/F studies for lower urinary tract symptoms and may affect diagnosis. This study determined the impact of the catheter on maximum flow during P/F study in different clinical and urodynamic categories.

### Methods

191 consecutive women with lower urinary tract symptoms were recruited. Exclusion criteria: lower urinary tract infection, bladder stone or tumour, suspected neuropathy, complete urinary retention, inability to void with catheter in place. Inclusion criteria: free flowmetry volume >150 ml; a voided volume (micturitional volume + post-void residue) varying less than 20% on the free and pressure flow studies. All women underwent history, physical examination (Halfway system classification), urinary questionnaire, urine culture, free flow uroflowmetry, post-void residual (PVR), dynamic ultrasound, urodynamics. Free flow measurements were made privately with the patient sitting. PVR was evaluated by catheter before cystometry. Multichannel urodynamics were performed according to the recommendations of the ICS. Cystometrography was performed using first a 9 Fr (126 patients) or a 7 Fr (to date 65 patients) double lumen transurethral catheter. Two P/F studies were performed. The Q<sub>max</sub> and lowest P<sub>det</sub>Q<sub>max</sub> were selected. Data were analysed according to symptomatology, type of incontinence (UI), cystocele, PVR, detrusor instability (DI: involuntary detrusor contractions during bladder filling) and BOO (Q<sub>max</sub> ≤15 ml/s with P<sub>det</sub>Q<sub>max</sub> ≥20 cmH<sub>2</sub>O) (1). Spontaneous and intubated (P/F) voiding were compared on the basis of urodynamic diagnosis and clinical characteristics. Free flow parameters included Q<sub>max</sub>-UF and post-void residual urine (PVR-UF). P/F parameters included Q<sub>max</sub>-PF and post-void residual urine (PVR-PF). Results were analysed using the Wilcoxon test and the Mann-Whitney. For categorical variables we used McNemar and X<sub>2</sub> tests (p<0.005 significant).

### Results

Table 1 shows patient characteristics in the 2 groups.

	Catheter n° 7(65 pts)	Catheter n° 9(126 pts)	P
Mean age±SD	59.4±9.5	57.7±10	Ns
Mean parity±SD	1.8±1	2±1	Ns
Previous pelvic surgery	36	61	Ns
Urinary incontinence (Stress, urge, mixed)	48(73.8%) (17,13,18)	108(85.7%) (42,15,51)	Ns
Obstructive symptoms	29(44.6%)	51(40.5%)	Ns
Irritative symptoms	42(64.6)	87(69%)	Ns
Cystocele ≥2	25(39.8%)	69(54.7%)	Ns
<i>Urodynamic Detrusor hyperactivity</i>	12(18.5%)	28(22.2%)	Ns
<i>Urodynamic BOO</i>	19(30.1%)	35(28%)	Ns

During P/F study the mean Qmax-UF decreased from 27.7±12 ml/sec to 19.3±9.7 in A-group and from 27±14.4 to 18.6±9.6 ml/sec in the B-group. Tab. 2 shows the percentage reduction in flow in free flowmetry and P/F study in the different diagnostic categories.

	7-Fr Catheter				9-Fr Catheter			
	N° pt	Qmax-UF (mean±SD)	Qmax-PF (mean±SD)	Difference (mean±SD)	N° pts	Qmax-UF (mean±SD)	Qmax-PF (mean±SD)	Difference (mean±SD)
Cystocele≥2	25	29.5±13.1	18.7±10.9	10.4±9.1	69	23.8±12.4	16.1±8	7.7±10
Cystocele<2	40	26.7±11.3	19.7±8	7.0±8.5	57	30.8±15.7	21.7±10.5	9.1±10.4
No DI	53	28±11	18.6±10	9.4±7.9	98	28.5±15	19.4±9.8	8.9±10.8
DI	12	24.7±16.3	19.5±7.5	5.2 ±12.1	28	21±7	15.8±8.4	5.9±7.6
BOO	19	18.6± 7.1	10.3±2.8	8.2±6.6	35	16.4±6.9	9.6±3.9	6.7±5
Obstr.symp	29	22.6± 9.2	15.3±7.9	7.3±6.9	51	22.2±13.9	14.4±8.8	7.7±10.2
Irritative sympt	42	27.1± 10.8	18.7± 9.3	8.4±8	87	26.1±13.9	17.3±8.7	8.7±10.6
PVR -UF	6	16.6± 5	9.7± 3.5	6.8±6.5	24	14.1±6.9	9.7±5.6	4.4±4.3
PVR – PF	8	16.7± 6.9	8.6± 2.5	8.1±8	29	14.3±6.7	8.9±4.4	5.4±5.1
UI	48	29.1±12.4	20.6±10.2	8.5±9.4	108	28.4±14.7	19.6±9.5	8.8±10.8
No symptoms	14	31±16	22.6±12.6	8.4±11.5	29	32.5±15.6	23.9±10.9	8.6±10.8

In patients with cystocele, PVR or BOO the catheter reduced flow significantly more than in the other categories and may determine erroneous diagnosis of BOO (in the 7Fr-group 19 P/F obstructed vs 7 free flowmetry obstructed; in the 9Fr-group 35 P/F obstructed vs 18 free flowmetry obstructed). Catheter size had no significant impact.

### **Conclusions**

Results of studies investigating the clinical consequences of transurethral catheterisation during P/F studies in women are controversial. Our data (like Groutz, 2) show Qmax is considerably reduced during a P/F study using a 7Fr-catheter. We observed a significant decrease in P/F-Qmax, particularly in women with cystocele, PVR and BOO. Groutz did not detect more pronounced catheter induced changes in BOO, perhaps because of the relatively few patients with BOO in his series. Dysfunctional voiding because the patient contracts the sphincter due to discomfort, lower voided volume also to discomfort and BOO caused by the urethral catheter itself may significantly reduce flow in P/F studies in women. In our experience the obstructive picture may be distorted by the catheter, no matter which size, particularly in patients with cystocele, BOO and PVR.

### **References**

- 1) Chassagne S, Bernier PA, Haab F et al. Proposed cutoff values to define bladder outlet obstruction in women. Urology 51:408,1998.
- 2) A.Groutz, J.G.Blaivas, M.Sassone. Detrusor pressure uroflowmetry studies in women: effect of a 7Fr transurethral catheter. J.Urol. 164:109,2000.