



ICS/IUGA Annual Meeting Annual Meeting

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Abstract Title:

COMPARISON OF MEASUREMENTS OBTAINED WITH MICROTIP AND EXTERNAL WATER PRESSURE TRANSDUCERS

Abstract Text:

Hypothesis / aims of study

The aim of this study was to compare simultaneous pressure readings obtained with catheter-mounted microtip and external water pressure transducers during filling cystometry.

Study design, materials and methods

Multichannel urodynamic testing was performed in 95 women. Two 8Fr urodynamic urinary catheters were zeroed at the urethra and placed simultaneously into the bladder. Women were randomized to a combination of either two microtip (MM, n = 16) or two external water pressure transducer (WW, n = 16) catheters, or a combination of the two transducer types (MW, n = 63). Both transducers were connected to a multichannel urodynamic recorder (Laborie Medical Technologies Corp., Toronto, Canada) so both pressure tracings could be recorded concurrently. A series of three coughs and two Valsalva manoeuvres of various strengths and at different volumes (150mL, 300mL) were then performed during the course of cystometric evaluation. Cough efforts generated pressures < 50, 50-100, and > 100cm water over baseline. Valsalva efforts generated pressures < 75 or ≥ 75cm water over baseline. The simultaneous intravesicle pressure (IVP) readings generated by the two systems at baseline, and the maximum IVP readings at each event were then compared using Pearson correlation coefficients.

Results

The patients had a mean age of 54.2±13.0 years, 89% were Caucasian and 9% were African American. Correlation of maximum pressure readings was consistently high between microtip transducers (r = 0.99), regardless of the type or strength of manoeuvre, or the volume of testing. Correlation between external water transducers was also high across varying manoeuvre types and strengths at both testing volumes (r = 0.96-0.99). Correlations were lower but still good when readings between microtip and external pressure transducers were examined (r=0.89-0.94). Within this group, correlation was highest for Valsalva manoeuvres (r = 0.93-0.94) relative to coughs (r = 0.89) and baseline readings (r = 0.66-0.71). Adjustment for baseline pressure prior to each event increased correlation across all categories (Table 1).

Mean differences between the pressures recorded by the two catheters was not affected by manoeuvre type or fill volume when the transducers were similar. However, when different transducers were compared, mean differences increased as cough strength increased, regardless of volume. A similar effect was not seen with Valsalva manoeuvres (Table 2).

Table 1. Pearson correlation of intravesical pressure between transducers

		Absolute Values			Adjusted For Baseline		
		Groups			Groups		
		MM	MW	WW	MM	MW	WW
150cc	Baseline	0.91	0.71	0.74	-	-	-
	Cough	0.99	0.87	0.97	0.99	0.89	0.96
	Valsalva	0.99	0.92	0.95	0.99	0.93	0.97
300cc	Baseline	0.93	0.66	0.80	-	-	-
	Cough	0.99	0.88	0.98	0.99	0.89	0.98
	Valsalva	0.99	0.92	0.94	0.99	0.94	0.97

Table 2. Mean IVP between transducers (cm H₂O)

Volume	IVP Difference Mean (\pm SD)	MM	MW	WW
300ml	Valsalva 1	0 (\pm 2)	8 (\pm 11)	-5 (\pm 6)
	Valsalva 2	-1 (\pm 2)	10 (\pm 13)	-5 (\pm 7)
	Cough 1	0 (\pm 1)	10 (\pm 14)	-3 (\pm 5)
	Cough 2	-1 (\pm 2)	17 (\pm 19)	-6 (\pm 7)
	Cough 3	-1 (\pm 4)	24 (\pm 27)	-8 (\pm 11)

Interpretation of results

Correlation between pressure measurements obtained from microtip and external water transducers for cough and Valsalva efforts during cystometrics is high. Little intra-catheter variation was seen between transducers of similar type, suggesting excellent reproducibility. While correlation between microtip and external water transducers was also high, there were significant differences in the maximum pressures measured by these two systems for individual pressure events. The mean difference between transducer types for the strongest cough efforts was 25cm water, with a maximum difference of 91cm water in one instance. Differences of this magnitude could be clinically significant. Differences were greatest for rapid pressure changes (cough efforts) and appear to increase in proportion to the magnitude of the pressure generated.

Concluding message

The decreased correlation between microtip and external water pressure transducers suggests that these two types of catheters may not be directly comparable and should not be assumed to be identical. Research studies should use a consistent catheter type and not alternate between the two when recording leak point pressures.