BPH and Prostate Diseases

*Original article*

**Comparison of impact of monopolar versus bipolar resection of the prostate on erectile function in patients with benign hyperplasia of the prostate**


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**KEYWORDS**

BPH; Prostate; TURP; Bipolar resection; Erectile dysfunction

**Abstract**

*Introduction and Objective:* The incidence of erectile dysfunction (ED) after TURP for BPH is still debated. Current study aims at comparing the impact of monopolar and bipolar TURP on the sexual function of male patients with LUTS, using the IIEF EF-domain score (questions 1–5, 15) and to identify statistical risk factors associated with development of post-operative ED.

*Patients and methods:* Between April 2014 and May 2015, 102 patients underwent TURP for symptomatic BPH. Sixty on underwent TURP by the monopolar technique and 41 by the bipolar technique. Patients were assessed on the day before the surgery by IIEF and followed up 3 and 6 months postoperatively, using the same scoring system.

*Results:* On a 6 month follow up, 13 patients (22.4%) in the monopolar group and 12 (30%) in the bipolar group, experienced clinical change in their EF score. Among risk factors studied, only diabetes, intraoperative capsular perforation and preoperative use of PDE5I had a statistically significant impact on the EF score. No statistically significant difference in IIEF score and EF domain score was observed between the patients who underwent TURP by the monopolar technique, compared to those patients in which the bipolar one was used; whether at three months (p value 0.33) or at six months (p value 0.397).

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The impact of monopolar versus bipolar resection of the prostate on erectile function

Introduction

Conventional transurethral resection of the prostate (TURP) represents the gold standard for treatment of lower urinary tract symptoms (LUTS) caused by benign prostatic hyperplasia (BPH). It is considered a safe procedure, as regards sexual function. However, most of the published literature reveal an incidence of postoperative ED following TURP, ranging from 4% to 40% [1]. The implementation of technological advancements, such as bipolar technology and laser energy were expected to minimize these risks [2].

Patients and methods

Between April 2014 and May 2015, 102 patients (98 completed follow-up) underwent TURP in the Department of Urology, Cairo University, for the treatment of symptomatic BPH. These patients were part of a prospective, non-randomized clinical trial, aiming to compare the impact of monopolar and bipolar TURP on the sexual function of male patients with LUTS, using the IIEF self-questionnaire scoring system. The study also aimed to identify statistical risk factors associated with development of post-operative ED.

Patients included in the study are patients with LUTS scheduled for surgery (refractory urine retention, haematuria, recurrent urinary tract infections, renal impairment and bladder stones secondary to BPH) and had to have stable sexual partners for 6 months before surgery and for 6 months postoperatively until time of follow-up. An EF score ≥6 was necessary for inclusion in the study. Known cases of prostate cancer or patient with neurologic disorders were excluded. Patients were assessed on the day before the surgery by IIEF self-questionnaire scoring system, and followed up 3 and 6 months postoperatively, using the same scoring system.

Monopolar technique used high frequency current with a maximum cutting power of 130 W, starting at the ventral parts of the gland (between 11 and 1 o’clock position), followed by both lateral lobes, then the mid-lobe, and finishing with apex. Bipolar TURP involved the use of a continuous flow resectoscope and saline irrigation, using a plasma kinetics device with a maximum power of 200 W at a radio-frequency wavelength of 320–450 kHz and a voltage range of 254–350 V. The loop consisted of an 80/20 platinum/iridium alloy electrode with active and return electrode on the same axis (axipolar) separated by a ceramic insulator. At the end of either procedure, a 24 Fr. 3-way catheter was inserted. Saline irrigation was continued at a rate sufficient to maintain a clear returning fluid and the catheter was removed if the urine was clear in the absence of irrigation. The patient was subsequently given a voiding trial and discharged from the hospital, as soon as he voided spontaneously.

Statistical methods

Data analysis was performed using SPSS program, version 22. Numerical data were presented in terms of range, mean, standard deviation, median and interquartile range (IQR). Categorical data were summarized as percentages. All p-values were two sided and considered significant when p-values were less than 0.05.

Results

The study was conducted on 102 patients; 61 underwent TURP by the monopolar technique and 41 by the bipolar technique. Ninety-eight patients completed the follow-up period (58 in the monopolar arm and 40 patients in the bipolar arm). Demographic and operative patients’ data are presented in Tables 1 and 2. When comparing both groups, as regards patient demographics, the mean age was higher and the mean EF domain of IIEF score was lower in the bipolar arm. When comparing the operative data, the operative time was longer and the weight of the specimen was higher in the bipolar group.

On a 3 month of follow up, only 15 patients out of 58 (25.9%) in the monopolar group and 14 patients out of 40 (35%) in the bipolar group experienced a clinical change in their EF score domain. (Table 3).

On a 6 month of follow up, only 13 patients (22.4%) in the monopolar group and 12 (30%) in the bipolar group experienced a clinical change in their EF score. So, minimal clinically important change in the EF score on a 6 months follow up, occurred only in 25 (25.5%) patients (Table 3). The remaining 73 (74.5%) patients retained the clinically perceived preoperative EF score. We considered minimal clinically important change to be a change in the EF domain by ≥4 [3]. Among risk factors studied, only diabetes, intraoperative capsular perforation and preoperative use of PDE5I were found to have a statistically significant impact on the EF score among all patients with post-operative ED (Table 4).

No statistically significant difference in IIEF and EF scores was observed between the patients who underwent TURP by the monopolar technique, compared to those patients in which the bipolar one was used; whether at three months (p value 0.33) or at six months (p value 0.397) (Table 3).
Table 1  Demographic and operative data.

<table>
<thead>
<tr>
<th></th>
<th>Monopolar TURP (n = 58)</th>
<th>Bipolar TURP (n = 40)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>60.19 ± 6.54</td>
<td>65.38 ± 6.69</td>
<td>0.001</td>
</tr>
<tr>
<td>Weight of the specimen (gm)</td>
<td>39.03 ± 17.09</td>
<td>50.28 ± 34.04</td>
<td>0.034</td>
</tr>
<tr>
<td>Duration of operation (min)</td>
<td>59.31 ± 17.95</td>
<td>78.88 ± 33.13</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Data are given in mean ± standard deviation.

Table 2  Erectile function score.

<table>
<thead>
<tr>
<th></th>
<th>Monopolar TURP (n = 58)</th>
<th>Bipolar TURP (n = 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative erectile function score (end score 30)</td>
<td>21.52 ± 6.91</td>
<td>16.52 ± 7.13</td>
</tr>
<tr>
<td>Postoperative erectile function score (end score 30) at 3 months</td>
<td>19.59 ± 7.11</td>
<td>12.95 ± 8.62</td>
</tr>
<tr>
<td>Postoperative erectile function score (end score 30) at 6 months</td>
<td>20.45 ± 7.57</td>
<td>13.68 ± 8.99</td>
</tr>
</tbody>
</table>

Data are given in mean ± standard deviation.

Table 3  Patients with ED at 3 months and at 6 months.

<table>
<thead>
<tr>
<th>Erectile dysfunction (ED)</th>
<th>Monopolar TURP (n = 58)</th>
<th>Bipolar TURP (n = 40)</th>
<th>Total (n = 98)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 3 months postoperative</td>
<td>15 (25.9%)</td>
<td>14 (35%)</td>
<td>29 (29.6%)</td>
<td>0.33</td>
</tr>
<tr>
<td>At 6 months postoperative</td>
<td>13 (22.4%)</td>
<td>12 (30%)</td>
<td>25 (25.5%)</td>
<td>0.71</td>
</tr>
</tbody>
</table>

* Data are given in number (%).

Table 4  Differences between normal patients and those with erectile dysfunction (bipolar + monopolar).

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>ED</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age</td>
<td>61.9 ± 6.9 yrs</td>
<td>63.5 ± 7.6 yrs</td>
<td>0.4</td>
</tr>
<tr>
<td>Mean operative time</td>
<td>65.6 ± 27.6 min</td>
<td>72.2 ± 24.7 min</td>
<td>0.3</td>
</tr>
<tr>
<td>Prostate weight</td>
<td>42.7 ± 26.7</td>
<td>46.4 ± 23.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Mean EF domain (pre-TURP)</td>
<td>20.1 ± 7.5</td>
<td>17.8 ± 7.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Mean total IIEF (pre-TURP)</td>
<td>45.6 ± 16.9</td>
<td>40.8 ± 16.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Smoking</td>
<td>44/73</td>
<td>14/25</td>
<td>0.3</td>
</tr>
<tr>
<td>Chest disorders</td>
<td>2/73</td>
<td>2/25</td>
<td>0.3</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>10/73</td>
<td>11/25</td>
<td>0.001</td>
</tr>
<tr>
<td>Cardiovascular disorders</td>
<td>16/73</td>
<td>7/25</td>
<td>0.5</td>
</tr>
<tr>
<td>Alpha blockers</td>
<td>40/73</td>
<td>16/25</td>
<td>0.4</td>
</tr>
<tr>
<td>PDE-5</td>
<td>23/73</td>
<td>16/25</td>
<td>0.004</td>
</tr>
<tr>
<td>Bleeding</td>
<td>9/73</td>
<td>6/25</td>
<td>0.2</td>
</tr>
<tr>
<td>Capsular perforation</td>
<td>7/73</td>
<td>11/25</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Italic numbers signify significant difference (p value < 0.05).

Discussion

The incidence of ED after TURP for BPH is still debated. It has been reported to be between 4% and 35% of patients and to be associated with age or pre-existing ED [4–7]. Muntener et al., in 2007 stated that TURP had no negative influence on the quality of erections measured by self-assessment questionnaires. However, the loss of ejaculatory function was significant and was associated with considerable bother. He stated despite that, three out of four patients undergoing TURP were still sexually active and that the surgery had no influence on this ratio [8].

This study aimed to compare the impact of monopolar and bipolar TURP on the sexual function of male patients with LUTS, using the IIEF self-questionnaire scoring system with emphasis on the EF score domain (questions 1–5, 15) of the IIEF score. It is a non-randomized study, as the demographic data of the patients in the two groups showed them to be non-homogenous. The bias in the distribution of patients in the 2 arms can be explained by the fact that certain preoperative data favor the use of bipolar technology in some patients, based on the fact that normal saline is used during the procedure. Bipolar use allows safer resection in large sized prostate over a longer period of time, and in patients with preexisting pulmonary and cardiac comorbidities, with a much lower risk of TUR syndrome. The technique also allows sufficient time for young urologist to train for resection, similarly without the risk of TUR syndrome. Consequently, in the bipolar group, the mean age of patients and the weight of the specimen were higher, the mean IIEF score and EF score were lower and the mean operative time was longer.

In 2011, Rosen et al stated that the minimal change that occurs in EF score and can be perceived clinically by male patients was 4 [3]. According to this definition, we classified patients in our study post-operatively into two groups: patients with no significant or patients with significant change in EF score. In our work, at 6 months follow up, only 13 patients (22.4%) in the monopolar group and 12 (30%) in the bipolar group experienced a clinical change in their EF score.
Cavernous nerve damage, fibrosis and thrombosis of the cavernous arteries, or psychological changes due to ejaculatory failure or urethral sphincter insufficiency have been postulated to be the main causes of post-operative ED after TURP [5]. Further work suggested that ED associated with TURP is most likely of neurogenic origin due to capsular perforation or of psychogenic nature, as suggested by the significant association with diminished libido [12]. Diabetes mellitus and reported intraoperative capsular perforation were considered significant risk factors for newly observed postoperative ED in other studies [13].

Poulakis et al., reported a relative risk (RR) of 1.12 in postoperative erectile dysfunction if capsular perforation during surgery had occurred [13], whereas other studies have not found an increase in risk [15].

Walsh, in 1992 stated that possibly excessive coagulation on the lateral floor of the prostate may injure the nerves important in potency. Again, many patients may already have compromised arterial supply to the penis because of age [14]. Capsular perforations in TURP occurred in 3 out of 65 patients in a study made by Taher in 2004, of whom two suffered ED [1]. In a study by Favilla in 2009, age was the only risk factor associated with newly-reported ED 12 months after TURP (patients older than 65 years had a higher risk of developing ED after TURP (p < 0.0001) and they developed a lower IIEF-5 score (p < 0.0001) at follow up compared with those ≤65 yr). No statistical associations were found between hypertension, diabetes, dyslipidemia and capsular perforation and the development of ED after TURP [15]. In our work, among risk factors studied, only diabetes, intraoperative capsular perforation and preoperative use of PDE5I were found to have a statistically significant impact on the EF score among all patients with post-operative ED. However, these factors had no statistically significant impact on the post-operative EF in the bipolar group. This might be due to the relatively smaller number of patients of the bipolar group compared to the monopolar one. We believe that a bigger sample size would give better statistical results and that this should guide us for a future study to obtain more validated results. Additionally, in our study, among patients who retained their preoperative IIEF score, the mean values of all domains of the IIEF score decreased in both arms. The domain that was also affected more than others in both arms was the orgasmic domain, as most of patients experienced post-operative retrograde ejaculation. The overall satisfaction score remained constant in the bipolar, but decreased in the monopolar arm.

Conclusion

No statistically reported difference could be detected between monopolar and bipolar TURP, regarding the risk of developing post-operative ED. However, a higher incidence should be anticipated in patients with DM, intraoperative capsular perforation and preoperative use of PDE5I.

Conflict of interest

We the authors declare that no conflict of interest or source of funding for the current study.

Disclosure

I hereby, acknowledge that we are the sole authors of this manuscript and that we have nothing to declare and have not received funding from any organizations.

Authors’ contributions

Ayman I Kassem: performing the procedure, writing, editing and revision of the paper.

Galal El shorbagy: data collection, revision and editing.

Mohamed Abdel Rassoul: performing the statistical analysis.

Mohamed El Ghoniemy: performing the procedure, Revision and editing.

Hussein Ali Hussein: editing and revision of the paper.

Ahmed El Feel: the idea of the study and supervision.

Mohammed El Gamal: the idea of the study and supervision.

Ethical committee approval

The study was a master thesis and was approved by department council.

Consent from the patients

Written informed consents were obtained from all patients prior to enrolment in this study.

References


