

A COMPARISON BETWEEN URETHRAL PRESSURE REFLECTOMETRY AND THE PERFUSION TECHNIQUE FOR MEASUREMENT OF MAXIMUM URETHRAL PRESSURE.

Hypothesis / aims of study

Urethral Pressure Reflectometry (UPR) is a novel method for simultaneous measurements of pressure and cross-sectional area (CA) in the urethra. A very thin and collapsible plastic bag is introduced into the urethra. The bag is distended to different predefined pressures with a pump, and the CA is measured simultaneously by acoustic reflectometry (1). The method enables measurement of pressure at a cross-sectional area close to zero. UPR provides new urethral parameters (2). UPR has been validated in vitro and proved to be reliable (1). The aim of the present study was to validate clinical measurement of pressure using the UPR technique by comparing it to the perfusion technique recommended by the ICS as the gold standard (3)

Study design, materials and methods

One hundred and thirteen women (37 healthy, 56 stress-, 12 urge-, and 8 mixed-incontinent) had repeated examinations with the UPP and UPR techniques respectively (2 successive measurements with each technique). The women were examined in the supine position, relaxing and with an empty bladder. The UPP was made with a perfusion catheter Ch 8 (CA = 5.1 mm²), perfused with saline 2 ml/min. The Maximum Urethral Pressure (MUP) of the UPP was compared to the pressure of the high pressure zone of the UPR at an opening of 5.1 mm². Wilcoxon rank sum for unpaired data was used with a significance level of $p < 0.05$.

Results

The mean MUP was 54.0 cmH₂O at UPP and 53.0 cmH₂O at UPR respectively (NS), the variation ("limits of agreement" according to Bland and Altman) between the two methods was 0.9 ± 19.5 cmH₂O (2 SD) (fig. 1). The test re-test variation was 0.2 ± 13.6 cmH₂O for the UPP (fig. 2) and 0.1 ± 8.4 cmH₂O for UPR (fig. 3). The variation of repeated measurements was significantly less with the UPR method ($P < 0.01$).

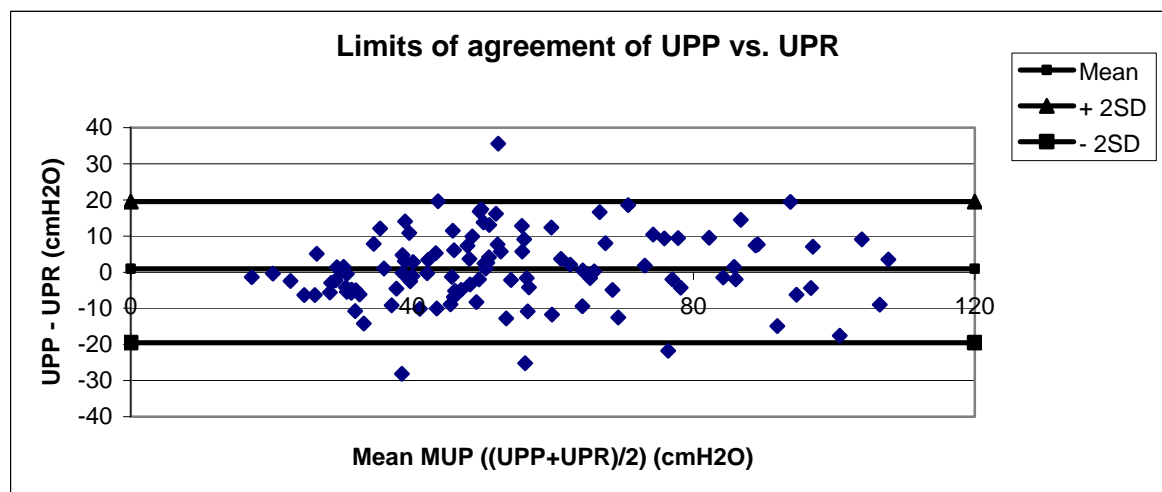


Fig 1. The variation of the Maximum Urethral Pressure (MUP). The difference between UPP and UPR against the mean of 113 measurements.

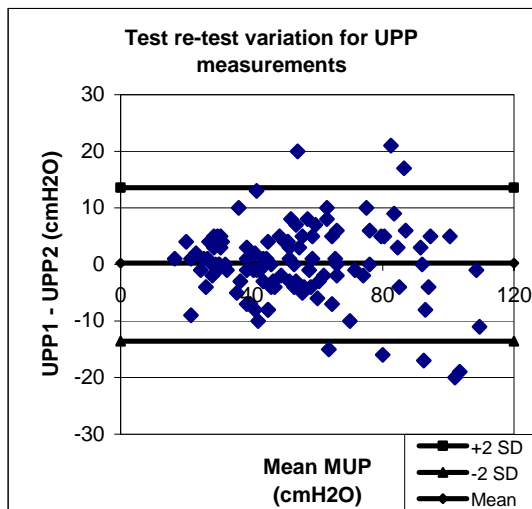


Fig. 2. Urethral Pressure Profilometry (UPP). The difference between repeated measurements against the mean of 113 measurements.

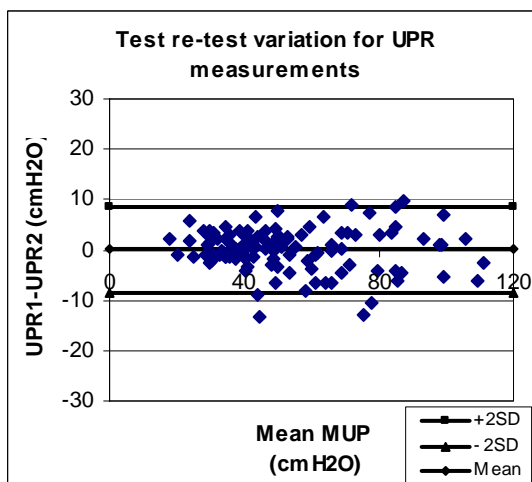


Fig. 3. Urethral Pressure Reflectometry (UPR). The difference between repeated measurements against the mean of 113 measurements.

Interpretation of results

The study shows that the mean maximum urethral pressure in women is identical when measured by UPR and UPP. The variation of repeated measurements is significantly less with the UPR technique than with UPP.

Concluding message

UPR seems to be a reliable method for urethral pressure measurement in women. The technique has the same accuracy as the perfusion technique but the precision (repeatability) is better.

References

- 1) Pressure Reflectometry: In vitro recordings with a new technique for simultaneous measurement of cross-sectional area and pressure in a collapsible tube. *Physiol Meas* 2005; 26:269-280.
- 2) Urethral sphincter properties measured using reflectometry in healthy and stress incontinent women. Poster abstract 326. International Continence society, Paris 2004
- 3) Standardisation of Urethral Pressure Measurement: Report from the Standardisation Sub-Committee of the International Continence Society. *Neurourol Urodyn* 2002; 21:258-260.