ORIGINAL ARTICLE

Bipolar enucleation of the prostate with the TUEB electrode loop: experience of 20 cases with this surgical technique

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KEYWORDS
Enucleation of the prostate; TUEB; Bipolar energy

Abstract

Background: Lower urinary tract symptomatology secondary to benign prostatic hyperplasia is one of the most common pathologies in men, and transurethral resection of the prostate is the technique of choice for its surgical management. However, in the last few years new technology and techniques have been developed, such as Holmium laser enucleation of the prostate (HoLEP), that have had good functional results and less comorbidity. Transurethral enucleation of the prostate with bipolar energy (TUEB) is a novel technique that has also shown adequate results.

Aims: To describe the experience of the first 20 cases of patients that underwent enucleation of the prostate with bipolar energy.

Methods: Twenty patients were selected that presented with severe lower urinary tract symptoms, despite medical treatment with alpha blockers, and that had prostate volumes ranging from 50-80 cc and adenomas from 30-50 cc. Bipolar electrosurgical equipment with 120 W coagulation energy and 220 W cutting energy was placed over a 26 Fr continuous flow resectoscope (Olympus®); irrigation was carried out with saline solution and a morcellation unit connected to a suction pump was used for extracting the enucleated tissue.

Results: Mean surgery duration was 102 min and mean enucleation time was 41.2 min. The quantity of morcellated tissue was 58.5 g, none of the patients presented with prostate capsule perforation, and the mean postoperative hospital stay was 27.8 h. In regard to follow-up, the mean IPSS score was 4.5 points, residual volumes measured 34.3 ml, and Qmax was 18.5 ml/sec.
Discussion: Among the new techniques currently available for the surgical treatment of prostate hyperplasia, transurethral resection is the treatment of choice. However, laser enucleation of the prostate is a novel procedure that has shown good long-term clinical results. Enucleation of the prostate with bipolar energy has emerged as an alternative to HoLEP, offering the patient a lower cost and good results.

Conclusions: The technique of bipolar enucleation of the prostate is an important alternative to transurethral resection of the prostate and retropubic prostatectomy. It has the advantage that it can be performed regardless of prostate volume and it achieves total resection of the adenoma, with fewer intraoperative and postoperative complications.

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Introduction

For many years, transurethral resection of the prostate (TURP) has been the treatment of choice for lower urinary tract symptomatology secondary to prostate enlargement. TURP is associated with significant morbidity, especially in patients with large prostates, blood disorders, or those undergoing anticoagulation. There are several complications related to this procedure; they include postoperative bleeding that can require blood transfusion, urinary incontinence, retrograde ejaculation,
longer catheter placement duration, and longer hospital stay, which have led to the proposals of new techniques to replace conventional TURP.

The abovementioned begs the question as to whether a reduced use of TURP is based on scientific evidence or is a product of aggressive commercialization of the new surgical techniques.6 Before including any new therapy in our surgical armamentarium, it must have a documented, significant, evidence-based advantage over TURP. In the past, there have been numerous techniques that did not meet these criteria. Morbidity was often moved from the intraoperative to the postoperative period, and high treatment failure rates became evident during prolonged follow-up periods.4-5 Therefore, in addition to initial clinical results that are promising, long-term follow-up data on these techniques are obligatory. Current results of random controlled trials and prospective studies with solid methodologies suggest that some of the proposed procedures have the potential of replacing TURP; they include TURP with bipolar energy, vaporization of the prostate with bipolar energy, Holmium laser enucleation of the prostate (HoLEP), and KTP laser vaporization of the prostate. There are studies that confirm the adequate results of these techniques, as well as their diverse costs.6

The aim of our study was to describe the surgical technique of enucleation of the prostate with bipolar energy with the TUEB electrode loop in 20 patients and to report the postoperative results.

Methods

Twenty patients with lower urinary tract symptomatology that were indicated for prostate surgery were included in the study within the time frame of May 1, 2014 and August 1, 2014. They completed the International Prostate Symptom Score (IPSS) and prostate volume was measured through transrectal ultrasound of the prostate. Patient selection was based on a maximum total volume of 90 cc and a maximum adenoma volume of 80 cc. Patients that had a high prostate-specific antigen value had a prior transrectal biopsy of the prostate to rule out malignant disease. All the patients underwent preoperative uroflowmetry, as well as pre- and post-micturition kidney and bladder ultrasound to evaluate residual volume. Retrograde urethrography was performed to rule out urethral stricture and a preoperative study profile was done. Urine cultures were negative and the antibiotic regimen was based on third generation cephalosporins.

All the patients underwent peridural block and were placed in the lithotomy position. Cystoscopy was initially carried out to evaluate the length of the urethra and afterwards the entire bladder was evaluated, looking for suspicious lesions. The meatuses were first identified, and then the verumontanum. Bipolar electrosurgical equipment was used with 120 W coagulation energy and 220 W cutting energy. The equipment was placed over a 26 Fr continuous flow resectoscope (Olympus®) and the bipolar TUEB electrode loop. Three-liter bags of physiologic saline solution were used for the irrigation system; they were situated 50 cm above the bladder and connected to the external sheath of the resectoscope through a Y-shaped tube and the fluid came out through the connection to a continuous flow system. The incision was begun at the radius of the 5 and 7 o’clock position in the direction of the verumontanum. The enucleation plane of both lateral lobes was then opened and continued until they were freed toward the bladder. And finally, the middle lobe was freed. Enucleation was performed. A morcellation unit with a mechanical handpiece was situated on top of a nephroscope for bladder insertion and was connected to a suction pump for extracting the enucleated tissue. Once this was done, the instruments were withdrawn. Twenty cubic centimeters of lubricating gel were applied and a 3-way catheter was put into place with continuous irrigation. Traction was placed at the penis, the patient was sent to the recovery room, and after 24 h the urethral catheter was removed. The patients were evaluated one month later through uroflowmetry, bladder-voiding ultrasound, IPSS, and a review of the histopathologic report.

Results

The mean age of the patients was 73.5 years, acute urinary retention in 56% of the patients was the most common surgical indication, and relative failure of medical treatment was the indication in 5%. The mean IPSS was 24.5, mean prostate-specific antigen value was 3.8 ng/ml, mean total prostate volume was 70.8 cc and mean adenoma value was 64.5 cc. Three patients underwent prostate biopsy because of high prostate-specific antigen values. Voiding ultrasound revealed a mean residual volume of 178.4 ml, preoperative uroflowmetry showed a mean Qmax of 4.5 ml/sec. None of the patients presented with images suggestive of urethral stricture (table 1).

The mean surgery duration was 102 min, mean enucleation time was 41.2 min, and mean quantity of morcellated tissue was 58.5 g. There were no prostate capsule perforations, mean hospital stay was 27.8 h, none of the patients developed electrolyte alterations, and the mean time with urethral catheterization was 1.3 days. One patient presented with acute urinary retention secondary to the presence of prostate tissue that was later expelled (table 2).

In the follow-up consultation the patients presented with a mean IPSS of 4.5, residual volumes of 34.3 ml, and a Qmax

<table>
<thead>
<tr>
<th>Table 1 Preoperative characteristics of the patients</th>
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<tbody>
<tr>
<td><strong>Characteristics</strong></td>
</tr>
<tr>
<td>Total number</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>IPSS</td>
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<tr>
<td>Residual volume</td>
</tr>
<tr>
<td>Qmax</td>
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<tr>
<td>Prostate volume</td>
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<tr>
<td>Adenoma volume</td>
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<td>Prostate-specific antigen</td>
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of choice for many years for its surgical treatment, but it is not exempt from significant morbidity. New techniques have emerged with less morbidity and better long-term results. One of the first proposals was HoLEP, and today it has results at 5 years; the functional results are as good as those of TURP, with a lower IPSS and more pronounced Qmax with HoLEP than with TURP. Consequently HoLEP is the only confirmed endoscopic technique with superior efficacy to TURP. This is most likely secondary to the fact that it achieves prostate loculi similar to those of retropubic adenomectomy. Therefore, if performed correctly, a maximum quantity of tissue is extracted, resulting in complete resolution of the obstruction, as shown in a large number of studies. In addition, the substantial reduction of PSA > 80% after HoLEP is an indirect sign of its ablative capacities.

This being said, surgery duration is significantly greater, compared with TURP. Curiously, when comparing the tissue recovery rates (g/min) of HoLEP vs. TURP, there was no significant difference (0.52 g/min vs. 0.57 g/min) in the studies analyzed, suggesting that the 2 procedures are equally time-efficient. The mean length of time with the indwelling catheter in place was 1.13 days, a shorter time than after TURP.

Potential intraoperative complications consist of capsule perforation (such as laser fiber cuts along the surgical capsule) and damage to the bladder mucosa (caused by the morcellation blades). The risk for relevant bleeding and the need for blood transfusion are also minimal.

Based on our experience described above, our wish was to demonstrate the feasibility of bipolar energy enucleation of the prostate with the TUEB electrode loop as a technical alternative to HoLEP. This is an initial report on a case series of 20 patients that underwent surgery with prostate volumes < 100 g, adequate surgery durations, an enucleation rate of 0.57 g/min, urethral catheter remaining in place for a mean 1.3 days, no important blood loss, and no need for transfusion in any of the patients.

We found the important advantage of less difficulty in passing from TURP to enucleation of the prostate with bipolar energy than to the HoLEP technique, in relation to the learning curve. Likewise, there was less difficulty in controlling intraoperative bleeding, because the electrode loop enabled adequate coagulation with no loss of visibility and it shortened the enucleation time.

To the best of our knowledge, this is the first report on bipolar enucleation of the prostate with the TUEB electrode loop performed on patients that shows objective improvement in the IPSS, Qmax, and residual urine volume parameters. For this reason we believe that more comparative and long-term studies are needed in order to establish the clinical and urodynamic results, as well as weighing the complications; the costs of this technique must also be compared with those of other procedures. It will then be possible to establish the true usefulness of this surgical procedure.

Conclusions

We conclude that enucleation of the prostate with bipolar energy and the TUEB electrode loop is a safe technique with

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**Table 2** Postoperative characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mean (Ranges)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPSS</td>
<td>4.5 (2-6)</td>
</tr>
<tr>
<td>Residual volume</td>
<td>34.3 ml (10-55 ml)</td>
</tr>
<tr>
<td>Qmax</td>
<td>18.5 ml/sec (15.5-20.4 ml/sec)</td>
</tr>
<tr>
<td>Morcellated tissue</td>
<td>58.5 g (50-88 g)</td>
</tr>
<tr>
<td>Surgery duration</td>
<td>102 min (60-120 min)</td>
</tr>
<tr>
<td>Enucleation time</td>
<td>41.2 min (30-58 min)</td>
</tr>
</tbody>
</table>

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**Figure 1** Postoperative characteristics

![Postoperative characteristics](image1)

**Figure 2** Postoperative characteristics

![Postoperative characteristics](image2)
adequate postoperative results for the patients managed at our institution.

**Financial disclosure**

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**Conflict of interest**

The authors declare that there is no conflict of interest.

**References**