

COMPARISON OF CYSTOMETRICALLY MEASURED BLADDER PRESSURES WITH VOLUME SPECIFIC PRESSURE UNDER RESTING CONDITIONS

Aims of Study

Cystometry is universally used as a clinical tool to characterize voiding dysfunction in order to formulate appropriate management strategies. Bladder compliance is an important estimate of bladder accommodation properties that is often obtained during cystometry. This parameter, however requires an accurate measurement of intravesical pressures without infusion related artifacts. Although ambulatory urodynamics utilizing physiologic filling of the bladder is recommended, it can be time consuming and has its own inherent drawbacks which require careful scrutiny of pressure-volume configurations. A simple method to estimate the filling artifact induced by cystometry is to determine the intra-vesical pressure and bladder volume prior to filling cystometry (physiologic volume specific pressure) and compare this pressure with the pressure generated at the same volume during cystometry (cystometric volume specific pressure).

Methods

With patients in the supine position, a fluid filled catheter was introduced into the bladder. One lumen of the catheter was attached to a transducer to measure bladder pressure and a second lumen was used to fill the bladder. Upon catheter insertion, the physiologic volume specific pressure (PVSP) was determined from the instantaneous intravesical pressure and the corresponding volume of urine drained. Subsequently, slow-fill cystometry (25 ml/min) was performed in all patients. The cystometric volume specific pressure (CVSP) was determined once the bladder volume reached the initial volume that was measured at catheter insertion. Further urodynamic testing was continued to fully characterize the voiding dysfunction of each patient.

Results

Adult male patients with spinal cord injury (n=22) and those with non-neurogenic voiding dysfunction (n=18) were urodynamically evaluated. The mean PVSP was 14.5 cm H₂O (range 4-42 cm H₂O) and mean CVSP was 20.6 cm H₂O (range = 6-70 cmH₂O). CVSP was significantly higher than PVSP in the SCI group. In the non-SCI group, nine patients had involuntary detrusor contractions that occurred prior to reaching the stipulated bladder volume. The remaining patients did not show a significant difference between PVSP (mean = 7 cmH₂O, range = 4 – 23 cmH₂O) and CVSP (mean = 9 cm H₂O, range 4-24 cm H₂O).

Conclusions

This study suggests that significant filling artifact during cystometry, despite slow filling, occurs in patients with upper motor neuron lesions and in those with detrusor instability. Thus, the PVSP could be a useful parameter in assessing bladder accommodative properties. However, in patients with normal bladder activity or underactive detrusors, this difference may not be clinically significant. However, a larger number of patients will need to be studied to support these observations.