

IMPACT OF CATHETER SIZE ON PRESSURE/FLOW RESULTS IN WOMEN

Aims of Study

Pressure flow studies are considered the best method for assessing the voiding phase of the micturition cycle. As the transurethral catheter may cause urethral irritation and/or relative bladder outlet obstruction (BOO) during pressure/flow (P/F) studies, we determined the impact of two different sized catheters on maximum flow in different age groups and in terms of urine volume, in order to provide a correct assessment of flow measurement.

Methods

We reviewed a urodynamic database of 750 consecutive women with lower urinary tract symptoms. Exclusion criteria: urinary tract infection, bladder stone or tumour, suspected neuropathy, complete urinary retention, inability to void with catheter in place. Inclusion criteria: free flowmetry volume over 150 ml; voiding a volume of urine (micturitional volume + post-void residue) varying less than 20% on free flowmetry and P/F study; 191 women were recruited. All underwent: history, physical examination (Halfway system classification), urinary questionnaire, urine culture, non invasive free flow uroflowmetry, post-void residual (PVR) determination, 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 International Continence Society. Cystometrogram was performed using originally a 9 Fr double lumen transurethral catheter (A-group: 126 pts) and then a 7 Fr (B-group: to date 65 pts). Under strong stimulus to urinate the patient voided with the catheter in place in privacy in a sitting position. Two P/F studies were performed. The highest peak flow rate (Qmax) and lowest detrusor pressure at maximum flow (PdetQmax) was selected. Comparisons were made of spontaneous (free) and intubated (P/F) voiding in the two groups (7 Fr and 9 Fr catheter) and according to age groups and voided volume. Free flow parameters included the maximum flow rate (Qmax-UF) and voided volume (V-UF). Pressure flow parameters included maximum flow rate (Qmax-PF) and voided volume (V-PF). Results were analysed by the Wilcoxon test for dependent data and the Mann-Whitney for independent data. For categorical variables McNemar and Chi-square tests with $p < 0.005$ considered significant were used.

Results

Table I shows patient characteristics and Tab. II the mean values of free and P/F Qmax in the 2 groups.

Table I	Catheter n° 9 (126 pts)	Catheter n° 7 (65 pts)	P
Mean pt age \pm SD	57.7 \pm 10	59.4 \pm 9.5	Ns
Mean parity \pm SD	2 \pm 1	1.8 \pm 1	Ns
Previous pelvic surgery	61	36	Ns
Urinary incontinence	108 (85.7%)	48 (73.8%)	Ns
Obstructive symptoms	51 (40.5%)	29 (44.6%)	Ns
Irritative symptoms	87 (69%)	42 (64.6)	Ns
Cystocele \geq 2	69 (54.7%)	25 (39.8%)	Ns
<i>Detrusor hyperactivity</i>	28 (22.2%)	12 (18.5%)	Ns
<i>Bladder outlet obstruction</i>	35 (28%)	19 (30.1%)	Ns

TAB. II

	7 Fr - Catheter			9 Fr - Catheter		
Mean ml/sec	Qmax UF	Qmax P/F	Difference	Qmax UF	Qmax P/F	Difference
	27.7 \pm 12	19.3 \pm 9.7	8.5 \pm 9	27 \pm 14.4	18.6 \pm 9.6	8.4 \pm 10.2

In both groups the Qmax rate was significantly less on pressure versus free flow studies but not between the 2 groups. Fig 1a and 1b show Qmax UF and Q-max- PF- in groups A and B on the basis of different bladder volume.

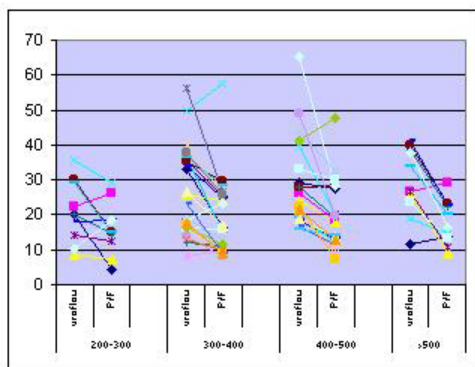


Fig. 1a: 7 Fr Catheter

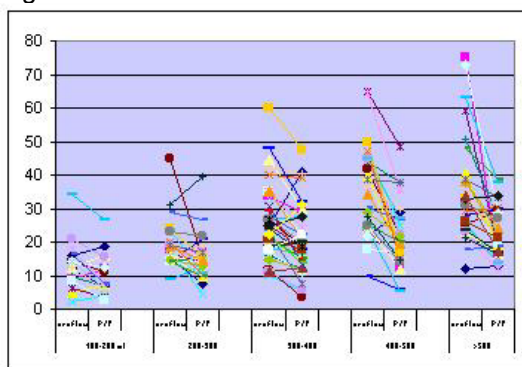


Fig. 1b: 9 Fr Catheter

Table III shows Free Q max and P/F Qmax diminished with age and catheter size had no significant impact in the different age-groups.

Tab. III

Age	Catheter 7 Fr (mean values)			Catheter 9 Fr (mean values)		
	Free Qmax	P/F Qmax	Difference	Free Qmax	P/F Qmax	Difference
30-40	38,7 (1)	22,5	9,6	29,3 (6)	17,5	11,8
41-50	36,4 (7)	22,2	14,1	30,7 (28)	19,5	11,2
51-60	25,3 (25)	18,8	6,6	27,3 (42)	19,5	7,8
61-70	28,1 (23)	19,6	8,4	26,1 (37)	18,9	7,1
>70	24,9 (8)	15,8	9,1	19,34 (12)	12,7	6,6

Conclusions

Contradictory results emerge from extensive research into whether the transurethral catheter has a significant impact on flowmetric measurements with few data being available in women. The results of our study show both a 7 Fr and a 9 Fr catheter may adversely affect uroflowmetry parameters in women undergoing P/F studies for lower urinary tract symptoms. This finding may have clinical implications in the interpretation of these parameters and in accurately diagnosing BOO. Concurring with Roberts who established peak urinary flow rate declined by about 2% per year in men, we observed free Qmax declined by about 1.6% in women aged between 50 and 60 and by 1.9% in women over 60 years old.

References

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- 2) R.O.Roberts, S.J.Jacobsen, D.J.Jacobson, T.Rhodes, C.J.Girman, M.M.Lieber. Longitudinal changes in peak urinary flow rates in a community based cohort. J.Urol. 163:107, 2000

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