Early and late outcomes of transurethral prostatectomy in men with significant postvoid residual volumes and mild or no lower urinary tract symptoms

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INTRODUCTION

Non-neurogenic chronic urinary retention is defined as a postvoid residual (PVR) >300 mL that persists on two measurements for at least 6 months.[1] When patients have hydronephrosis, acute kidney injury, chronic urinary tract infections (UTIs), urinary incontinence, or symptomatic retention, active management with surgical intervention or intermittent catheterisation is appropriate.[2] However, the most challenging patients are those with elevated postvoid residual volumes (often discovered incidentally) who experience no or mild urinary symptoms. The American Urology Association whitepaper suggests that these patients undergo no treatment, due to lack of knowledge about effectiveness of interventions at reducing future complications.[1] Interventions such as intermittent catheterization can cause urinary tract infections, urethral trauma and reduce a persons quality of life[3], and transurethral prostatectomy (TURP) is associated with defined complications such as stricture and incontinence.[4] However, it is also possible that reducing any degree of outlet obstruction will help prevent progression to complications,[5] or "high risk"[1] chronic urinary retention. Our objective was to examine the outcomes of men with elevated PVRs and mild or no lower urinary tract symptoms (LUTS) who after shared decision making elected to undergo a TURP.

METHODS

This is a retrospective case-series study. We used electronic office billing records to identify all men who underwent a TURP by a single urologist between 2011-2020. Our inclusion criteria were: men with at least two consecutive documented elevated PVRs (defined as >500 ml on bladder scan or catheterization) who were voiding spontaneously and did not have neurologic disease; mild or no LUTS (international prostate symptom score (IPSS) <8)[6]; no

evidence of obstructive uropathy (based on serum creatinine or hydronephrosis); no prior prostate surgery, and finally, no significant history of overflow incontinence or urinary infections. All patients had their elevated PVR's discovered incidentally. We created an electronic data extraction template, and used all available clinical records to ensure maximal data accuracy. PVR and maximal flow rate (Qmax) based on noninvasive uroflowmetry voided volume >150mL were reviewed. The study was approved by the Western University ethics committee (120709).

Statistical analysis

Continuous variables are presented as median and interquartile range (IQR). Categorical variables are presented as number (%). Continuous parameters were compared by Wilcoxon's signed-rank test for paired data. All statistical analyses were 2-sided, and significance was defined as $p<0.05$. R Statistical Software (version 3.5.1; R Foundation for Statistical Computing, Vienna, Austria) was used.

RESULTS

We identified 14 men who met our inclusion criteria. The median age at TURP was 65 (IQR 61-70). Preoperatively, median Qmax was 8 ml/sec (IQR 6-13) and PVR was 820 ml (IQR 691-985). The median IPSS prior to surgery was 5 (IQR 4-7). Sonographic evaluation of the pre-TURP prostates demonstrated a median volume of 38 (IQR 29-46) mL. Five men underwent urodynamic studies (UDS) before surgery and had a median bladder outlet obstruction index (BOOI) of 56 (IQR 50-74), with all results in the obstructed range.[7] The median bladder volume at permission to void during these UDS was 960 ml (IQR 700-1350). There were no postoperative Clavien-Dindo complications ≥3, median weight of prostate tissue removed was 8.3 (IQR 6.2-11) grams, and duration of postoperative catheterisation was <5 days for all men.

At the first postoperative follow-up (4-8 weeks after surgery) the PVR was significantly lower and the Qmax was significantly higher (table 1). Patients had a median postoperative follow-up period of 3.5 (IQR 2-7) years, and at the patient's final follow-up, the PVR continued to be significantly lower compared to the preoperative measurement (table 1), and only one man had a PVR higher than his preoperative value (by 30 mL). Similar improvements were seen in the men with confirmed BOO on UDS (table 1). No one needed to use catheters throughout the follow-up period, and there were no bladder neck contractures or evidence of upper tract deterioration or obstructive uropathy.

DISCUSSION

This small pilot study demonstrates that men with mild urinary symptoms and elevated PVRs experienced numerical improvement in their PVRs and Qmax after TURP, and this benefit appears to be sustained over a median of 3 years. This study supports the concept that first, TURP is safe in these patients, and second that it may prevent deterioration in bladder function in the future. It is important to note that this was a carefully selected group of men who participated in shared decision making and were motivated to try and avoid catheter use in the future.

The natural history of chronic urinary retention is not well understood. Several studies suggest that men with high PVRs and "high pressure" chronic urinary retention (characterized by hydronephrosis) or severe LUTS may be more likely to benefit from a TURP.[8,9] Authors have argued that conservative management of large PVRs is appropriate, however almost a quarter of men progress and need intervention.[10] It is unclear what proportion of men with BPH go on to develop an acontractile detrusor muscle and require CIC, and if the natural history of their bladder dysfunction could have been altered with earlier intervention. If we accept PVR as a surrogate marker of detrusor function which may end in an acontractile bladder, then our results would suggest that TURP may reduce this risk. Our cohort of patients represents only a small subset of men with elevated PVRs, but we believe our data will help the urologist in decision-making and patient counselling when encountering this clinical scenario.

Our study limitations include the small sample size, which limited our ability to further analyse subgroups. Our inclusion criteria mean that these results are not generalizable to all men with a large PVR. Finally, there is no comparison group, and it is possible that with conservative management these men would not have developed any further urinary dysfunction with time.

CONCLUSIONS

In conclusion, in our small cohort of selected men with elevated PVRs and mild or no LUTS, TURP improved PVRs and Qmax postoperatively, and this improvement was maintained during a median followup of over three years.

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FIGURES AND TABLES

Table 1. Pre- and post-TURP PVRs and Qmax

	Preoperative		Postoperative followup at 4–8 weeks		Final postoperative followup (median 3.5 years)	
	Qmax (mL/sec)	**PVR (mL)**	**Qmax (mL/sec)**	**PVR (mL)**	**Qmax (mL/sec)**	**PVR (mL)**
All men (n=14)	8 (IQR 6–13)	820 (IQR 691–985)	17 (IQR 7–18)*	143 (IQR 60–430)*	14 (IQR 6–17)*	337 (IQR 5–550)*
Men with UDS confirmed BOO (n=5)	8.5 (IQR 6–17)	849 (IQR 600–990)	17 (IQR 10–17)*	333 (IQR 40–430)*	15 (IQR 6–16)*	300 (IQR 25–760)*

*p<0.01 compared to preoperative value. BOO: bladder outlet obstruction; IQR: interquartile range; PVR: postvoid residual; Qmax: maximal flow rate; TURP: transurethral resection of the prostate; UDS: urodynamic study.