

### COMPARISON OF WATER AND AIR-CHARGED TRANSDUCER CATHETERS IN THE EVALUATION OF CYSTOMETROGRAM PRESSURES

Hypothesis / aims of study:

Air-charged (AC) and water-perfused (WP) catheters have been evaluated for differences in measuring pressures for voiding dysfunction. (1) Typically, a two catheter system is used. We believe that a single, dual catheter, and the same experienced clinician throughout the study will provide analogous pressures for coughs and valsalvas in both AC and WP catheters when analyzed during cystometrogram (CMG).

Study design, materials and methods:

The primary objective of this study is to demonstrate the reproducibility of AC versus WP catheters when measuring changes in pressure during coughs and valsalvas in urodynamic studies (UDS).

This IRB approved prospective study included women above the age of 21 with complaints of lower urinary tract symptoms who needed UDS as part of their diagnostic work-up. A commercially available AC catheter was utilized to form a dual catheter to simultaneously read water and air pressures within the bladder 1cm apart . The water-filling channel serves both as a bladder filler and water pressure sensor to an external transducer on a Laborie urodynamic machine. The patient is evaluated with an empty bladder on CMG, followed by cough and valsalva maneuvers at bladder volumes of over 50 mL, 200 mL, and functional maximum capacity. A comparative analysis was performed on the maximum stress peak pressures for valsalvas and coughs.

Results:

Forty women with a mean age of 57 years were recruited. Significant correlations were observed between AC and WP pressures as shown in Figures 1, 2. Trendline equations comparing AC and WP measurements over distinct bladder fill regions for cough and valsalva showed a high correlation (average R<sup>2</sup>=0.91). We did note an average bias (4.7 cmH2O for coughs and 4.1 cmH2O for valsalva) throughout the measurements. Visual impression of the two overlying measurement methods shows virtually identical tracings in figure 3. The voiding pressure portion of the CMG showed high correlation.

Figure 1

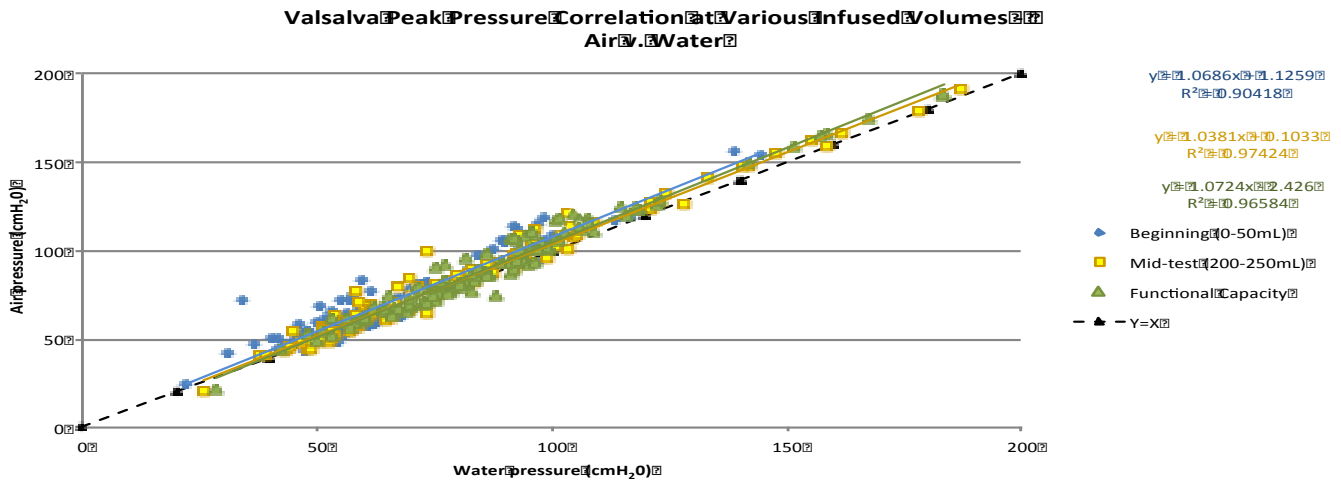


Figure 2

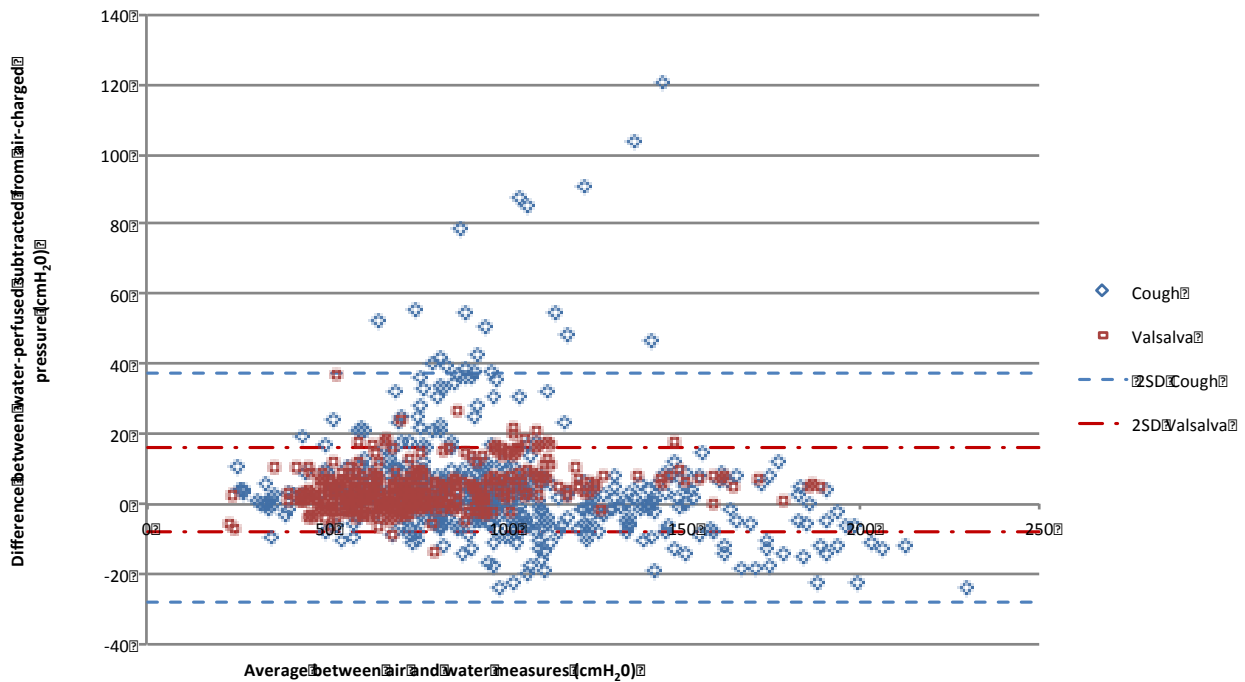
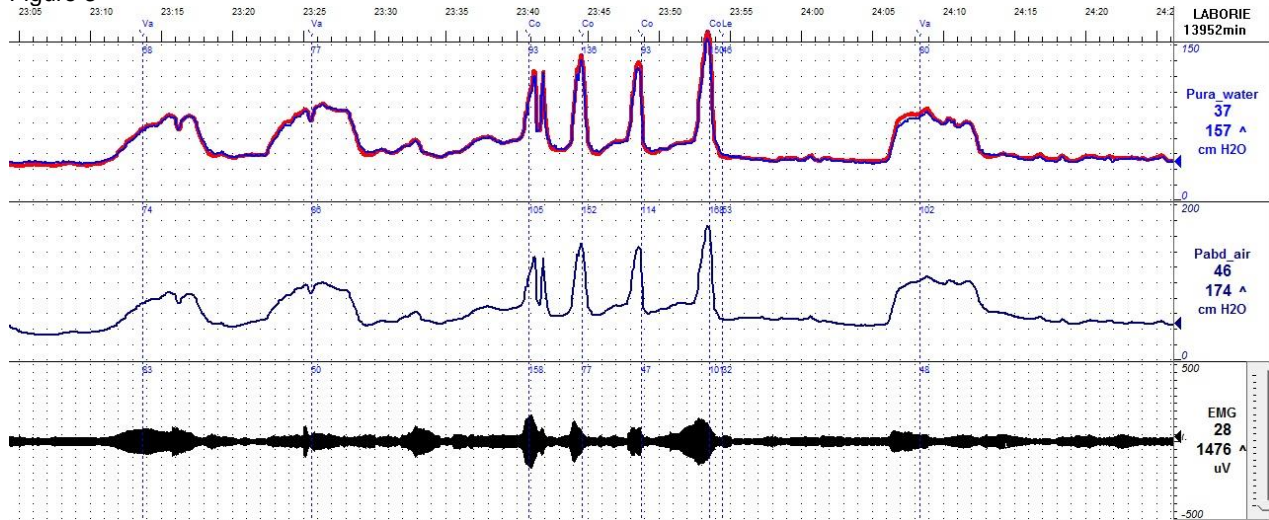


Figure 3



Interpretation of results:

Cystometric pressures measured using air-charged catheters are comparable with water-filled catheters and clinically can be equally beneficial for evaluating coughs and valsalvas. The data points on figure 2 that are outliers are when the bladder was empty as the water pressures were not accurate until >50ml.

Concluding message:

Cystometrogram measurements done with either water ( weighted) or air ( weightless) catheters will yield similarly accurate results. Clinically, the data will be compatible. Results suggest water pressure (WP) catheters are not accurate when the bladder is empty.

Disclosures

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