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WHAT SIZE CATHETERS SHOULD BE USED IN WOMEN DURING URODYNAMICS?

Hypothesis / aims of study

Pressure / Flow (P/F) studies are the gold standard technique to assess voiding function in women. A transurethral catheter is usually used to measure the vesical pressure. However, the size of catheter is important and the bigger the catheter the more likely it will cause bladder outlet obstruction and give false results(1). Previous studies have shown that catheters greater than 6Fr in size can cause obstruction(2).

The aim of this study is to evaluate the effect of a 16 gauge (G) (1.6 mm in diameter) transurethral catheter on the urofowmetry and to evaluate whether it may potentially contribute to bladder outlet obstruction in women during voiding pressure/flow studies.

Study design, materials and methods

We reviewed the urodynamic data of 1253 women retrospectively who underwent urodynamic studies between February 2012 and January 2015 for various lower urinary tract symptoms (LUTS); mainly urinary incontinence and voiding dysfunction. Patients were included in the study if they voided > 150ml in both the free flow rate (FF) and intubated flow rate (IF).

Multichannel urodynamics using a 7Fr filling catheter and a 16G pressure measuring catheter were performed according to the recommendations of the International Continence Society. Before voiding was initiated, the filling catheter was removed and the patients voided with only a 16G catheter in the bladder to measure voiding pressure. FF and IF were compared. Free flow parameters included maximum flow rate (Qmax), voided volume (VV), voiding pattern and post-void residual (PVR). IF parameters included: Qmax, voiding pattern and PVR.

Results

502/1253 women (40.1%) were included with a mean age of 51 ± 14 years. The mean Qmax decreased from 28 ± 13ml/s (FF Qmax) to 23 ± 10 ml/s (IF Qmax) and this decrease was statistically significant (P<0.001). The VV at the IF (391 ± 133 ml) was higher than that of the FF (245 ± 166 ml) and the PVR was less at the IF (12 ± 48 ml) than that of the FF (16 ± 51 ml). These were not statistically significant (P=0.052), (Table 1).

Table (1): Urodynamic parameters

Urodynamic Parameters	Free Flow	Intubated Flow	P Value
Qmax	28.04 ± 13.12	22.80 ± 9.86	P<0.001
Initial volume	360.77 ± 170.15	403.38 ± 135.65	P<0.001
Voided volume	245.09 ± 165.74	391.06 ± 132.54	P<0.001
Residual volume	15.68 ± 51.02	12.32 ± 48.08	P=0.052
Residual ratio %	3.48 ± 10.74	2.61 ± 9.18	P=0.055

Residual ratio= RV *100 / Vini.

The cut off value for significant PVR (V+) was defined as ≥20% of the initial volume (Vini) and insignificant PVR (V-) was <20% (Table 2). Voiding patterns significantly changed from normal to fluctuating or intermittent patterns (P<0.001) but on the other hand 82.9% of patients maintained the same voiding pattern or improved (Table 3).

Table (2): Occurrence of significant PVR

Intubated Flow	Free Flow	
	FF V-	FF V+
IF V-	450 (96.6%)	27 (75.0%)
IFV+	16 (3.4%)	9 (25.0%)

McNemar Test, P=0.127

Table (3): Change in voiding patterns

Intubated Flow	Free Flow		
	Normal FF	Fluctuating FF	Intermittent FF
Normal IF	269 (81.3%)	25 (20.7%)	3 (6.0%)
Fluctuating IF	38 (11.5%)	72 (59.5%)	13 (26.0%)
Intermittent IF	24 (7.3%)	24 (19.8%)	34 (68.0%)
Total	331	121	50

Wilcoxon test, P<0.001

Interpretation of results

Although the VV during the IF was higher than that of the FF, even if we tried to match the VV using the Liverpool nomogram, still the flow rate would be lower at the IF. The catheter does not have a significant effect on the voiding pattern; however, a significant effect is seen on the Qmax. In addition, the cost of the 7Fr filling catheter is £2.55 and that of the 16G catheter is £2.49 summing a total cost of £5.04. Meanwhile, the 6Fr Double lumen catheter costs £10.05. Therefore the two catheter technique is cheaper and less likely to cause obstruction during voiding.

Concluding message

Although the 16G catheter is a very small catheter used to record vesical pressure during voiding, its presence caused a reduction in Qmax. This suggests that the use of larger catheters, such as 6Fr double lumens, can cause even more changes in Qmax and therefore may give false results in patients when looking for stress incontinence during filling and obstruction during voiding. This study also highlights the importance of performing an adequate FF before undertaking urodynamics that should be carefully considered when assessing the voiding phase. We would recommend that size of catheter used is highlighted in any new ICS Good Urodynamics Practice document and recommend that the two catheter technique is used as the standard of care compared to double-lumen catheters both from a point of cost and from the point of causing less obstruction during voiding.

References

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