

URETHRAL PRESSURE REFLECTOMETRY

A METHOD FOR SIMULTANEOUS MEASUREMENTS OF PRESSURE AND CROSS-SECTIONAL AREA IN THE FEMALE URETHRA

SUMMARY

A novel technique for simultaneous measurements of pressure and cross-sectional area (CA) in the female urethra, denoted Urethral Pressure Reflectometry (UPR), was devised. A very thin and highly flexible polyurethane-bag was placed in the urethra. A pump applied increasing and decreasing pressures to the polyurethane-bag and thereby opened and closed the urethra. Sound waves were continually sent into the polyurethane-bag and the cross-sectional area (CA) of the bag (urethra) could be measured from the reflections with Acoustic Reflectometry. The CA of the bag was measured for each mm of the bag and 10 times per second. The examinations were performed with the women supine relaxing, supine squeezing, and standing relaxing. The examination provided measures of the opening pressure (the pressure exactly needed to open the urethra), the closing pressure (the pressure where the urethra closes again after dilation), the opening elastance (the resistance against dilation), the closing elastance (urethras ability to close again after dilation) and the hysteresis (the energy which dissipates when urethra is dilated). The examination was reliable both in vitro and in vivo. All the UPR parameters except the hysteresis were decreased in stress urinary incontinent (SUI) women compared to continent women. Thus the parameters seem to be relevant regarding SUI. UPR examination was performed before and after urethral bulking and from these examinations a mechanism of action of the bulking procedure was proposed. A randomised, double-blinded placebo-controlled cross-over study demonstrated that UPR is valuable in developing and monitoring pharmacological treatments for SUI. Cases demonstrated that UPR has potential to sub-classify SUI in accordance to the pathophysiology and establish pathological conditions i.e. a stricture.

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