

## DO PRESSURE-FLOW PARAMETERS CHANGE WITH RATES OF BLADDER FILLING OR WITH DEGREE OF DESIRE TO VOID?

### Hypothesis / aims of study

Pressure-flow (PQ) studies are generally recommended for accurately characterizing bladder outlet resistance and detrusor contractility in patients with symptomatic complex voiding dysfunctions. Although low rates of bladder filling are typically preferred to simulate physiologically relevant cystometry, it is not clear whether the rate of bladder filling influences PQ parameters, thus impacting the urodynamic diagnoses. Further, whether the degree of desire to void preceding the act of urination has an influence on the P-Q parameters is unresolved. Previous studies have shown that the sequence of events in relation to bladder neck and striated sphincter relaxation during initiation of voiding are different in an urgency type (forestalling) of micturition, compared to a volitional type of micturition (initiation without desire to void)<sup>1</sup>. We therefore hypothesize that pressure-flow parameters generated during slow versus fast bladder filling and with two different types of initiation of micturition (Volitional and Urgency) would be different.

### Study design, materials and methods

We conducted pressure-flow (PQ) studies in adult men with lower urinary tract symptoms (LUTS) in the standing position after a fluoroscopically assisted filling cystometrogram and voiding cystourethrogram in supine position. Patients with spinal cord injury, multiple sclerosis, Parkinson's disease, severe stroke and those with overt neuropathologies were excluded from the study. In the first set of studies with slow and fast filling rates, we used 25 ml/minute and 100 ml/minute, respectively via a 7F dual lumen catheter. In the second set of PQ studies, patients were advised not to initiate voiding despite a strong desire to void; they were asked to prevent urination until they no longer could postpone the act. After they completed their urgency associated micturitional acts, the bladders were emptied followed by refilling and the PQ studies were repeated with instructions to the patients to initiate micturition as soon as they developed a desire to void (volitional act). Differences in pressure-flow parameters including detrusor contractility (Watts Factor), bladder outlet obstruction index (BOOI), detrusor pressure at maximum flow ( $P_{det\ Qmax}$ ), detrusor opening pressure ( $P_{det\ open}$ ), detrusor closing pressure ( $P_{det\ close}$ ) were analyzed.

### Results

The age of the patients ranged from 52 to 86 years. The first set of studies, slow vs fast fill PQ studies, were done in 16 patients and the second set of PQ studies related to urgency and volitional types of voiding were conducted in 18 patients. Increased filling rates did not significantly alter detrusor contractility, although half had lower WF values and five patients had higher WF values compared with low fill rates. No significant changes in BOOI were seen; only two patients showed changes, one from obstructed to equivocal and the other from equivocal to the obstructive category. The opening time ranged from 2.1 to 20s in these first set of patients but there was no significant difference between the slow and fast filling rates. The post-void residual volume (PVR) was elevated after the second PQ study with fast fill in 12 patients with PVR ranging from 110 ml to 250 ml.

In the second set of studies, eighteen patients successfully completed both types of micturition. Among all the PQ parameters,  $P_{det\ open}$  was significantly increased in urgency micturition compared to the volitional micturition. No significant differences were noted with respect to WF and BOOI.

### Interpretation of results

No statistically significant changes in PQ parameters were observed with fast filling (100 ml/minute) of bladder although a tendency for decreased WF and increased PVR was seen with the fast fill study. Similarly, except for increased  $P_{det\ open}$ , no other significant changes in PQ parameters were observed with urgency micturition compared to volitional micturition.

### Concluding message

Our studies in two sets of patient groups showed that the rate of bladder filling up to 100 ml/minute and the nature of the voiding act during PQ studies do not significantly alter clinically relevant parameters such as WF for bladder contractility and BOOI for bladder outlet resistance. These impressions are based on small number of patients and a larger sample is needed to corroborate our observations.

### References

1. J Urol. (1997): 157:590-595.

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<b>What were the subjects in the study?</b>	<b>HUMAN</b>
<b>Was this study approved by an ethics committee?</b>	<b>Yes</b>
<b>Specify Name of Ethics Committee</b>	<b>VA Boston Healthcare System, Research &amp; Development</b>
<b>Was the Declaration of Helsinki followed?</b>	<b>Yes</b>
<b>Was informed consent obtained from the patients?</b>	<b>No</b>