The Risk and Effectiveness of Transurethral Resection of Prostate

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Abstract

Background : To advise a patient to have transurethral resection of prostate (TURP) needs information on the benefit and complications of the procedure. Quality assurance also needs present results to be compared with future ones.

Objectives : The authors wanted to know: 1. Whether TURP can decrease the International prostate symptom score (IPSS) and improve the Quality of Life (QOL) scores concerning urination at 1.5 months post-operatively for at least 25 per cent of the pre-operative scores? ; 2. What are the common medical diseases in this type of patient? ; and 3. What are the mortality and immediate complications of TURP?

Method : This was a prospective, before-after design trial. All patients who came to have TURP at a tertiary care hospital were studied. IPSS and QOL scores were recorded before surgery and again when the patients came back to follow up at 1.5 months after discharge. Patients were evaluated for cardiopulmonary reserve and congestive heart failure. Anesthetic technique of choice was spinal anesthesia with 0.5 per cent bupivacaine. Anesthetic and surgical complications were recorded if the definitions were met.

Analysis : Pre-operative and 1.5 months post-operative scores were compared using paired *t*-test and 95 per cent confidence interval.

Results : During the 13 months there were 269 consecutive males who received TURP. The mean ± SD age was 70.4 ± 8.8 years (range 35-97). The mean difference between pre- and post-operative IPSS was 6.7 ± 9.1 (95% CI 5.2-7.8). Quality of Life also improved, the mean difference between pre- and post-operative QOL was 3.2 ± 1.6 (95% CI 2.9-3.5). Most patients had ASA class 2. Common pre-operative existing diseases were hypertension (31.6%), ischemic heart disease (18.2%), diabetes (15.6%), and COPD (7.1%). Anesthetic techniques were spinal block (77.3%), epidural block

(5.9%), continuous epidural (11.2%), and general anesthesia (5.6%). Intra-operative complications were reported and TUR syndrome occurred in 1 patient (0.37%). There was one surgical death 3 days post-operation, due to septic shock probably from bowel perforation.

Conclusion : The patients' symptoms and quality of life significantly improved, but there was 1 surgical death and 1 TUR syndrome among 269.

Key word : TURP

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Transurethral resection of the prostate (TURP) is a common procedure. Although the result is acceptable, there are still reports of death from TUR syndrome(1).

As many of the patients are elderly, the incidence of cardiopulmonary problems, hypertension, diabetes, and other chronic medical conditions may be high. In order to distend the urinary bladder for a clear view and unobstructed operative field, continuous irrigation is needed. This leads to intravascular absorption of irrigating fluid and TURP syndrome. Other problems are excessive bleeding, perforation of the bladder or urethra, and other complications from the anesthetic technique, e.g. hypotension from regional anesthesia. Surgeons and anesthesiologists have to communicate and co-operate to diagnose and treat any complications that occur, to prevent the morbidity and mortality.

To better serve the patient by providing information and quality assurance, the authors studied the benefits, i.e. the improvement in the patients' condition, versus the risk, i.e. the mortality and morbidity.

Objectives

1. Can TURP decrease the International prostate symptom score (IPSS) and improve the Quality of Life (QOL) scores concerning urination in benign prostatic hyperplasia and cancerous enlargement of prostate at 1.5 months post-operatively for at least 25 per cent of the pre-operative scores?

2. What are the common medical diseases frequently found?

3. What are the mortality and immediate complications of TURP?

Method

This was a prospective, before-after design trial. All patients who came to have TURP at the Division of Urology, Department of Surgery, Siriraj Hospital from February 1998 to March 1999 were studied. They were males who had been diagnosed with prostate enlargement with complications, such as retention of urine, or had failed medical treatment.

On the night before surgery, anesthesia residents interviewed the patient for the International prostate symptom score (IPSS) and Quality of life (QOL) score. IPSS was known as the American Urological Association Score(2) until the World Health Organization International Committee accepted it. It was translated into the Thai language by the Thai Urological Association, and has been compared between self-administration by the patient and questioned by the physician(3). There are 7 questions concerning urinary symptoms. The frequency of each symptom is graded on an ordinal scale (from 0 = no symptoms at all, to 5 = almost every time). For the QOL score, the patient states his feelings if he were to have the symptoms he is having throughout his life on an ordinal scale (from 0 = very glad, to 6 = very sad).

IPSS and QOL scores were recorded again when the patients came back to follow up at 1.5 months after discharge.

On the night before surgery, questions were asked to evaluate cardiopulmonary reserve and whether the patient had congestive heart failure. These were questions on dyspnea at rest (compared to their friends in the same age group), and on exertion (one flight of stairs). Physical examination included heart sound, lung sound, height of jugular vein, and pretibial edema. Routine pre-operative investigation was done; hematocrit, BUN, creatinine, serum electrolytes, chest X-ray and electrocardiograph were recorded for this study.

Anesthetic technique of choice was spinal anesthesia with 0.5 per cent bupivacain. Intra-operative monitoring were BP, pulse rate, EKG, hemoglobin oxygen saturation. If central venous pressure was monitored, this was also recorded. Complications were recorded if the definitions were met: hypotension when systolic blood pressure decreased more than 30 per cent of baseline for more than 5 minutes; hypoxemia when the hemoglobin oxygen saturation was lower than 90 per cent for more than 3 minutes; arrhythmia that needed treatment; excessive bleeding when blood transfusion was given; cardiac arrest, bladder perforation, and TURP syndrome. Factors affecting risk of complications, i.e. type and volume of intravascular replacement and of the irrigating fluid, duration of surgery, and weight of the excised tissue were also recorded.

Analysis

Patients' characteristics, IPSS scores, and quality of life scores were described by the means and standard deviation. Pre-operative and 1.5 months post-operative scores were compared using paired *t*-test and 95 per cent confidence interval.

RESULTS

During the 13 months there were 269 consecutive males who received TURP. The mean ± SD age was 70.44 ± 8.75 years, range 35-97 years.

Changes in IPSS snd QOL scores

International Prostate Symptom Scores significantly improved after TURP, as seen in Table 1. The mean difference between pre- and post-operative IPSS was 6.7 ± 9.1, and 95 per cent CI of mean difference was 5.2-7.8, confirming the significant difference since the entire CI range was above 0. Quality of Life also improved as shown by the mean difference between pre- and post-operative QOL was 3.2 ± 1.6, and 95 per cent CI of mean difference was 2.9-3.5, showing significant difference.

When subgroup analysis was done according to tissue pathology, the improvement in IPSS and QOL were not different between the benign prostatic hyperplasia group and the cancer group.

Diseases, abnormal history, physical examination and laboratory results

ASA classification and associated diseases are reported in Table 2. Mean pre-operative hematocrit was 40.4 per cent (SD 4.6, range 30-50.9%), and low hematocrit was found in 5 patients (1.9%). Mean pre-operative serum sodium was 141.8 mEq/L (SD 4.4, range 128-154 mEq/L), and hyponatremia was found in 2 (0.7%). Abnormal EKG was found in 83 patients (30.9%). Cardiopulmonary symptoms and

Table 1. Pre-operative and 1.5 month-post-operative International Prostate Symptom Scores (IPSS) and Quality of Life score (QOL) (mean ± SD).

Score	Pre-operative	Post-operative	P-value
IPSS			
1. Sense of residual urine	2.9 ± 1.9	0.5 ± 1.1	< 0.001
2. Daytime frequency	2.9 ± 1.8	1.5 ± 1.7	< 0.001
3. Intermittence	2.6 ± 0.2	0.5 ± 1.1	< 0.001
4. Urgency	1.8 ± 1.9	0.7 ± 1.1	< 0.001
5. Weak stream	3.4 ± 1.8	0.5 ± 1.1	< 0.001
6. Hesitancy	2.6 ± 2.0	0.3 ± 0.9	< 0.001
7. Nocturia	3.4 ± 1.4	2.7 ± 1.4	< 0.001
Quality of Life score	4.6 ± 1.2 (range 2-6)	1.4 ± 1.0 (range 0-6)	

Table 2. ASA classification, associated diseases, abnormal history and physical examination of the cardiopulmonary system of the patients.

Associated abnormality	Number	%
ASA classification		
Class 1	26	9.7
Class 2	213	79.2
Class 3	30	11.1
Hypertension	85	31.6
Ischemic heart disease	49	18.2
Diabetes mellitus	42	15.6
Chronic obstructive pulmonary disease	19	7.1
Renal insufficiency	7	2.6
Parkinson disease	3	1.1
CA lung	3	1.1
Hepatitis	2	0.7
Irregular heart rate	1	0.4
Mitral stenosis	1	0.4
Anemia	1	0.4
Morbid obesity	1	0.4
Dyspnea when walked one flight of stairs	37	13.8
CXR showed cardiomegaly	36	13.4
Unable to lie flat	7	2.6
Crepitation at base of lung field	7	2.6
Congested jugular vein	6	2.2
Pretibial edema	5	1.9
Abnormal pulmonary function test	3	1.1

signs were also reported, but since only 1 patient developed TURP syndrome the authors did not try to analyze the risk factors statistically.

Immediate complication of anesthesia and TURP

Anesthesia, surgery, and their complications are reported in Table 3. Central venous monitoring was done in 22 patients (8.2%). Eight patients were admitted to the ICU, 2 from suspected TURP syndrome (only one was later confirmed), 1 from massive bleeding, and 5 from preexisting medical problems.

Among 269 cases, one patient was diagnosed with TURP syndrome (0.37%). He was 65 years old with BPH and hypertension with mild cardiomegaly and received propranolol 120 mg/day to control his blood pressure. Other pre-operative lab investigations were within normal limits, serum sodium was 142 mEq/L. On the day of the surgery the premedication was oral diazepam 5 mg, propranolol 40 mg, and nitroderm 5 mg applied to the chest wall. Anesthetic technique was spinal block with 0.5 per cent hyperbaric bupivacaine 1.75 ml the anesthetic level of which reached T10. Thirty minutes into the operation, there was marked bleeding, and transamine 2 ml was given. Intra-operative irrigating fluid used was 16 liters of sterile water. The patient complained of tightness in the chest and chlorphenilamine maleate 10 mg, dexamethasone 5 mg, and frusemide 5 mg were given, but the symptoms deteriorated. Within 2 minutes, his blood pressure rose to 180/110-200/100 mmHg. The central vein was then cannulated and CVP was found to be 16 mmH_2O. Serum sodium was found to be 126 mEq/L. The patient developed bradycardia 40 beat/min, and atropine 0.6 mg was given. Other treatments were cardepine and dormicum. The weight of his excised prostatic tissue was 57.5 g. The patient was sent to the ICU with the diagnosis of TUR syndrome and normal saline was given. There was bleeding from the prostatic bed that was treated by irrigation and blood transfusion. EKG, CXR and coagulogram were normal. The patient was discharged from the ICU after one night's stay. Before discharge his serum sodium was138 mEq/L.

There was one surgical mortality. A 97-year-old patient with BPH had spastic lower extremities and had not walked for 5 years. Pre-operative EKG showed first degree AV block, inverted T in V1-V4, ST depression in V4, prolonged PR interval. Other lab investigations were normal. Epidural block was tried without success, so the patient was given general anesthesia with thiopentone, succinyl choline, fentanyl, nitrous oxide, oxygen, isoflurane and vecuronium. Irrigating fluid used was 15 liters of sterile water and 10.5 g of prostate was excised during the surgery, which lasted 45 minutes. The patient received 200 ml of Ringer lactate solution and frusemide 20 mg intravenously. After the operation he was extubated and sent to the ICU because of his age. On admission at the ICU, he had confusion, stable vital signs, serum sodium was 130 mEq, hematocrit 40 per cent. After 1 day in the ICU, he was discharged to the ward. But 12 hours afterwards he had sudden cardiac arrest, CPR, and was transferred back to the ICU. Peritonitis from perforation or bowel gangrene was found. The patient developed septic shock, renal failure, coagulopathy and died 2 days later.

DISCUSSION

This study showed that TURP resulted in statistically and clinically significant improvement in IPSS and QOL scores. However, TURP has its risk of mortality and morbidity. In an age of evidence-

Table 3. Anesthesia and surgery (n = 269).

	Number	%	
Anesthetic technique			
Spinal block	208	77.3	
Epidural block	16	5.9	
Continuous epidural	30	11.2	
General anesthesia	15	5.6	
Intravenous fluid			
Crystalloid	269	100.0	mean 577.5 ml
Colloid given	12	4.5	mean 620.0 ml
Blood transfusion			
Packed red cell	7		
Whole blood	5		
Intra-operative complication			
TURP syndrome	1	0.37	
Hypotension	32	11.9	
Arrhythmia	6	2.2	
Massive bleeding	5	1.9	
Bladder perforation	2	0.7	
Shivering	3	1.1	
Duration of surgery (min)			
≤ 90	259	96.3	mean 38.7 ± 25.6
> 90	10	3.7	range 4-145 min
≤ 60	231	85.9	
> 60	38	14.1	
Irrigating fluid			
Sterile water	261	97.0	mean 11.3 ± 7.8
Glycine	8	3.0	range 0.5-57 liter
Prostate weight (gm) (n = 249)			
≤ 45 g	224	90.0	mean19.82 ± 7.9
> 45 g	25	10.0	range 1-135.4 g
Operation			
TURP only	236	87.7	
with cystolithotripsy	12	4.5	
with herniorrhaphy	13	4.8	
with orchidectomy	7	2.6	
with diverticulectomy	1	0.4	
Pathology			
Benign	200	74.3	
Cancerous	27	10.0	
Unspecified	42	15.6	

based medicine and information, urologists and anesthesiologists need to be able to present the patients with data of desired and adverse effects.

TURP syndrome has a high morbidity/mortality. It has been reported to occur from 15 minutes into the procedure[4] until as late as 24 hours after the operation[5]. The incidence was 10-15 per cent [6], and the mortality rate 0.2-0.8 per cent[7]. The risk factors of TURP syndrome, according to the American Urological Association Co-operative Study, are a prostatic gland larger than 45 g, and resection time longer than 90 minutes. Violation of the prostatic capsule, hydrostatic pressure of irrigation solution > 60 cmH_2O could increase the absorption of the irrigation fluid.

The geriatric population is increasing in number and TURP is a very common procedure in the elderly. In this series of 269 males, the mean age was 70.4 ± 8.8 years. The most common preexisting medical problems were hypertension, ischemic heart disease, and diabetes mellitus. The most common abnormal lab investigations were abnormal EKG, and cardiomegaly from CXR. More than half the patients were in ASA class II. With the physiological effect

of the procedure, this group of patients becomes a high-risk group.

In 1989, Mebust et al[8] reported immediate and post-operative complications from TURP in 3,885 males, 77 per cent with significant pre-existing problems. The mortality rate of their series was 0.2 per cent, immediate post-operative morbidity rate was 18 per cent, and TURP syndrome occurred in 2 per cent. In two prospective studies with 100 TURP each, one study by Goel[9] found no change in serum sodium and no TUR syndrome occurred. Another study by Agius[1] found that seven patients showed a significant drop in serum sodium, two TUR syndromes occurred and one of them died. In the present study, the mortality rate was 0.37 per cent, intra-operative complications 18.2 per cent, and TURP syndrome occurred in 1 patient or 0.37 per cent. Mebust proposed that the morbidity increased in those who had prostatic gland size > 45 g or an operative time > 90 min[8]. This is because TURP syndrome is believed to result from excessive absorption of irrigating fluid, which caused fluid overload and dilution of plasma electrolytes. In Thailand, the irrigating fluid used is hypotonic sterile water. The problems of hemolysis, hemoglobinemia, hemoglobinuria, severe anemia can occur, but were not found in the present study. Glycine, a nonhemolytic irrigating fluid was used in only 3 per cent of the cases because of its price. Glycine is metabolized to glycolic acid and ammonium, and ammonia intoxication has been suggested as a possible cause of the TUR syndrome, as has the direct toxic effect of glycine[10]. The authors did not use other more objective equipment to prevent TUR syndrome, such as monitoring the increased bladder pressure[11], load cell transducer placed under the operating table[12], or ethanol in expired breath to measure the absorbed glycine[13].

The anesthetic technique of choice in the authors' institute is spinal block. General anesthesia is used only when regional anesthesia fails. The advantage of regional anesthesia is that the symptoms and signs of TURP syndrome can be detected promptly by the change in consciousness and dyspnea[14]. When these occur, surgery should be stopped and diuretics should be given. The disadvantage of spinal block was intra-operative hypotension that occurred in 11.9 per cent, and was not associated with massive bleeding or long duration of surgery. Six patients who developed intra-operative arrhythmia that needed treatment were all bradycardia, 5 patients had not had bradycardia before, and one patient had 2nd degree AV block in his pre-operative EKG.

The present study showed the follow-up of patients for only 1.5 months. In one long-term study [15] 79 per cent of the patients were still satisfied after 16 years, their post-operative incidence of urethral stricture and bladder neck contracture were 1.5 per cent and 2.4 per cent respectively. The authors propose that tertiary care hospitals should try to improve long-term complications follow up such as incontinence and impotence[16]. In this era of medical information technology, surgeons and anesthesiologists have to be able to advise patients with evidence-based information.

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ความเสี่ยงและประสิทธิผลของการผ่าตัดต่อมลูกหมาก

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หลักการและเหตุผล : แพทย์จำเป็นต้องมีข้อมูลเกี่ยวกับผลดีและอาการแทรกซ้อนของการผ่าตัดต่อมลูกหมากโดยผ่านทาง urethra (transurethral resection of prostate, TURP) เพื่อให้คำแนะนำผู้ป่วยที่จะมารับการผ่าตัด การควบคุมคุณภาพการรักษาพยาบาลจำเป็นต้องมีข้อมูลปัจจุบันเพื่อใช้เปรียบเทียบกับผลการรักษาในอนาคต

จุดประสงค์ : ต้องการทราบว่า 1. การผ่าตัด TURP สามารถลดคะแนนอาการของโรคต่อมลูกหมาก (International prostate symptom scores, IPSS) และเพิ่มคะแนนคุณภาพชีวิต (Quality of life score, QOL) ที่เกี่ยวข้องกับการปัสสาวะให้คะแนนเหล่านี้หลังผ่าตัด แตกต่างจากคะแนนก่อนผ่าตัดอย่างน้อยร้อยละ 25 ได้หรือไม่ 2. ผู้ป่วยมักมีโรคประจำตัวอะไรบ้าง 3. การผ่าตัดนี้มีอัตราตายและอาการแทรกซ้อนในระยะแรกอย่างไรบ้าง

วิธีการศึกษา : ใช้วิธีการศึกษาแบบไปข้างหน้า เปรียบเทียบระหว่างก่อนและหลังการผ่าตัด ผู้ป่วยทุกรายที่มารับการผ่าตัดในโรงพยาบาลตติยะภูมิแห่งหนึ่งได้ถูกนำมาศึกษา ทำการบันทึก IPSS และ QOL scores ก่อนผ่าตัดและหลังผ่าตัดได้หนึ่งเดือนครึ่ง ผู้ป่วยถูกประเมินสภาวะ cardiopulmonary reserve และภาวะหัวใจล้มเหลว การระงับความรู้สึกใช้การฉีดยาชาเฉพาะที่ bupivacaine ร้อยละ 0.5 เข้าไขสันหลัง บันทึกอาการแทรกซ้อนที่เกิดจากการระงับความรู้สึกหรือจากการผ่าตัดตามข้อกำหนด

การวิเคราะห์ : เปรียบเทียบ IPSS และ QOL scores ก่อนผ่าตัด และหลังผ่าตัด โดยใช้ paired *t*-test และร้อยละ 95 confidence interval

ผลการศึกษา : ในช่วงเวลา 13 เดือน มีผู้ป่วยรับการผ่าตัด TURP 269 คน อายุเฉลี่ย 70.4 (8.8 ปี ความแตกต่างระหว่างก่อนผ่าตัดและหลังผ่าตัดของ IPPS คือลดลง 6.7 $\pm$ 9.1 (95% CI 5.2–7.8) ความแตกต่างระหว่างก่อนผ่าตัดและหลังผ่าตัดของ QOL คือเพิ่มขึ้น 3.2 $\pm$ 1.6 (95% CI 2.9–3.5) ผู้ป่วยส่วนใหญ่มีสภาวะร่างกายจัดตาม ASA กลุ่มที่ 2. โรคที่พบบ่อยก่อนผ่าตัดได้แก่ ความดันเลือดสูง (ร้อยละ 31.6), โรคหัวใจขาดเลือด (ร้อยละ 18.2), โรคเบาหวาน (ร้อยละ 15.6), และโรคปอดอุดกั้นเรื้อรัง (ร้อยละ 7.1) วิธีระงับความรู้สึกเป็น spinal block (ร้อยละ 77.3), epidural block (ร้อยละ 5.9), continuous epidural (ร้อยละ 11.2), และ general anesthesia (ร้อยละ 5.6) ได้รายงานอาการแทรกซ้อนที่เกิดขึ้นระหว่างผ่าตัด พบกลุ่มอาการ TUR ในผู้ป่วย 1 ราย (ร้อยละ 4.7) มีผู้ป่วยถึงแก่กรรมอันเป็นผลจากการผ่าตัด ในวันที่ 3 หลังผ่าตัด จำนวน 1 ราย เนื่องจากมีการช็อคซึ่งอาจเกิดเนื่องจากลำไส้ทะลุ

สรุป : พบว่าหลังการผ่าตัด TURP อาการและคุณภาพชีวิตของผู้ป่วยดีขึ้นอย่างมีนัยสำคัญ แต่มีผู้ถึงแก่กรรม 1 ราย และเกิดกลุ่มอาการ TUR 1 รายในจำนวนผู้ป่วย 269 คน

คำสำคัญ : การผ่าตัดต่อมลูกหมาก, ความเสี่ยง, ประสิทธิผล

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