

# Comparison of Water and Air-charged Transducer Catheters in the Evaluation of Urethral Pressures

Timothy McKinney, Elizabeth Babin, Adele Campbell, Cynthia McKinney, Joseph Glowacki, Nima Shah, Natasha Ginzburg, Ing Goping

## Introduction

The aim of this study is to determine if there is a significant difference between air-charged (AC) and water-perfused (WP) urethral pressure profiles (UPP), namely maximum urethral closure pressures (MUCP) in urodynamic studies (UDS). Although previous studies have investigated the differences between AC and WP catheter, this study introduces a single catheter technique to overcome the limitations of double-catheterization including better patient comfort, decreased alteration of the natural urethral closure mechanism and a lessened risk of catheter cross-talk.

## Materials and Methods

This IRB approved prospective study recruited women above the age of 21 with lower urinary tract symptoms in whom UDS was deemed necessary for diagnostic workup. All UDS were conducted based upon Good Urodynamic Practices set forth by the International Continence Society. A commercially available T-DOC AC catheter was utilized to form a dual catheter via a three-way stopcock to simultaneously read water and air pressures within the bladder and urethra. A transducer evaluates water pressure and sends electrical signals to a Laborie urodynamics machine. The water-filling channel serves both as a bladder filler and water pressure sensor. A minimum of 3 consecutive UPPs were measured at a bladder volume of 200 mL and included in analysis. A comparative analysis was performed to acquire MUCP and maximum urethral pressures (MUP).

## Results

For this series, 25 women with a mean age of 57 years were recruited. Correlations are presented between AC and WP pressures as shown in Figure 1. AC pressures are on average 10.1 cmH<sub>2</sub>O (MUP) and 9.9 cmH<sub>2</sub>O (MUCP) higher than WP. A strong correlation was found between AC and WP pressures for the measures of MUP ( $R^2=0.95$ ) and MUCP ( $R^2=0.96$ ), respectively. A Bland-Altman plot displays the reproducibility of consecutive pull-throughs for MUP while comparing AC and WP, indicating the reproducibility is not significantly different (Figure 2).

**Conclusion:** UPP measured using AC catheters are highly correlated and clinically equivalent to WP catheters. AC produces MUP/MUCP pressures that are on average 10cmH<sub>2</sub>O higher. Subsequent studies will follow.

Figure 1. MUP and MUCP correlation between AC and WP measurements

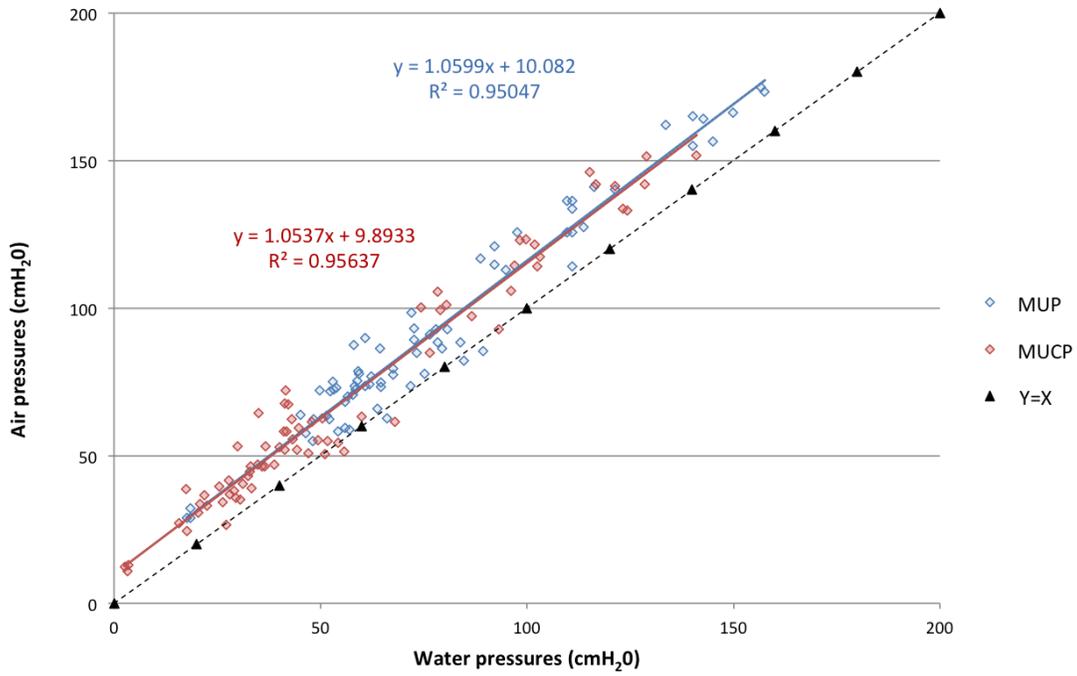


Figure 2. The difference between the MUP of consecutive UPP plotted against the average of the two measures representing comparisons of intra-method (AC & WP) reproducibility.

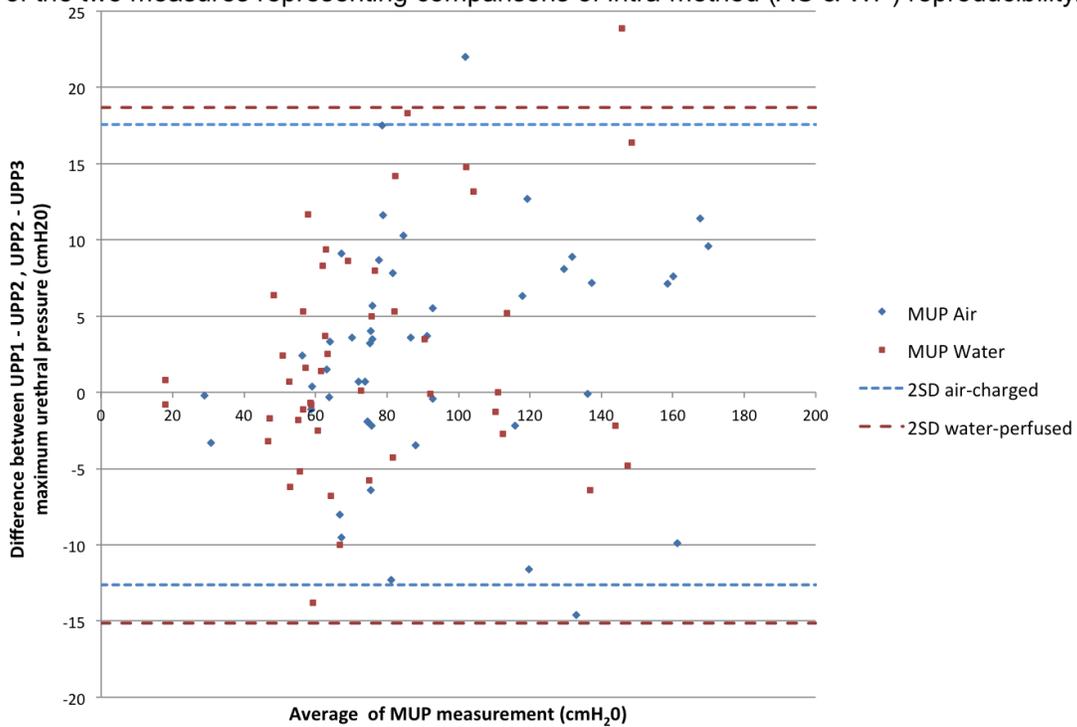


Figure 3. Three urethral pressure profiles performed at a bladder volume of 200mL. The top row contains two tracings representing WP (blue 'Pura\_water' and AC (red 'Pves\_air').

