

## 2

Noguchi N<sup>1</sup>, Chan L<sup>2</sup>, Cumming R<sup>3</sup>, Blyth F<sup>1</sup>, Naganathan V<sup>1</sup>

1. Centre for Education and Research on Ageing and Ageing and Alzheimer's Institute, Concord Hospital, University of Sydney, 2. Department of Urology, Concord Hospital, University of Sydney, 3. Centre for Education and Research on Ageing and Ageing and Alzheimer's Institute, Concord Hospital, University of Sydney, School of Public Health, University of Sydney

## NATURAL HISTORY OF POST-VOID RESIDUAL URINE VOLUME (PVR) OVER FIVE YEARS IN COMMUNITY-DWELLING OLDER MEN

### Hypothesis / aims of study

In a random sample of community-dwelling men, it has been shown that an elevated PVR at baseline tend to decrease over time (1). This finding was explained as the phenomenon of regression to the mean (1). It is, therefore, speculated that most cases of elevated PVR may not result in complications such as urinary retention, urinary tract infection or renal impairment. Knowing more about natural history of PVR would help determine if it is safe to leave patients with an elevated PVR untreated on individual basis.

The aim of this study was to describe the natural history of PVR in community-dwelling older men who were neurologically and urologically intact.

### Study design, materials and methods

Our study involves a representative sample of community-dwelling men aged 70 and older in a defined geographic region in metropolitan Australia. A questionnaire survey and a clinical examination were repeated at baseline and two- and five-year follow-up.

At the clinic visit, uroflowmetry was performed using Urolynx 1000 (Medtronic Functional Diagnostics A/S, Skovlunde, Denmark) followed by a measurement of PVR using a portable ultrasound bladder scanner, BladderScan BVI 3000 (Verathon Inc, Bothell, WA, USA).

Men who had neurological diseases or prostate cancer at any follow-up points and men who had urological treatment at baseline were excluded from the analyses.

The incidence of surgical and medical treatment for benign prostate enlargement (BPE) and indwelling catheterization during five-year follow-up was determined by baseline PVR categories.

The change in PVR between baseline and two- and five-year follow-up was described in men who did not receive urological treatment during the follow-up.

The mean ( $\pm$ SD) change in PVR between baseline and five-year follow-up was compared between men with a low baseline maximum urinary flow rate (Q<sub>max</sub>) (<15mL/sec) and men with a normal Q<sub>max</sub> (15mL $\leq$ ) and between men with a low baseline International Prostate Symptom Score (IPSS) (0-7 points) and men with an elevated IPSS (8-35 points).

### Results

Of the 1705 men at baseline, 954 were followed up for five years of whom 526 were neurologically and urologically intact. Each analysis was conducted on a different number of men due to missing and invalid PVR data at the required time points.

The incidence of BPE surgery and indwelling catheterization over five years was analysed in the 330 men with valid baseline PVR data. It was 6 in 184 (3%) in men with a baseline PVR of 0-49mL, 4 in 59 (7%) in men with a PVR of 50-99mL, 1 in 72 (1%) in men with a PVR of 100-199mL, 1 in 11 (9%) in men with a PVR of 200-399mL and 3 in 4 (75%) in men with a PVR of 400mL and over of whom 1 also received indwelling catheterization.

The incidence of receiving medications for BPE over five years was 11 in 184 (6%) in men with a baseline PVR of 0-49mL, 5 in 59 (8%) in men with a PVR of 50-99mL, 9 in 72 (13%) in men with a PVR of 100-199mL and 0 in men with a PVR of 200-399mL and 400mL and over. None of the patients received both surgical and medical treatment for BPE.

Further excluding men without a valid PVR at two- or five-year follow-up and men who received urological treatment during five-year follow-up, the natural history of PVR was described in the remaining 102 men. Shifts towards lower PVR categories were commonly observed. None of the 101 men with a PVR of less than 400mL at baseline had a PVR of 400mL and over at either two- or five-year follow-up.

The change in PVR by baseline Q<sub>max</sub> and by baseline IPSS was analysed in the 146 men with PVR data at baseline and five-year follow-up.

In men with a baseline PVR of 0-99mL, the mean ( $\pm$ SD) change in PVR over five years was 32.5 $\pm$ 69.8 mL in men with a low baseline Q<sub>max</sub> and 29.4 $\pm$ 63.9 mL in men with a normal Q<sub>max</sub> (p=0.81). In men with a baseline PVR of 100mL and over, it was -23.6 $\pm$ 93.8 mL in men with a low Q<sub>max</sub> and -25.2 $\pm$ 51.2 mL in men with a normal Q<sub>max</sub> (p=0.95).

In men with a baseline PVR of 0-99mL, the mean ( $\pm$ SD) change in PVR over five years was 28.0 $\pm$ 65.3 mL in men with a low baseline IPSS and 36.7 $\pm$ 57.6 mL in men with an elevated IPSS ( $p=0.56$ ). In men with a baseline PVR of 100mL and over, it was -23.3 $\pm$ 81.5 mL in men with a low IPSS and -24.6 $\pm$ 67.5 mL in men with an elevated IPSS ( $p=0.96$ ).

#### Interpretation of results

Moderately elevated PVR of less than 400mL in older men did not increase over time and only a minority needed intervention over five years. Very high PVR of 400mL and over either resulted in intervention or remained high. Neither baseline Qmax nor IPSS was predictive of the change in PVR.

#### Concluding message

Conservative management may be appropriate for most older men with moderately elevated PVR of less than 400mL.

#### References

1. Rule AD, Jacobson DJ, McGree ME, Girman CJ, Lieber MM, Jacobsen SJ. Longitudinal changes in post-void residual and voided volume among community dwelling men. J Urol 2005;174(4): 1317-1321.

#### Disclosures

**Funding:** This work was supported by the Australian National Health and Medical Research Council (NHMRC Project Grant number 301916); the Ageing and Alzheimer's Institute; and Sydney Medical School Foundation. **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Concord Hospital Human Research Ethics Committee **Helsinki:** Yes **Informed Consent:** Yes