TURP in the new century: an analytical reappraisal in light of lasers

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I gladly accepted the invitation to argue for transurethral resection of the prostate (TURP) in the surgical treatment of benign prostatic hyperplasia (BPH), although I am a young urologist with an inherent bias towards technology and innovation. I am also capable of performing a Holmium laser enucleation of the prostate (HoLEP).[1] Among the various minimally invasive surgical therapies (MIST), laser therapies (for resection or vaporization of the prostate) seem to be the most promising. Similar to robotic surgery,[2] lasers also are attractive to patients and surgeons. How much of this attention is hype versus reality? Let us review the best available evidence from randomized controlled trials (RCTs).

The merits of TURP

TURP to treat BPH has been the gold standard for decades. It is still considered the standard by the CUA,[3] and as the "benchmark for surgical therapies" by the American Urological Association.[4] Moreover, the European Urological Association considers TURP "the treatment of choice for prostates sized 30 to 80mL."[5]

TURP has been demonstrated to be efficient, cost-effective and, most importantly, durable with low long-term complications and re-treatment rates.[6-9] The seminal multicentre randomized trial comparing TURP with watchful waiting demonstrated a 52% reduction in treatment failure in TURP, a 1% risk of urinary incontinence similar in the watchful waiting group, and an overall decline in sexual function identical to the watchful waiting group.[7] More recently, Reich and colleagues published a contemporary prospective evaluation of 10 654 patients who underwent TURP statewide.[8] The mortality rate was 0.10% and the cumulative short-term morbidity rate was 11.1%; both rates continuously declined compared to a previous classical study by Mobust and colleagues of 3885 patients.[6] Complications of TURP include failure to void (4.5% to 5.8%), surgical revision (1.1% to 5.6%), urinary tract infection (3.6% to 4.2%), bleeding which requires transfusions (2.0% to 2.9%) and TUR syndrome (0.8% to 1.4%).[8,10]

The wide acceptance of medical treatment has significantly decreased the use of TURP in Canada[11] and worldwide. In the United States, the advent of a multitude of expensive office-based or outpatient MIST has further contributed to the decrease of TURP, which represented 39% of total BPH surgeries in 2005.[12] TURP still comprises 95% of all surgical procedures in Europe,[5] and in countries with universal health-care systems, such as Canada.

In parallel to MIST, TURP has evolved quietly and has become a safer operation, while maintaining its excellent efficacy. Preoperative treatment with 5-alpha reductase inhibitors appears to reduce intraoperative bleeding; appropriate prophylactic antibiotic regimens reduce postoperative infection rates; improved instrumentation and, most importantly, diathermy delivery can reduce TUR syndrome, catheter time and length of hospital stay.[13]

Bipolar TURP

Bipolar TURP (B-TURP) is one of the most recent advances in TUR surgery. B-TURP has an improved safety profile compared with monopolar TURP (M-TURP). Mamoulakis and colleagues, in their detailed meta-analysis of 16 RCTs (1406 patients), compared B-TURP and M-TURP. They found that B-TURP, while maintaining comparable efficacy (short-term data <12 months), resulted in a 2% decreased risk of TUR syndrome and a 5% risk reduction of clot retention. Furthermore, irrigation and catheterization duration were significantly shorter with B-TURP, on average 8.75 hours and 21.77 hours, respectively. Operation times, transfusion rates, retention rates after catheter removal and urethral complications were not significantly different.[14] Another meta-analysis of data from 10 RCTs compared B-TURP and M-TURP (890 patients).[10] This study showed less frequent complications and overall morbidity for B-TURP. None of the 10 trials mentioned TUR syndrome as an adverse event of B-TURP. Perioperative complications (acute urinary retention, clot retention and urinary tract infection) were significantly less common in B-TURP (12% vs. 18%), as well as late complications (bladder neck stenosis, urethral stricture, reintervention) (3.5% vs. 10.5%).[10]

In summary, TURP and its modifications offer well-documented long-term data of efficacy and safety in surgical

treatment for BPH. Emerging laser treatments that deserve consideration in this debate are HoLEP and photoselective laser vaporization of the prostate (PVP).

HoLEP

There are 4 RCTs comparing HoLEP and TURP.[15-18] The mean follow-up ranged from 1 to 3 years. HoLEP demonstrated equal efficacy compared to TURP in short- and medium-term follow-up (International Prostate Symptom Score [IPSS] and quality of life score [QOL], and maximum flow rate [Qmax]) owing to similar resected adenoma tissue-weights. However, HoLEP operating room times were significantly longer in all trials by an average of 26 minutes, 27 minutes, 13 minutes, and 29 minutes, respectively;[15-18] it was almost double the time of TURP in 1 trial.[15] Catheter duration, hospital-stay and blood loss were in favour of HoLEP.[10,19] However there were no differences in blood transfusions, urethral stricture, stress urinary incontinence and reintervention rates in 1 meta-analysis.[19] Urgency symptoms were more pronounced after HoLEP compared to TURP in another meta-analysis (5.6 vs. 2.2%).[10] Bladder injury during morcellation and postponed morcellation due to equipment failure are reported complications with HoLEP. Overall, there were no significant differences in overall morbidity.[10]

The learning curve with HoLEP is a big issue and a formidable challenge, for some. We estimated the learning curve between 20 and 30 cases, after watching a priori an average of 20 cases, and being proficient in TURP (another 20 to 30 cases).[1] Shah and colleagues described the learning curve of an experienced endourologist. A plateau was reached only after 50 cases.[20] Consider this for a moment: how many residents in a particular program are we able to teach at this rate? And how many practicing urologists are willing to dedicate enough time and effort to learn HoLEP?

Cost is another issue. HoLEP requires a 100-W laser; I suspect most hospitals have a lower power laser for stone surgery. There is also the added cost of the fibres and morcellator.

Conceptually, HoLEP is a sound technique and offers significant advantages for larger glands obviating the need for simple open prostatectomy.[21,22] But this is another debate; in my opinion HoLEP is more advantageous for large glands compared to open prostatectomy. HoLEP has been around for more than 13 years, but has not been embraced by mainstream urology beyond a select group of urologists worldwide.

Photoselective laser vaporization of the prostate

PVP uses 532-nm lasers (80-W potassium-titany-phospahte [KTP], GreenLight, AMS, Minnetonka, MN) or 120-W lithium borate (LBO) to create a TURP-like channel. It was initially proposed as an alternative to TURP in anticoagulated patients. One inherent limitation of PVP is the absence of tissue diagnosis.

There are 2 RCTs comparing PVP to TURP.[23,24] Follow-up data is very limited. Both studies showed an advantage for PVP in duration of catheter and hospital stay. While the study by Bouchier-Hayes and colleagues[23] demonstrated non-significant differences in terms of efficacy with a 12-month follow-up, Horsanti and colleagues showed that measurements of efficacy (IPSS, Qmax and post-void residual) were all significantly inferior in PVP, even with shorter follow-up.[24] Operating room times were also significantly longer for the PVP (87 vs. 51 minutes). Of note, transrectal ultrasound volumes were 70 to 100 mL in this study.[24] The percentage volume reduction was also significantly lower in PVP group. Reoperation was necessary in 7 of 39 patients in PVP, but none in the TURP group. The authors concluded that intraoperative and perioperative safety and early functional results of TURP are superior to PVP in patients with prostates larger than 70 mL.[24] A meta-analysis showed increased postoperative urinary tract infections compared to M-TURP and B-TURP (12% vs. 4.1 vs. 2.6%), and increased dysuria (8.5% vs. 0.8% vs. 0%, respectively).[10]

Another RCT compared PVP and open prostatectomy in large glands (average 93 vs. 96 mL). Operating room times were significantly longer for PVP (80 vs. 50 minutes). At the 18-month follow-up, data showed similar Qmax and IPSS scores, but inferior QOL scores. In addition, at 3 months, residual prostate volume was significantly lower in the open prostatectomy group and remained as such throughout follow-up.[25]

As opposed to HoLEP, the learning curve of PVP is felt to be shorter.[26] It is estimated around 5 cases in TURP-experienced surgeons.[27]

Cost is more of an issue with PVP. Lasers are sold at over $100K and fibres are disposable. There are no other usages for this equipment, unlike with the Holmium laser. Furthermore, this technology is constantly changing and there are different lasers and powers on the market quite frequently.

Gupta and colleagues concluded that lasers are superfluous in the surgical management of BPH, particularly in developing countries. They argue that their cost, unproven long-term durability, steep learning curve and lack of advantages over TURP make them unreasonable for BPH.[28]

In summary, PVP efficacy data suffers from short follow-up. PVP is significantly longer and seems to be less effective for larger prostates as compared to TURP. The reoperation rates are also high.

Conclusion

TURP is still alive and well in 2010, despite Stamey's affirmation in 1993 that "TURP is now a therapy of history."[29] TURP has taken on many challenges, but still remains the gold standard to which others are compared.[30]

TURP is adequate for its intended use; TURP outcomes depend on surgeons' experience, the patient's gland size and comorbidities. Therefore, in appropriately selected patients TURP has an unsurpassed tract record of durability.

TURP is one of the basic endoscopic procedures that urology residents learn and is also one of the bread-and-butter operations most urologists perform. The equipment is available in virtually all hospitals. On a personal note, in my practice I perform TURP for "TURPable" prostates and HoLEP for larger prostates.

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