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Trends in the Surgical Treatment of Benign Prostatic Hyperplasia in a Tertiary Hospital

Trends in the Surgical Treatment of Benign Prostatic Hyperplasia in a Tertiary Hospital

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ABSTRACT

Objective

To assess current treatment trends and peri-operative outcomes of Transurethral resection of the prostate (TURP) and Photoselective vaporization of the prostate (PVP) in a tertiary institution.

Patients and Methods

We prospectively collected a database of all patients undergoing TURP and PVP for Benign Prostatic Hyperplasia (BPH) at a tertiary hospital between January 2011 and December 2013. Patient characteristics such as length of stay, readmission, anticoagulation status, ASA score and need for blood transfusion were recorded and analysed.

Results

In total, 560 cases were included: 204 (36.4%) underwent TURP and 356 (63.6%) PVP. Patients undergoing PVP had higher ASA scores ($p<0.001$) and were more frequently on continuing anticoagulant therapy ($p<0.001$). With regards to non-aspirin/asasantin coagulation therapy, 61 (17.1%) patients underwent PVP with their anticoagulants continued while no patients who received TURP continued anticoagulation. Blood transfusion percentages were similar at 1.0% for TURP and 1.7% for PVP but readmission proportions were higher after PVP (32 patients, 9.0%)

compared to TURP (10 patients, 4.9%). These differences were attenuated when excluding patients continuing anticoagulation during the procedure.

Conclusion

At our institution, the use of PVP has been increasing on a year-by-year basis. The results of the current study demonstrated that PVP is safe in patients with increased anaesthetic risk or on active anticoagulation when compared to traditional TURP. While this makes PVP an attractive alternative to TURP in high-risk anticoagulated patients, these patients may have complex post-discharge issues that should be addressed during the informed consent process.

INTRODUCTION

Benign prostatic hyperplasia (BPH) is a common condition that frequently results in lower urinary tract symptoms (LUTS) in men (1). Recent pharmacology advances (2) and the introduction of minimally invasive treatment options (3) have resulted in a delay in definitive surgical management of BPH. The consequences of the increased utilisation of medical therapy being that when they fail, such patients are more likely to be older and have a higher comorbidity status when surgery is required (4, 5).

Despite pharmacological and minimally-invasive strategies, surgical intervention remains the most effective treatment strategy (6, 7). Surgical interventions typically result in the enucleation of the prostate, by means of open or endoscopic access. Traditionally, transurethral resection of the prostate (TURP) has been considered the gold-standard due to excellent urinary outcomes and relatively limited morbidity compared to open prostatectomy. Despite being the benchmark for BPH treatment, TURP possesses the significant potential for peri-operative problems such as bleeding and clot retention. Such risks have prompted various new surgical methods for BPH, with the objectives of relieving bladder outlet obstruction and to minimise morbidity and length of stay.

GreenLight Laser Photovaporisation of prostate (PVP) is an alternative endourological surgical procedure for BPH that vaporises prostatic tissue. PVP has been demonstrated in some studies to be successful in patients on long-term

anticoagulation (8). The 80-W potassium titanyl phosphate (KTP) laser was the first generation of PVP introduced in 1998 (9) which subsequently advanced to the more high powered 120-W laser in 2006 and to the now standard 180-W (XPS greenlight, American Medical systems USA) in 2010 (10). Higher power allows for more efficient vaporising of tissue with reduced lasing time. The introduction of laser prostatectomy or photoselective vaporisation of the prostate (PVP) has resulted in a change of practice in BPH management (5, 11). However, to date, no single definitive technique has emerged irrespective of TURP energy (monopolar or bipolar) or laser vaporisation or enucleation.

We aimed to determine the current treatment trends of TURP and PVP at a tertiary institution. Further, we aimed to assess the patient demographics, health status and resulting perioperative outcomes following the administration of each treatment option.

PATIENTS AND METHODS

Study population

Following institutional ethics approval, patient data was prospectively collected in an institutional database at the Austin Hospital, Heidelberg, Victoria, Australia from January 2011 until December 2013. All patients undergoing either a TURP or PVP procedure within the institution were recorded and there were no exclusions. These procedures were performed by a group of experienced surgeons.

Patients' peri-operative characteristics including age, anticoagulation status, length of inpatient stay (LOS), readmission and need for blood transfusion were collected. Patients were assessed by an anaesthetist and scored accordingly using the American Society of Anaethesiologists (ASA) score (12). We considered an ASA score of III or IV to be classified as high risk. Patients on oral anticoagulation and/or antiplatelet therapy were reviewed by an anaesthetist and discussed with cardiologists. The coagulation status of the patient at the time of surgery was coded as: ceased, continuing on aspirin or asasantin, continuing, or bridged with clexane. Patients readmitted within three months after the procedure were identified and recorded.

Description of Technique

TURP was performed by several surgeons and senior trainees and thus precise procedural details was performed at the respective surgeons' discretion. Monopolar TURP (Storz, Tuttlingen, Germany) was performed with a 23Fr resectoscope through a 24Fr rigid cystoscope under glycine irrigation. There was no time limitation for each procedure performed.

As with TURP, PVP was performed by multiple surgeons and trainees and procedures were performed at the surgeon's discretion. PVP was performed with 120-W GreenLight HPS side-firing laser (Boston Scientific, Marlborough, MA, USA) using 23Fr rigid cystoscope with isotonic sodium chloride solution as irrigation.

Routine post-operative management of catheterisation and bladder irrigation were followed. Indwelling catheters were removed post resolution of haematuria without continuous bladder irrigation for more than 24 hours.

Statistical analysis

Comparisons between the modalities for continuous variables were assessed with the non-parametric Wilcoxon rank-sum test due to expected significant deviations from normality confirmed by the skewness and kurtosis test. Categorical variables were compared with the chi-square or Fisher's exact test where appropriate. Statistical significance was set at $p<0.05$ and all tests were two sided. Statistical analysis was performed using Stata v12.0 SE (College Station, TX).

RESULTS

A total of 560 procedures were performed during the study period. 204 patients (36.4%) underwent TURP procedure while 356 patients (63.6%) underwent PVP. Five patients were converted from PVP to TURP during the operation due to a highly vascularised prostate. These converted cases were categorised as PVP as this was the surgeon's intention when treatment modality was decided. Median ages for both TURP (range 48 - 87 years) and PVP (range 51 - 91 years) were identical at

72 years. Patients' peri-operative characteristics and outcomes for both procedures are summarised in Table 1.

Both the absolute number and proportion of BPH cases treated by TURP declined year-on-year over the study period, from 52.0% of cases in 2011 to 23.6% in 2013.

Forty-two patients (7.5%) were readmitted and while a difference was seen between the modalities (PVP n=32, 9.0%; TURP n=10, 4.9%) this did not reach statistical significance (p=0.077). Upon comparing high risk patients (ASA III and IV), there were no significant differences in readmission rates (10.3% vs. 7.9%, p=0.8). PVP patients were observed to have a higher ASA score (p<0.001) with 54.5% assessed as high risk (ASA III/IV) compared to 30.9% of TURP patients. Eight patients required a blood transfusion (PVP n=6, 1.7%; TURP n=2, 1.0%).

Of the total PVP cases, 61 patients (17.2%) were on continuous oral anticoagulants while undergoing the procedure compared to zero TURP patients. Out of these 61 patients, nine (14.8%) were readmitted and four (6.6%) received a blood transfusion (Table 2). The five converted cases were not on oral anticoagulant and/or antiplatelet therapy and did not require readmission or blood transfusion.

When excluding patients continuing on non-aspirin/asasantin anticoagulation, the readmission proportion fell for PVP to 7.8% vs. 4.9% for TURP (p=0.20) as did the transfusion proportion (0.7% vs. 1.0%, p=0.7).

DISCUSSION

Prior to the introduction of medical treatment for BPH, men were treated surgically at a younger age and with fewer co-morbidities (13). In contemporary practice, medical therapy represents the first line treatment option due to improved tolerability and acceptable symptom control (14). As such, the need for surgical intervention had been delayed for many patients (4). The findings of the current study highlight the increased use of PVP, the safety and feasibility of PVP in higher risk patients and in patients on anti-coagulation therapy.

In our institution, there were more PVP procedures performed than TURP procedures during the study period and the proportion of these increased year-on-year. This highlights the growing acceptance and familiarity with the procedure among surgeons at our institution. Such practice and attitude shifts are in-line with international reports. Lee et al interviewed 600 urologists and demonstrated that laser technologies for the treatment of BPH was increasing, particularly for high-volume surgeons (11). Hueber et al published registry-based data in 2013 and reported an increasing proportion of laser transurethral procedures from 3.78% in 2007 to 7.56% in 2011 (15). The precise cause of the rapid uptake in PVP is unclear, but is likely multifactorial. Specifically, this may be a result of increased awareness, a relatively short learning curve and improved peri-operative profile (16-18).

In the current management of patients with BPH, surgically treated patients are more likely to be older and harbour higher rates of medical comorbidities (19). At our institution, PVP has provided the possibility to offer these high-risk patients with BPH a surgical option due to previous reports of improved post-operative morbidity profiles compared to traditional TURP (8, 20). In our series, the majority of PVP patients were of higher anaesthetic risk (ASA III/IV) compared to the majority of TURP patients who were ASA I/II. Despite this significant variation in patient cohorts, our study showed only a slightly higher absolute readmission percentage in PVP cases compared to TURP cases though this difference did not reach statistical significance. Comparative data reporting similar outcomes in high-risk individuals in current literature is sparse. Despite this, multiple series report equivocal rates of peri-operative morbidity between TURP and PVP without accounting for increased anaesthetic risk or medical comorbidities (6, 21). Similarly, Rambachan et al. reported that the risk of readmission for both procedures did not differ (Laser prostatectomy 4.27% vs TURP 4.24%) (22).

The findings of the current study highlight the safe use of PVP during periods of active anti-coagulation in high-risk individuals. Intuitively, performing surgery while being on continuous oral anticoagulation carries a risk of major bleeding and death(5, 23). However, withdrawing oral anticoagulants in high-risk patients may lead to a hypercoagulable state and thromboembolic complications such as deep vein thrombosis (24). Therefore, the risk of bleeding should be weighed against stopping oral anticoagulants prior to surgery. In our cohort, 17.1% of patients

undergoing PVP were on active anticoagulation. It should be noted, that five patients undergoing PVP experienced significant bleeding and required conversion to TURP, of which none were on anticoagulant therapy. The reasoning for this is likely multifactorial. Firstly, the timing of the data collection included the early learning curve for PVP of several operators. Indeed, in the presence of significant bleeding, it is likely that conversion to TURP was performed due to previous familiarity and experience with TURP technologies. Further, in the systems utilized in our institution, PVP and TURP utilize a 23Fr and 26Fr cystoscope respectively. The larger bore cystoscope improves irrigation and vision and resulting the ease at which bleeding may be controlled endoscopically.

Nevertheless, PVP has been demonstrated to be safely performed on patients taking long-term oral anticoagulation without cessation of medication (25-27). Several studies have established a low incidence of intra and post-operative bleeding despite active anticoagulation (4, 28). However, there are no recommended guidelines on ceasing, bridging or continuing oral anticoagulation when performing PVP or other laser prostatectomies (5). Further, despite increased active anticoagulation during PVP, the percentage of patients requiring a blood transfusion in our series was low (1.7%) and was comparable between PVP and TURP. These findings are corroborated by similar series demonstrating that when PVP was performed with ongoing oral anticoagulant or anti-platelet therapy, risk of transfusion was minimal (4, 5, 28-30). Conversely, several contemporary series demonstrated that TURP carried a higher risk of post-operative bleeding and transfusion rate of 2-

7%. Post-operative complications such as blood transfusion and clot retention were significantly less likely with PVP while no difference was noted in other complications (31, 32).

There are several limitations to this study. First, this study focused on peri-operative and short term morbidity but not symptomatic improvement. Secondly, this was not a randomised study and surgeon preferences may have played a part in the selection of treatment modality as evidenced by the dissimilar patient profiles of the two treatments. While such study methodology increases the risk of various biases, the authors believe that the current series is reflective of contemporary clinical practice and thus is increasingly generalizable to similar tertiary institutions. However, this has allowed us to demonstrate that surgeons are conscious of the different and perhaps better peri-operative outcomes from the PVP procedure over TURP. Preoperative prostate volume size was not assessed and therefore may create a potential bias in terms of operating time and patient selection (although typically larger prostates undergo PVP at this institution). Other limitations also included a potential for patients being readmitted to other hospitals within the 90-day period and therefore not recorded, however all patients were followed for up to six months and this data would have likely been collected.

CONCLUSION

At our institution, the use of PVP has been increasing on a year-by-year basis. The results of the current study demonstrated that PVP is safe in patients of increased anaesthetic risk or on active anticoagulation when compared to TURP. While this makes PVP an attractive alternative to TURP in high-risk anticoagulated patients, these patients may have complex post-discharge issues that should be addressed during the informed consent process. As such, PVP is a valuable option in these patients particularly if symptomatic relief and re-treatment rates on two-year follow up are shown to be equivalent.

CONFLICTS OF INTEREST (FINANCIAL/INSTITUTION)

None to declare

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