

Retrospektivna analiza transuretralne vapor resekcije prostate u odnosu na transvezikalnu prostatektomiju kod prostata preko 50 ml

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Apstrakt

Provedena je retrospektivna analiza efikasnosti transuretralne vapor resekcije (TUVRP) i transvezikalne prostatektomije (TVP) kod prostata > 50 ml. Devedeset pacijenata sa znacima urodinamske opstrukcije i volumenom prostate (VP) između 50 i 100 mL, su analizirani u zavisnosti od metode operativnog tretmana (TUVRP prema TVP). Pacijenti su imali određivanje kliničkih parametara preoperativno i prilikom praćenja na 3 i 6 meseci postoperativno. Svi pacijenti su imalu opštu i standardnu urološku evaluaciju pre hirurškog lečenja uključujući analizu urina, urinokulturu, analizu krvi sa određivanjem PSA, rektalni pregled prostate (RT), ultrazvuk abdomena i male karlice (UZ), transrektalni ultrazvuk prostate (TRUZ), određivanje maksimalnog protoka urina (MPU), rezidualnog urina posle mokrenja (RU), Internacionalnog Prostata Simptom Skora (IPSS), i ocenu kvaliteta života (KŽ). Uretrocistoskopija je obavezno rađena pre TUVRP. TRUZ-vođena biopsija prostate je rađena kod pacijenata sa vrednostima PSA > 4 ng/ml, abnormalnim RT i/ili sumnjivim nalazom na TRUZ. IPSS, KŽ, MPU i RU su određivani pri svakoj kontroli. Od 90 pacijenata podesnih sa evaluaciju, 69 pacijenata je kompletiralo lečenje za period od 12 meseci (TUVRP, n = 35; PTV, n = 36). TUVRP procedura nije bila brža (P=0.41); 43,6% i 84,8% tkiva prostate je resecirano posle TUVRP i TVP, respektivno (P<0.001). U TVP grupi, IPSS, KŽ, MPU i volumen RU su bili signifikantno bolji nego u TUVRP grupi pri praćenju na 3 i 12 meseci postoperativno. Na 12 meseci postoperativno, IPSS se poboljšao za 62,7% i 87,9% (P<0.001), KŽ se smanjio za 41,9% i 71,9% (P<0.001), srednji MPU se povećao za 6,3 ml/s (102,0%) i 11,4 ml/s (230,2%) (P=0.001), i srednji volumen RU se smanjio za 65,4 ml (70,5%) i 71,2 ml (88,6%) (P=0.001) u TUVRP

A retrospective analysis of transurethral vapor resection of the prostate versus transvesical prostatectomy for prostate greater than 50 ml

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Abstract

We compared the safety and efficacy of transurethral vapor resection (TUVRP) and transvesical prostatectomy (TVP) for prostate > 50 ml in retrospective study. Ninety patients with urodynamic obstruction and prostate volume (PV) in range between 50 and 100 ml were analyzed according to the mode of operative treatment (TUVRP vs. TVP). Patients were assessed preoperatively and followed-up at 3 and 12 months postoperatively. All patients underwent general and urological standard evaluation before surgery, including urine analysis, urine culture, blood samples tests, with determination of PSA, DRE, abdominal and minor pelvis ultrasound (US), transrectal ultrasound (TRUS), maximal flow rate (Qmax), postvoid residual urine (PVR), and self assessment by International Prostate Symptom Score (IPSS) and Quality of Life Score (QoLS). Urethrocystoscopy was obligatory done before TUVRP. TRUS-guided biopsies of the prostate were performed in patients with PSA > 4 ng/ml, abnormal DRE, and/or suspicious echogenicity on TRUS. IPSS, QoLS, Qmax and PVR were obtained at each follow-up. Of 90 patients eligible to participate, 69 patients completed 12 months of follow-up (TUVRP, n=35; TVP, n=36). TUVRP procedure was not faster than TVP procedure (P=0.41); 43.6% and 84.8% of prostatic tissues were resected after TUVRP and TVP, respectively (P<0.001). In TVP group, IPSS, QoLS, Qmax and PVR volume were significantly better than those in TUVRP group at 3 and 12 months of follow-up. At 12 months postoperatively, IPSS improved 62.7% and 87.9% (P<0.001), QoLS decrease by 41.9% and 71.9% (P<0.001), mean Qmax increased by 6.3 ml/s (102.0%) and 11.4 ml/s (230.2%) (P=0.001) and mean PVR volume decreased by 65.4 ml (70.5%) and 71.2 ml (88.6%) (P=0.001) in TUVRP and TVP

i TVP grupi, respektivno. Dva pacijenta su dobila strikturu uretre i 1 pacijent skleroze vrata mokraćne bešike postoperativno, iziskujući internu uretrotomiju i TUIP. TVP je efikasnija i sigurnija metoda nego TUVRP kod pacijenata sa benignom hiperplazijom prostate čiji je VP > 50 ml.

Ključne reči: prostata, benigna hiperplazija, volumen >50 ml, terapija, hirurgija.

group, respectively. Two TUVRP patients developed urethral stricture and 1 bladder neck sclerosis postoperatively, requiring internal urethrotomy and TUIP, respectively. TVP may be more effective and safer than TUVRP for benign prostatic hyperplasia (BPH) patients whose PV is > 50 ml.

Key words: prostate, benign hyperplasia, volume >50 ml, therapy, surgery

Introduction

The surgical management of patients with large PV (>50 ml) that cause bladder outlet obstruction (BOO) secondary to BPH is a challenging area. TURP is considered golden standard for removal of obstructive prostatic tissue¹⁻³. The application of open surgery for BPH has been progressively decreasing over the years after the rapid advent of minimally invasive techniques, including TURP⁴.

To address the safety and efficacy of TUVRP and TVP for prostate >50 ml, this paper reports the 12 months of follow-up results of retrospective trial comparing TUVRP with TVP.

Material and methods

Ninety patients with urodynamic obstruction and PV in range between 50 and 100 ml were analyzed according to the mode of operative treatment (TUVRP vs. TVP). Patients were assessed preoperatively and followed-up at 3 and 12 months postoperatively. All patients underwent a general and urological standard evaluation before surgery, including urine analysis, urine culture, blood sample tests with determination of PSA, DRE, Qmax, PVR and self assessment of QoLS and IPSS. PV was measured using TRUS with patient in the left lateral decubitus. Urethrocystoscopy was obligatory done before TUVRP. TRUS-guided biopsies of the prostate were performed in patients with PSA >4 ng/ml, abnormal DRE, and/or suspicious echogenicity on TRUS. IPSS, QoLS, Qmax and PVR were obtained at each follow-up. Perioperative data and postoperative outcomes were compared. All complications were recorded.

The indications for prostatectomy, by either open approach or TUVRP, include refractory urinary retention, recurrent or persistent urinary tract infections, significant symptoms for BOO not responsive to medical therapy (IPSS >18, QoLS >3, Qmax < 12 ml/s, PVR > 150 ml), recurrent gross hematuria of prostatic origin, pathophysiologic changes of the kidneys and ureters secondary to prostatic obstruction. Exclusion criteria were previous prostate or urethral surgery and voiding disorders not related to BPH (eg neurogenic bladder disorders) if indicated; prostate cancer was excluded by biopsy. All patients signed an informed consent form for the surgery.

Intervention

Patients mainly underwent one-day TUVRP treatment following immediate preoperative routine check-up by anesthesiologist including laboratory analysis, ECG, physical and chest X-ray examination. The procedure is performed using Storz TUR device Ch 26/27 with vapor cut monopolar electrode and high frequency generator Martin M400 and Erbe ICC-350 (resection set at 110-130 W, coagulation at 50-60 W), with glycine solution as irrigant fluid. TVP was performed as classical procedure according to Harris-Hryntschak technique, with insertion of suprapubic Foley catheter as cystostomy, which is removed a few days later⁵⁻⁷. TUVRP is performed in regional anesthesia and TVP in general anesthesia. In both procedures, an irrigant Foley catheter was inserted and bladder irrigation was used as necessary until hematuria had settled significantly to stop irrigation.

Statistics

Student's t-test was used for comparison of related variables of both groups, and results were given as mean values \pm standard deviation (SD). The Chi-square test was used for categorical data. A P value of 0.05 or less was considered statistically significant.

Results

Of 90 patients eligible to participate, 69 patients (TUVRP, n=35; TVP, n=34) completed 12 months of follow-up. Chronic urinary retention occurred in 18 (51%) and 15 (44.1%) patients, respectively. TRUS-guided biopsies of the prostate with negative finding in sense of prostate cancer was performed in 10 (28.6%) and 8 (23.5%) patients, respectively.

Baseline characteristics of both groups were shown in Table 1. No statistical differences were observed.

| Parameter | TUVRP (n=35) mean (\pm SD) | TVP (n=34) mean (\pm SD) | P Value |
|----------------------|----------------------------------|--------------------------------|---------|
| Age (years) | 70.9 (7.9) | 71.3 (6.1) | 0.824 |
| Prostate volume (ml) | 71.7 (36.1) | 78.4 (35.3) | 0.422 |
| IPSS score | 21.7 (5.6) | 23.1 (5.4) | 0.355 |
| QoL score | 4.3 (0.4) | 4.4 (0.5) | 0.412 |
| Qmax (ml/s) | 6.2 (2.9) | 5.1 (2.7) | 0.081 |
| PVR (ml) | 92.7 (51.7) | 80.3 (49.9) | 0.314 |
| PSA (ng/ml) | 3.3 (4.2) | 4.1 (1.2) | 0.092 |

Table 1. Review of cumulated patients characteristics

The TUVRP procedure was not faster than TVP procedure ($P=0.41$ (Table 2). in TUVRP and TVP groups, a mean of 38.4 ± 24.9 g and 66.5 ± 33.2 g prostatic tissues was resected, meaning that 53.5% and 84.8% of the preoperatively calculated transrectal total PV was resected after TUVRP and TVP, respectively. TUVRP was characterized by the significantly shorter postoperative irrigation time, lower volume of irrigant fluid postoperatively, shorter nursing contact time and earlier removal of the catheter. The procedure was mainly performed as one-day treatment: 29 (82.8%) patients were discharged from office within 12 hours.

The mean postoperative hemoglobin reduction at 24 h of follow-up was 1.25 g/dl, with a 2.1% hematocrit reduction, in the TUVRP group, and 1.81 g/dl hemoglobin reduction, with a 3.2% hematocrit reduction, in the TVP group ($P=0.716$).

| Parameter | TUVRP (n=35) mean (\pm SD) | TVP (n=34) mean (\pm SD) | P Value |
|--------------------------------|----------------------------------|--------------------------------|---------|
| Procedural time (min) | 103.7 (30.1) | 89.5 (27.1) | 0.410 |
| Resected tissue weight (g) | 31.3 (4.79) | 66.5 (33.2) | <0.001 |
| Intraop bleeding (ml) | 312 (85) | 425 (68) | 0.205 |
| Irrigant volume intraop (l) | 16.4 (5.01) | 10.8 (4.2) | 0.390 |
| Irrigant volume postop (l) | 7.0 (8.4) | 45.5 (8.0) | <0.001 |
| Postop irrigation time (days) | 0.3 (0.5) | 4.1 (0.8) | <0.001 |
| Postop catheter removal (days) | 2.0 (2.1) | 7.5 (1.6) | <0.001 |
| Admission time (days) | 0.8 (1.8) | 9.2 (3.4) | <0.001 |
| Nursing contact time (min) | 36 (8.2) | 182 (9.8) | <0.001 |

Table 2. Perioperative characteristics

| Variables | Baseline mean (±SD) | 3 months mean (±SD) | 12 months mean (±SD) | Amelioration (%) |
|--------------------|---------------------|---------------------|----------------------|------------------|
| IPSS | | | | |
| TUVRP | 27.1 (5.6) | 10.1 (2.2) | 8.1 (3.4) | 62.7 |
| TVP | 23.1 (5.4) | 6.2 (1.0) | 2.8 (1.2) | 87.9 |
| P value* | 0.305 | <0.001 | <0.001 | |
| Qmax (ml/s) | | | | |
| TUVRP | 6.2 (2.9) | 11.3 (2.7) | 12.5 (4.3) | 102.0 |
| TVP | 5.0 (2.7) | 14.5 (2.6) | 16.4 (5.1) | 230.2 |
| P value* | 0.081 | <0.001 | 0.001 | |
| Qol score | | | | |
| TUVRP | 4.3 (0.4) | 2.7 (0.6) | 2.5 (0.8) | 41.9 |
| TVP | 4.4 (0.5) | 1.5 (0.9) | 1.26 (0.8) | 71.4 |
| P value* | 0.412 | <0.001 | <0.001 | |
| PVR (ml) | | | | |
| TUVRP | 92.7 (51.7) | 31.7 (26.9) | 27.3 (29.6) | 70.5 |
| TVP | 80.3 (49.9) | 16.4 (11.5) | 9.12 (11.0) | 88.6 |
| P value* | 0.314 | 0.003 | 0.001 | |

Table 3. Postoperative data

Follow-up data of both groups (at 3 and 12 months postoperatively) are presented in Table 3.

In TVP group, IPSS, QoLS, Qmax and PVR were significantly better than those in the TUVRP group, through 12 months. At 12 months postoperatively, IPSS improved 87.9% and 62.7% in the TVP and TUVRP groups, respectively. Mean Qmax increased by 11.49 ml/s (230.2%) in the TVP group and 6.33 ml/s (102%) in the TUVRP group, and mean PVR decreased by 71.2 ml (88.6%) in the TUVRP group and 65.4 ml (70.5%) in the TUVRP group, respectively. The adverse events at 12 months postoperatively are listed in Table 4. Two patients in the TUVRP group developed urethral bulbar stricture and 1 patient bladder neck sclerosis, requiring internal urethrotomy and TUIP, respectively. The blood transfusion rate and incontinence rate demonstrate no statistically significant difference in both groups (P=1.0).

| Data | TUVRP | TVP | P value* |
|-------------------------|-------|-----|----------|
| Blood transfusion | 2 | 5 | NS |
| Incontinence | - | 1 | NS |
| Re-operation | 2 | - | NS |
| Transient dysuria | 6 | 2 | NS |
| Bladder neck sclerosis | 1 | - | NS |
| Urethral stricture | 2 | - | NS |
| Epididymitis | - | 1 | NS |
| Urinary tract infection | 1 | 4 | NS |
| Re-catheterized | 1 | 3 | NS |

Table 4. Total adverse events

Incidental prostate cancer was detected in 2 (5.7%) patients in the operative specimen at TUVRP: 1 patient is referred to radical retropubic prostatectomy and 1 patient underwent surveillance.

Discussion

Irrespective of a large number of alternative surgical procedures available today, TURP is still regarded as an effective surgical technique with excellent functional short-term results⁸⁻¹⁰. Based on technical improvement and a growing clinical expertise, perioperative mortality associated with TUVRP has decreased dramatically, approaching zero within the last decade¹¹.

Endoscopic treatment by TURP has occasionally been used for large adenomas but becomes increasingly difficult and unsafe as PV increases. Modifications of the traditional techniques, such as the use of bipolar technology, removal of only 1 lateral lobe, and various loop modifications have been made to increase the volume of gland that can be safely tackled.

The PV threshold between transurethral surgery and TVP remain an open issue; patients with glands >50ml may be considered for open surgery in some countries, whereas a 2-stage procedure with transurethral resection of 1 prostatic lobe at a time may be performed in other countries. Management of large prostate is not without consequences. Mebust and co-workers¹² clearly identified an association between PV and the risk of complications in patients undergoing TURP. Morbidity and costs associated with transurethral resection of large prostate fostered the development of different alternative and minimally invasive treatments (eg, TUMT, TUNA, TUIP). Unfortunately, they worked best in small- to medium-sized prostates and basically failed to provide better alternative for large prostate glands.

TUVRP is a further modification using one of the novel band resection electrodes that differs from the previous analogues in design. The advantage of TUVRP includes instantaneous bulky tissue removal, with greater visibility, better hemostasis, and less bleeding¹³⁻¹⁶. We demonstrated that average time for postoperative irrigation was significantly reduced, including the volume of irrigant fluid, diminished admission time and early catheter removal. The present study demonstrated that this procedure can be performed as one-day treatment. During resection in TUVRP, a large amount of prostatic tissue is vaporized, and about 50% of estimated resected tissue weight of the prostate¹³. HOLEP is another alternative for surgical management of prostates with volume > 70 ml. This technique may be a valid alternative to TURP as a new gold standard regardless of the PV and offers satisfactory and durable results with a low rate of long-term complications¹⁷⁻²⁰.

TVP remained the gold standard treatment of BPH for many decades. The conversion from open to transurethral surgery occurred gradually; TVP is still relatively common in some countries, whereas it has been almost abandoned in others. In a landmarks study, Tubaro and coworkers²¹ evaluated the 12-month clinical and urodynamic outcomes of patients treated with TVP. TVP induced a significant reduction of symptom score and improvement of QoLS after treatment of 12 month. Of these patients, 84% described themselves as delighted with the results obtained and none had a QoLS > 3 (mean, 0.2). In their series, 60% of patients became asymptomatic after treatment and 96.9% had a Qmax > 15 ml/s. A significant improvement in voiding volume, PVR and bladder wall thickness was also observed.

Several studies indicated that TVP provides outstanding relief of BOO and lower urinary tract symptoms^{21,22}. However, randomized studies of TUVRP vs. TVP for prostate >50 ml are scanty. In our study, TVP was superior to TUVRP with respect to resected tissue weight. Although the follow-up period was relatively short, an assessment of perioperative morbidity and early relief from obstructive voiding can be made. The outcomes of Qmax, PVR, QoLS and IPSS differed significantly between groups at 3- and 12-month-follow-up. The reasons analyzed for the significant difference of median IPSS at 12-month between TVP and TUVRP (2.8 vs. 8.1) were (1) according to our study, the patients in the TVP group showed greater improvement of Qmax, IPSS, QoLS and PVRs than those in the TUVRP group; (2) 2 TUVRP patients developed urethral stricture and 1 bladder neck sclerosis postoperatively, requiring surgical reintervention; and (3) the most important point was about completeness of resected adenoma: the TUVRP for prostate >

50 ml was a challenge, and the residual adenoma would burden the questionnaire. Of course, the limit of our study was that patients sample size was relatively small, so further investigation was required.

The difference of the blood transfusion rates between both groups did not demonstrate statistical significance. However, the rates were relatively high (2 in TUVRP and 5 in TVP). The reasons we analyzed were that (1) 5 patients (1 in TUVRP and 4 in TVP) had histories of pulmonary and/or cardiac problems with mild anemia or lower limit hemoglobin values preoperatively; we offered blood transfusion postoperatively, even without massive blood loss, when these patients presented some systemic symptoms; (2) and PV in our study was quite large, which has been identified as a major risk factor for bleeding in other published studies.

In the TUVRP group, 3 patients required further surgery for urethral stricture and bladder neck sclerosis. One patient in the TVP group presented temporary stress incontinence postoperatively, which resolved spontaneously after 1 month without any medication or surgical intervention.

Conclusion

Our results have demonstrated that TVP may be more effective and safer than TUVRP for the BPH patients whose PV is > 50 ml within 12-month of follow-up. Results of long-term studies are also warranted.

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