

TRANS-URETHRAL PROSTATECTOMY

By S. L. Yong

SYNOPSIS

T.U.R. prostate is a safe operation, which can be used in the majority of patients with prostatic enlargement.

Patients have a smooth and brief convalescence. Complications of the operation are few.

Hospital bed occupancy and blood utilization rate are lower following T.U.R. prostate than following open prostatectomy.

INTRODUCTION

Among the surgical techniques for the removal of enlarged prostates, the classical Freyer's trans-vesical and Millin's retropubic prostatectomies are well-known to surgeons in this region.

Transurethral resection of the prostate (T.U.R. prostate) was popularised in the 1930's in the United States of America. Since then, this operation has gained firm advocates both there and in Europe (Mitchell, 1970).

Though individual variations in techniques occur, T.U.R. prostate is by now a well-established method of prostatectomy (Baumrucker, 1968).

MATERIAL STUDIED

At the University Hospital, Kuala Lumpur, T.U.R. prostate was introduced by the author in September 1969. This paper is a record of his experience with the first 100 consecutive cases.

During the same period, 28 open prostatectomies were performed by the author and his colleagues in the Department of Surgery.

The Types of Patient Treated

Age: Fig. 1 shows the age distribution of the two groups of patients.

Ethnic Groups: The racial distribution of patients approximates the ratio of ethnic groups over the age of 65 years admitted to the University Hospital in 1969 (Hospital Universiti, 1971).

Mode of Admission: As shown in Fig. 2, the majority of admissions were emergencies, most of these patients being in acute retention of urine.

Complications of Primary Disease: Less than 20% of either group of patients had no detectable complication of prostatic obstruction when admitted (Fig. 3).

In the two groups, more than half had significant pyuria. 57.2% of the first group and 32% of the second group had positive urine culture on admission.

The other complications are listed in Fig. 3.

Associated Diseases:

(a) CARDIOVASCULAR SYSTEM

Only one quarter of the patients were free of detectable cardiovascular disease.

Fig. 4 shows the types of cardiovascular diseases found.

(b) RESPIRATORY SYSTEM

Only about half of the patients had no detectable respiratory disease.

Old or active tuberculosis, emphysema, chronic bronchitis and asthma were detected in the rest of the patients (Fig. 5).

(c) DIABETES MELLITUS

This was found in one patient of the open prostatectomy group and in six patients of the T.U.R. group (Fig. 5).

RESULTS

1. Anaesthetic Technique Used

75% of open prostatectomy were performed under general anaesthesia. The rest were performed under epidural or high spinal anaesthesia.

Only 60% of T.U.R. prostate required general anaesthesia. Caudal or low spinal anaesthesia was adequate for 34% of the cases. 6% were given epidural or high spinal anaesthesia (Fig. 6).

2. Duration of Operation

65% of T.U.R. prostate were completed in less than one hour, and another 30% between 1-1½ hours.

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T. U. R. PROSTATE

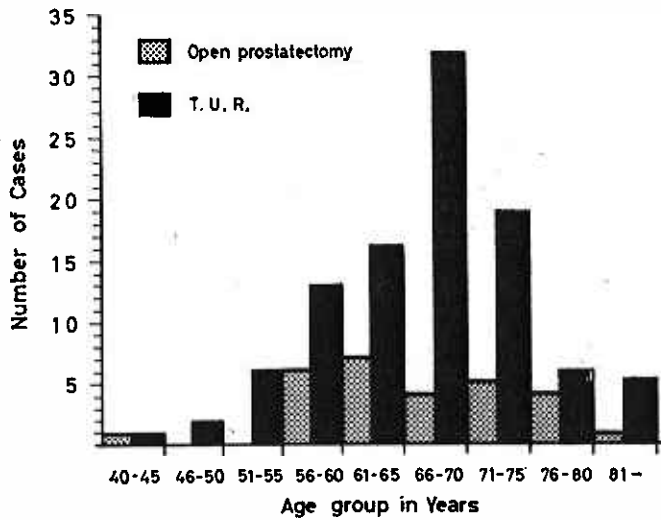


Fig. 1. Age Distribution: The peak incidence of cases undergoing T.U.R. prostate was in the 66-70 age group. Age distribution of cases undergoing open prostatectomy was more evenly spread out.

**T.U.R. PROSTATE
MODE OF ADMISSION**

	Open Prostatectomy		T.U.R.	
	Number	%	Number	%
Elective	1	3.6	18	18
Urgent	5	17.8	4	4
Emergency	22	78.6	77	77
Others	—	—	1	1
TOTAL	28	100.0	100	100

Fig. 2. Mode of Admission: Emergency admissions comprised over 75% in either group of patients.

**T.U.R. PROSTATE
COMPLICATIONS OF PRIMARY DISEASE**

	Open Prostatectomy		T.U.R.		
	Number	%	Number	%	
No Abnormality Detectable	5	17.8	19	19	
Urinary Infection	Pyuria	15	53.6	54	54
	Positive urine culture	16	57.2	32	32
Raised Blood Urea (> 55 mg. %)	5	17.8	26	26	
Hydronephrosis and Hydroureter	2	7.2	6	6	
Vesical Diverticula	5	17.8	35	35	
Vesical Calculi	6	21.4	14	14	

Fig. 3. Complications of Primary Disease: Only a small proportion of cases showed no complication of the primary disease on admission. Infection of urine was the dominant complication.

T.U.R. PROSTATE
ASSOCIATED DISEASES
(A) Cardiovascular System

	Open Prostatectomy		T.U.R.	
	Number	%	Number	%
(A) No Abnormality Detectable	7	25.0	22	22
Hypertension	8	28.6	31	31
Clinical Signs of Disease	1	3.6	20	20
Radiological Evidence of Disease	19	67.9	62	62
Electrocardiographic Abnormalities	15	53.6	63	63
Anaemia	2	7.2	3	3

Fig. 4. Associated Diseases: (a) Cardiovascular System: Cardiovascular disease was not detectable in less than a quarter of all cases.

T.U.R. PROSTATE
ASSOCIATED DISEASES
(B) Respiratory System
(C) Diabetes Mellitus

	Open Prostatectomy		T.U.R.	
	Number	%	Number	%
(B) No Abnormality Detectable	16	57.2	43	43
Pulmonary Tuberculosis	3	10.8	26	26
Emphysema	7	25.0	23	23
Chronic Bronchitis	6	21.4	18	18
Asthma	2	7.2	5	5
Others	0	0	1	1
(C) Diabetes Mellitus	1	3.6	6	6

Fig. 5. Associated Diseases: (b) Respiratory System; (c) Diabetes Mellitus: Only about half of all cases had no detectable respiratory disease. Diabetes mellitus was present in a small number of cases.

T.U.R. PROSTATE
ANAESTHETIC TECHNIQUE

	Open Prostatectomy		T.U.R.	
	Number	%	Number	%
General Anaesthesia	21	75	60	60
Epidural or High Spinal Anaesthesia	7	25	6	6
Caudal or Low Spinal Anaesthesia	0	0	34	34
TOTAL	28	100	100	100

Fig. 6. Anaesthetic Technique: Note the significant number of cases who underwent T.U.R. prostate under caudal or low spinal anaesthesia.

Of open prostatectomy, 46.4% were completed between 1-1½ hours, and 25% between 1½-2 hours. Four cases took less than 1 hour each and four other cases took more than two hours each (Fig. 7).

3. Blood Replacement

Almost half of those patients undergoing T.U.R. prostate did not require blood replacement at all in the operative and post-operative period. 33% required 1 unit of blood only.

By contrast, 60.7% of patients undergoing open prostatectomy required 1 to 2 units of blood. Another 21.4% required 3 units of blood and 14.3% required 4 units of blood transfusion (Fig. 8).

4. Intra-Operative Complications

There was no intra-operative death in either series of patients.

No complication was encountered during 67.9% of open prostatectomy and 83% of T.U.R. prostate (Fig. 9).

Evidence of haemorrhagic shock was seen in 28.5% of patients undergoing open prostatectomy, and in only 6% of T.U.R. prostate.

Three complications specific to T.U.R. prostate were seen. In one case, the bladder was accidentally perforated. This was drained suprapubically in the operating room, without further sequelae. In eight cases, capsular perforation was detected. Signs of water intoxication were seen in three further cases (Marx and Orkin, 1962; Madsen, 1970).

**T.U.R. PROSTATE
DURATION OF OPERATION**

	0 - 30 minutes	31 - 60 minutes	61 - 90 minutes	91 - 120 minutes	More than 121 minutes
Open Prostatectomy	0	4 (14.3%)	13 (46.4%)	7 (25.0%)	4 (14.3%)
T.U.R.	23 (23%)	42 (42%)	30 (30%)	3 (3%)	2 (2%)

Fig. 7. Duration of Operation: The duration of T.U.R. prostate was somewhat shorter than that of open prostatectomy.

**T.U.R. PROSTATE
INTRA-OPERATIVE
COMPLICATIONS**

	Open Prostatectomy		T.U.R.	
	Number	%	Number	%
No Complication	19	67.9	83	83
Haemorrhagic Shock	8	28.5	6	6
Perforation into Peritoneum	1	3.6	—	—
Perforation of Bladder*	—	—	1	1
Perforation of Capsule*	—	—	8	8
Water Intoxication*	—	—	3	3
TOTAL	28	100	101**	101**

*Complications restricted to T.U.R.

**Capsular perforation led to haemorrhagic shock in 1 case of T.U.R.

Fig. 9. Intra-Operative Complications: The majority of cases in both groups did not suffer from any complication during surgery. There was a significant number of cases who developed evidence of haemorrhagic shock during open prostatectomy.

**T.U.R. PROSTATE
BLOOD REPLACEMENT**

	Open Prostatectomy		T.U.R.	
	Number	%	Number	%
Nil required	1	3.6	49	49
1 - 500 ml. used	8	28.6	33	33
501 - 1000 ml. used	9	32.1	12	12
1001 - 1500 ml. used	6	21.4	3	3
1501 - 2000 ml. used	4	14.3	3	3
TOTAL	28	100.0	100	100

Fig. 8. Blood Replacement: Almost half of all cases undergoing T.U.R. prostate did not require blood replacement at all.

T.U.R. PROSTATE
PATHOLOGY OF PROSTATE

	Open Prostatectomy		T.U.R.	
	Number	%	Number	%
Benign prostatic hyperplasia	27	96.4	81	81
Carcinoma of prostate	0	0	7	7
Bladder neck hypertrophy	1	3.6	12	12
TOTAL	28	100	100	100

Fig. 10. Pathology of Prostate: The histological types of tissue removed by the open method and by T.U.R. prostate are shown.

T.U.R. PROSTATE
POST-OPERATIVE COMPLICATIONS

(A) No Complication
(B) Infective Complications

	Open Prostatectomy		T.U.R.	
	Number	%	Number	%
(A) No Complication	8	28.6	50	50
(B) Pyrexia	2	7.2	5	5
Urine Infection	4	14.4	5	5
Urethritis	2	7.2	4	4
Wound Infection	9	32.1	2*	2*
Epididymo-Orchitis	5	17.8	10	10
Septicaemia Shock	3	10.8	1	1

*Infection of vasectomy wound = 1
Infection of suprapubic lithotomy wound = 1

Fig. 11. Post-Operative Complications: (a) No complication; (b) Infective complications: Half of those undergoing T.U.R. prostate did not suffer from any complication post-operatively. Wound infection rate was high among patients who underwent open prostatectomy.

T.U.R. PROSTATE
POST-OPERATIVE COMPLICATIONS

(C) Haemorrhagic Complications
(D) General Complications

	Open Prostatectomy		T.U.R.	
	Number	%	Number	%
(C) Clot Retention	1	3.6	3	3
Cystostomy for Bleeding	1	3.6	0	0
Secondary Haemorrhage	2	7.2	6	6
(D) Chest Infection	2	7.2	3	3
Congestive Cardiac Failure	0	0	1	1
Cerebro-vascular Accident	0	0	2	2
Deep Vein Thrombosis	0	0	1	1
Renal Failure	0	0	1	1

Fig. 12. Post-Operative Complications: (c) Haemorrhagic complications; (d) General complications: The incidence of haemorrhagic and general complications during convalescence was quite low.

T.U.R. PROSTATE
POST-OPERATIVE COMPLICATIONS

(E) Late Complications

	Open Prostatectomy		T.U.R.	
	Number	%	Number	%
(E) Persistent symptoms requiring repeat operation	2*	7.2	3	3
Persistent supra-pubic leakage	3	10.8	0	0
Incontinence	1	3.6	5	5
Urethral Stricture	1	3.6	3	3

*Both cases were successfully treated by T.U.R. subsequently.

Fig. 13. Late Complications: These were uncommon.

5. Pathology of Prostate

In 27 cases, specimens of the prostate removed by the open method showed benign prostatic hyperplasia and one case had bladder neck hypertrophy. There was no carcinoma of prostate in this group.

81% of prostates removed endoscopically were benign and 7% were malignant. Bladder neck hypertrophy was present in 12% of cases (Fig. 10).

6. Post-Operative Complications

(a) *No Complication*: Only 28.6% of open prostatectomy had an uncomplicated convalescence (Fig. 11).

50% of T.U.R. prostate were uncomplicated post-operatively.

(b) *Infective Complications*: Wound infection dominated the post-operative course following open prostatectomy, being present in 32.1% of cases (Fig. 11).

Epididymo-orchitis was seen following 17.8% of open prostatectomy and 10% of T.U.R. prostate.

Septicaemic shock was detected in 10.8% of open prostatectomy and only in 1% of T.U.R. prostate.

Urine infection was found in 14.4% of open prostatectomy and 5% of T.U.R. prostate post-operatively.

Purulent urethritis was present in 7.2% of cases after open prostatectomy and 4% after T.U.R. prostate.

(c) *Haemorrhagic Complications*: Clot retention occurred in one case of open prostatectomy, requiring cystostomy for control of the bleeding (Fig. 12).

3% of T.U.R. prostate developed clot retention which was corrected by closed irrigation of the bladder.

Secondary haemorrhage was seen in just over 5% of all cases.

(d) *General Complications*: These were infrequent. Chest infection was seen in 7.2% of open prostatectomy and 3% of T.U.R. prostate (Fig. 12).

(e) *Late Complications*: Incontinence of urine was seen in about 5% of all cases. All of them recovered continence during the follow-up period (Fig. 13).

Urethral stricture followed about 3% of all operations. Repeated urethral dilatation was adequate in maintaining satisfactory urinary stream.

Two cases of open prostatectomy and three cases of T.U.R. prostate had persistent retention of urine. All were successfully treated by T.U.R. prostate subsequently.

Three cases following open prostatectomy had suprapubic leakage. All but one recovered with conservative treatment. The exception was a man aged 88 years who developed septicaemic shock and was discharged at the relative's request, with a persistent suprapubic fistula. He was moribund on discharge.

7. Mortality

The case mentioned above constituted the only death in the 28 open prostatectomies.

One man aged 75 years had a cerebro-vascular accident 3 days following T.U.R. prostate. He was deeply comatose on discharge, at his son's own request and is presumed to have died at home.

8. Duration of Convalescence

No patient who had undergone open prostatectomy left hospital in the first post-operative week. 46.4% were discharged in the second post-operative week, 32.1% in the third week. Five cases of open prostatectomy (17.9%) stayed more than 4 weeks (Fig. 14).

T.U.R. PROSTATE
DURATION OF CONVALESCENCE

	Open Prostatectomy		T.U.R.	
	Number	%	Number	%
Within 7 days	0	0	52	52
8 - 14 days	13	46.4	33	33
15 - 21 days	9	32.1	5	5
22 - 28 days	1	3.6	8	8
29 days or more	5	17.9	2	2
TOTAL	28	100.0	100	100

Fig. 14. Duration of Convalescence: Half of the patients undergoing T.U.R. prostate were discharged within 1 week.

52% of the patients following T.U.R. prostate were discharged within 1 week after operation. 33% were discharged in the second week.

DISCUSSION

The majority of patients operated upon were in acute retention of urine when admitted. Moreover, more than half of them were found to have infected urine on admission. Elevation of blood urea was found in many of these patients. These facts indicate a reluctance on the part of patients to seek early attention for their urinary symptoms. This delay in presentation compares unfavourably with other series (Bennett and Harrison, 1969).

Though hydronephrosis and hydroureter were seen in only a few cases in this series, the incidence of vesical diverticula and bladder calculi is high. This is another indication of the undue delay in presentation.

The presence of cardiovascular and respiratory disease emphasizes the advanced age group to which these patients belong.

The proper selection of anaesthetic technique in elderly patients with cardiovascular and respiratory disease is critical. The presence of renal impairment makes it even more so. In this context, transurethral resection of the prostate, which can be readily carried out under low spinal anaesthesia, carries a distinct advantage over the open techniques of prostatectomy.

The relative brevity of the transurethral operation, combined with the relative lower incidence of haemorrhagic complications during operation, further enhances the advantage of T.U.R. prostate.

Surgeons in this region labour under difficult conditions. Two of the problems commonly faced are the acute shortage of hospital beds and the small reserve of blood available for surgical procedures. Here again, transurethral prostatectomy reduces the demand on these valuable commodities, thus permitting more cases to be treated with limited resources. In 1969, operations on the prostate were the third most common group of operations performed on male patients over the age of 65 years at the University Hospital (Hospital Universiti, 1971).

The brief and uneventful convalescence that patients can confidently anticipate following T.U.R. prostate and the absence of a painful surgical wound, are facts that would not be lost on our local population. These people, who are so reluctant to seek early relief of their distressing urinary symptoms, could conceivably be encouraged hereby to request treatment before complications occur.

The functional results following T.U.R. prostate were no less gratifying than those following open prostatectomy.

The incidence of haemorrhagic shock during T.U.R. prostate is low (See Fig. 9). This is because haemostasis was ensured during the operation so that blood loss was minimal. If the surgeon is unfamiliar with the technique, haemostasis may be

difficult. Troublesome bleeding will occur if the false prostatic capsule is perforated.

Perforation of the bladder is an avoidable accident. The patient listed in Fig. 9 is such a case. Prompt drainage prevented serious sequelae.

T.U.R. prostate, if prolonged, will lead to water intoxication. The water, being used as an irrigating medium, is absorbed through the prostatic bed. By various means, it has been calculated that between 300 to 2000 ml. have been thus absorbed (Madsen, 1970). This absorbed water can have a profound deleterious effect on the patient. This can be minimised by reducing the time taken to do the operation; using isotonic irrigating media such as Mannitol; and keeping the pressure of the irrigating medium as low as possible. Evidence of water intoxication must be constantly watched out for and treated.

Because of the special problems associated with this operation, T.U.R. prostate should be regarded as an operation which requires specialised training, careful technique and regular practice (Barnes *et al*, 1969).

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