CONTROL OF BLEEDING IN TRANSVERSICAL PROSTATECTOMY AT THE UNIVERSITY TEACHING HOSPITAL

BY

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A Dissertation Submitted in the Partial fulfillment of the requirement for the award of the MASTER OF MEDICINE (General Surgery) Degree of the University of Zambia.

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2006

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I hereby declare that the work presented in this study for the Degree of Master of Medicine in General surgery represents my work and has not been presented either or in part for any other degree and is not being currently submitted for any other degree at the University of Zambia or any other university.

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APPROVAL

This dissertation of Dr Mwila Lupasha is approved in the partial fulfillment of the requirements for the award of the Master of Medicine in Surgery by the University of Zambia.

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ACKNOWLEDGEMENTS

I greatly pay special thanks to Prof. M.A. Labib, Consultant Urologist, Lecturer in Surgery, The University of Zambia, School of Medicine, for his encouragement and the guidance in the development of the research and his ever helping hand throughout the research period. To you, Sir, I say may The Almighty Jehovah God be of guidance to you in every little bit that you do in your life. Thank you,

ABBREVIATIONS

UTH.....University Teaching Hospital

BPH.....Benign Prostatic Hyperplasia

TURP.....Transurethral Resection of the Prostate

DHT.....Dihydrotestosterone

IVP.....Intravenous Pyelogram

Hb.....Hemoglobin

TVP.....Transversical Prostatectomy

CONTENTS

ABSTRACT

With increasing age BPH causes a lot of morbidity in men. At UTH 40% of the patients in the urology clinic are those with BPH.

Treatment of this condition is both by medical and surgical. The goal of surgery is to remove the obstructing mass from within the capsule. This can be removed by several methods. Selection of an open versus closed method depends on the surgeon's preference, skill, size of the prostate and associated anatomical features.

Transurethral resection of the prostate has become the gold standard as a treatment mode of BPH as there is a reduction in surgical risks particularly as regards blood loss. However, at UTH, TVP remains the main mode of treatment for BPH. It is for the same reason that a study looking at bleeding control in TVP was carried out at UTH.

A total number of 50 patients were evaluated in the study and these were patients with confirmed BPH. Details of each patient were collected including pre and postoperative assessment. This was a prospective study.

Blood for hemoglobin and hematocrit was collected both pre operatively and post operatively. The difference between pre operative haemoglobin/hematocrit and postoperative haemoglobin/hematocrit was calculated. The minimum and maximum haemoglobin recruited for study were 10g/dl and 15.2g/dl respectively.

It was found that the mean difference between pre operative hemoglobin and postoperative haemoglobin was 1.686g/dl. The most frequent pre operative and post operative hemoglobin difference was 1.8g/dl, which represented 12% of the total number of patients studied.

Considering the above results, TVP with control of bleeding by suturing the prostatic bed from 3 to 9 O'clock reduces the amount of blood loss and that it can be rendered safe modality for treating BPH.

INTRODUCTION

Benign prostatic hyperplasia affects men over the 40yrs but only 10% will present with urinary symptoms of outflow obstruction. Benign Prostatic Hyperplasia is a common cause of bladder outlet obstruction in Zambia where it poses a burden on the country's health services

With increasing age benign prostatic hyperplasia (BPH) causes a lot of morbidity in men. Frequency of urination is a common early symptom (1). It has been said that the size of the prostate gland does not correlate with the degree of obstruction. Small glands may lead to urinary retention whereas large glands may not.

Difficulties in initiating urination with reduced forcefulness of the urinary stream and residual urine are often present. Suprapubic pain occurs if bladder bacteriuria is present, if a bladder calculus has formed as a result of stagnation of the urine within the bladder, or in acute retention of urine.

In the urology clinic at the University Teaching Hospital (UTH) about 40% (2,978 of 7500 patients) of cases seen per year have BPH (2).

The natural history and epidemiology of the untreated disease had an impact only recently despite its high prevalence (3,4). BPH was not identified as a disease entity until 19th century and it was only during the present century that effective treatment became available.

The treatment is expensive in terms of money and expertise, while complications arising from surgery cause great morbidity and mortality. There are different modalities of treatment that can be divided into conservative management or medical therapy and surgical treatment such as transversical prostatectomy, or transurethral resection of the prostate (TURP). Medical and surgical treatment of this condition is quite expensive and beyond the reach of every average Zambian.

The standard treatments for BPH have traditionally been surgical especially TVP and more recently TURP (5). Later developments include therapy with α-adrenergic blockers, 5α reductase inhibitors and innovative approaches using hypothermia and lasers (5,6). Irrespective of the initial degree of symptom severity prostate surgery results in larger improvements than those reported for either finasteride or α-blocker therapy. Prostate surgery was associated with statistically and clinically significant improvement of BPH symptoms.

Most of the patients with BPH at UTH in Lusaka are managed surgically. The goal of surgery for BPH is to remove the obstructing mass from within the capsule. This can be removed by several methods. Selection of an open versus closed operation depends on the surgeon preference and skill, size of the prostate and associated anatomical features, for example, Hip immobility may rule out lithotomy position.

Transurethral resection of the prostate has become the golden standard as a treatment mode of BPH as there is a reduction in bleeding after the procedure. However at UTH, transversical prostatectomy remains the main mode of treatment for BPH because of the limited resources. Worldwide transurethral prostatectomies are generally performed with a greater number of patients undergoing TURP. This procedure is rarely seen and there is no documentation that has been published regarding TVP with its association with bleeding. It is for this reason that we studied the control of bleeding in TVP. We evaluated the blood loss by assessing haemoglobin pre and post operatively

ANATOMY

There is a contemporary classification of the prostate into zones, which shows that it is divided into; the peripheral zone, which lies posteriorly and from which most carcinomas arise, and a central zone, which lies posterior to the urethral lumen and above the ejaculation duct as they pass through the prostate. The two zones are rather like an egg in its eggcup. Smooth muscle cells are found through out the prostate. In the upper part of the prostate and the bladder neck there is a separate sphincter muscle that conserves a sexual function; closing during ejaculation. Resection of this tissue is responsible for retrograde ejaculation (3).

The glands in the peripheral zone lie in the fibro muscular stroma and their ducts, which are long and branched, open into posterolateral grooves on either side of the verumontanum. The glands of the central zone are shorter and branched. All these ducts and the prostatic utricle open into prostatic

urethra. No wonder that infection of the prostatic urethra is difficult to eradicate.

The main arterial supply is from prostatic branch of the inferior vesicle artery with some small branches from the middle rectal and the internal pudendal vessels. The veins run into the plexus between the true and the false capsules and this joins the vesicoprostatic plexus situated in the groove between the bladder and the prostate. This plexus receives the deep dorsal vein of the penis and drains backwards into the internal iliac veins. The lymphatics of the prostate are into the internal iliac nodes and a few may reach the external iliac nodes.

The prostate has a sexual function but it is a little unclear how important its secretions are to human fertility. A normal adult prostate undergoes atrophy after castration.

OBJECTIVES

General

1. To assess the control of bleeding as a measure to reduce the mortality and morbidity after transversical prostatectomy.

Specific

1. To assess blood loss in terms of hemoglobin change or Hematocrit level pre and post operatively for transversical prostatectomy.
2. To find out the number of patients receiving blood transfusion after transversical prostatectomy.
3. To compare blood loss with duration of procedure

LITERATURE REVIEW

INTRODUCTION

Transversical prostatectomy was pioneered by Millin in 1947 and was adopted by other surgeons but never gained widespread popularity because of significant complications of bleeding and incontinence (7). In Freyer's operation (1901) the bladder was left open widely and drained by suprapubic tube with a 16mm lumen in order to allow free drainage of blood and urine. Harris (1934) advocated control of the prostatic arteries by lateral stitches inserted with his boomerang needle, the bladder was closed and the wound drained (7). Terrence Millin reported his personal experience of retropubic prostatectomy with 20 patients in 1969 (8) saying that he commenced TURP in 1930 and by 1949 he had carried out 2000 TURPS. By 1940 the percentage was approximately 80% but with the introduction of safer open prostatectomy the percentage declined to less than 10% in the years before he retired. When TURP was established as a standard of treatment for BPH the use of TVP decreased significantly and subsequently some surgeons have become reluctant to use it because of the perception that it is associated with greater blood loss than TURP (9).

Others have reported a more complicated course and longer hospital stay associated with TVP than after TURP (10). The overall risk rate of blood loss requiring transfusion following TURP is about 2.5%. TURP are designed to decrease blood loss. There is a modified cutting system in TURP that has coagulating cutting device to decrease blood loss. With a modification of TVP to include early vascular control it is possible to reduce blood loss and thus make the procedure a safer alternative for treating BPH

(11,12). In an analysis comparing the outcomes of TURP and TVP, the former was associated with a higher incidence of recurrence requiring a second resection and open surgery with a long-term mortality. In a study by Meyhoff and Nordling (13), surgery for obstruction or recurrence was required in 7% of cases after open surgery and 17-25% after TURP. The degree of blood loss is related to the care with which the surgeon inspects and treats the bleeding points during an operation (14). In a study done by Kachimba (15) there was mild postoperative complications where hemorrhage after open prostatectomy accounted for 1.9% as opposed to 6.9% after TURP. This is in contrast to all series reviewed.

Mallaya (16) reported a high rate of blood transfusion during and after TVP and reported that it reflected the amount of bleeding encountered during open surgery. Kanyi and Eshleman (17) on the other hand had low rate in their TURP study and found no need for blood transfusion.

For over five decades it has been widely accepted that for most men with bladder outlet obstruction requiring surgical treatment TURP is the best option. However recent studies have shown that a quarter (¼) of men fail to do well after TURP (18,19,20) and in a long term, about 20% undergo a second operation. Although TURP is favoured over TVP for most patients, Wenneberg's study (19,20,21) evaluating outcomes indicated that open prostatectomy had better long-term results measured by lower frequency of subsequent prostatectomy, urethral strictures and postoperative cystoscopies. This study found evidence for possible advantages of open prostatectomies even though this operation has largely been replaced by TURP in the developed world. As long as there is no specialist urological training in countries such as Zambia, the best option will continue to be transversical

prostatectomy for BPH (22) and there is no feasible remedy in future unfortunately.

Ahmed showed that where facilities are limited, such as ours in Zambia, TVP is safe, simple and economical (23). This is a finding reflected by Jumbe after his the experience with prostatectomy in Zanzibar using roll gauze packing to control bleeding and it was found that the method was simple, safe, life saving and economical (24).

AETIOLOGY

The major risk factors in the development of BPH include:

1) Increasing age: when man is aging, there is an induction of the maturation process inhibition thereby lowering the rate of cell death leading to cellular accumulation

2) Genetic factors: though no specific gene has been discovered yet, BPH has been demonstrated to be an inherited disease and severe forms have been shown in those with family history of BPH.

3) Hormonal status: dihydrotestosterone (DHT) is derived from testosterone. This is a major intracellular androgenic prostatic metabolite and main stimulator of prostatic growth. With aging prostate becomes more sensitive to androgens (25).

4) Other factor: oestrogen, stromal epithelial interaction and neurotransmitters either singly or in combination are thought to play a role in the aetiology of BPH (26).

SYMPTOMS OF AN ENLARGED PROSTATE

- There is bladder outflow obstruction that results from an enlargement of the periurethral area. This results in acute urinary retention or indeed chronic urinary retention (27) and urinary tract infection, bladder atony or detrusor muscle instability.
- There can be also a sense of incomplete emptying.
- Early return in which the urgency to return to urinate is less than 2hours.
- Urgency – having a strong urge to urinate that is very difficult to postpone.
- Nocturia – having to get up out of bed to urinate during the night.

Other symptoms include;

- Hesitation – frequent stopping and starting of urine flow during a single urinating period.
- Weak stream – urine that trickles out rather than flow strongly.
- Straining – having to push or strain in order to urinate.
- Incontinence – inability to hold urine in.
- Difficulty starting to urinate.
- Dribbling at the end of urination.
- Deep discomfort in the lower abdomen.

DIAGNOSIS AND TESTS

There must be a detailed medical history focusing on the urinary tract, previous surgical procedures, general health and fitness for possible surgical procedures (28).

- ✓ Digital rectal examination may reveal an enlarged firm prostate and also the size. In addition, the examination of the external genitalia must be done. It should however be remembered that the size of the prostate does not correlate with the degree of symptoms and the treatment outcome (29,30,31)

- ✓ Urinalysis may be done to check for infection as well as urine culture.

- ✓ To determine and exclude urinary insufficiency due to the presence of obstructive uropathy, serum Creatinine should be performed.

- ✓ Ultrasonography is done to detect any urinary pathologies and also to see the bladder, ureters and the kidneys including the prostate.

- ✓ Urine flow rate may be measured and the post- void residual urine may be measured as well though the surgical outcome of residual urine volume remains uncertain.

- ✓ Pressure flow studies will measure the pressure in the bladder as the patient urinates. This is called uroflowmetry.

- ✓ Cystoscopy may be performed to visualize the prostate and bladder if surgery is required. Urethroscopy is recommended in men with lower urinary tract symptoms with a history of macroscopic or microscopic haematuria, urethral stricture disease or urethral injury (32),

- ✓ An IVP may be done to confirm the diagnosis and or to look for blockage. This should not be done routinely unless patient has had history of urolithiasis, history of surgery in the urinary tract, renal insufficiency and haematuria (32).

PATIENTS AND METHODS

A prospective descriptive study was carried out in the urology unit of the department of surgery at the University Teaching Hospital in Lusaka. This was done in all patients recruited in the study.

The outcome that was looked for was the hematocrit and hemoglobin change pre and post operatively and also the number of patients receiving blood transfusion after the operation.

Study population

A total number of 50 patients seen in clinic 7 prior to the surgery was studied. These patients were from various parts of the country Zambia.

Inclusion criteria

- ✓ Patients had BPH.
- ✓ Hemoglobin was more than or equal to 10g/dl.
- ✓ No urinary tract infections prior to surgery.
- ✓ Absence of severe medical conditions.

Preoperative evaluation

Both in the clinic and on the ward, patients were physically examined and had their prostates evaluated. Those found to have prostate enlargement,

further underwent ultrasonographic examination of the prostate, bladder and kidney as a routine for any patient with BPH.
Patients had their hematocrit and hemoglobin checked as well.

The Operation

The patients were anaesthetized either using spinal or general anesthesia. Pfannestiel incision on the skin was used to access the prostate suprapubically.
After removal of the prostate, chromic catgut 1 suture was run at the prostatic bed from 3 to 9 O'clock to ligate the prostatic vessels.
The 3-way urethral catheter was inserted to drain the bladder as well as the balloon providing pressure on the bleeders, to a certain extent for haemostasis.

Postoperative assessment

Like any other prostatectomy, the bladder was continually irrigated until there was clear urine from the bladder.

Hemoglobin and hematocrit were measured on the 3rd day of operation to compare with the preoperative values.

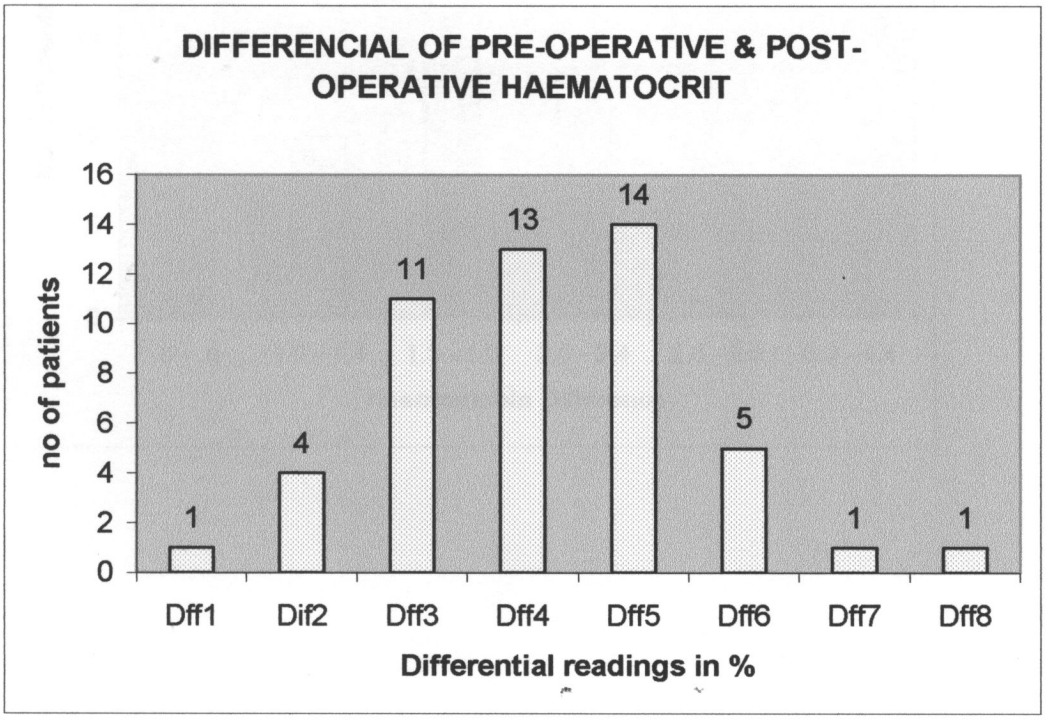
Patients were followed up until discharge from the hospital.

RESULTS

Chart 1 shows the differences in term of hematocrit pre and post operatively. It should be noted here that there was a large number of patients who had a difference of 5%. This number represents about 28% of total population studied.

Chart 1

Comparison of Preoperative and Postoperative Haematocrit differences



.Dff stands for difference in hematocrit pre and post operation

Chart 2 shows the differences between the pre and postoperative hemoglobin. A large number of patients had a difference of 1.8g/dl, which number represented 12% of the total number of patients studied.

CHART 2

Chart 2a: Comparison of Pre-operative and Post-operative Haemoglobin Differences in Patients

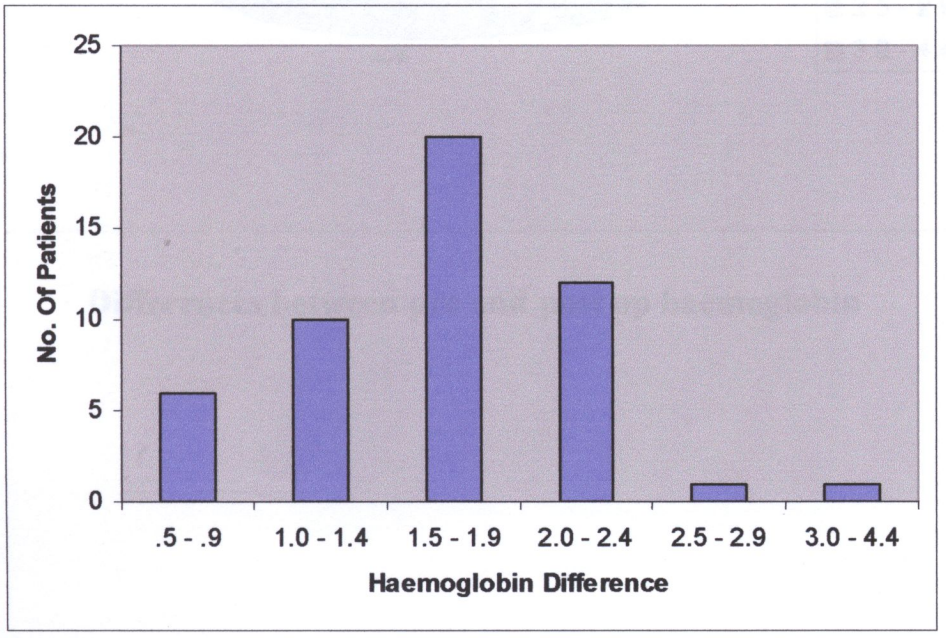
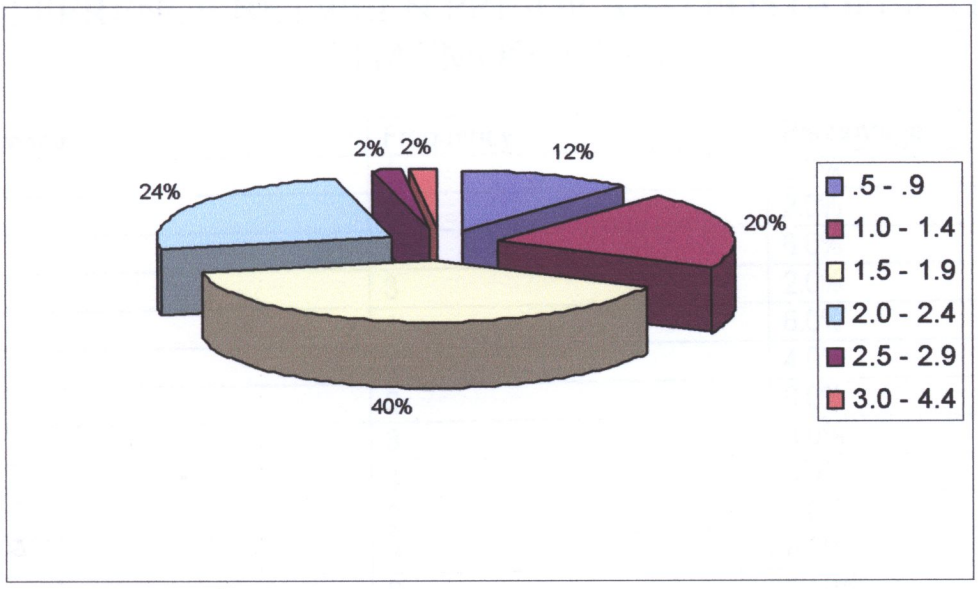


Chart 2b: Comparison of Pre-operative and Post-operative Haemoglobin Difference in Patients by Percentage



Differences between pre and post op haemoglobin

Chart 3 is a table that shows the percentage representation of the differences between the pre and postoperative hemoglobin.

DIFFERENCE BETWEEN PRE-OP AND POST-OPERATIVE HAEMOGLOBIN

Difference	Frequency	Percentage
0.5	1	2.0%
0.6	1	2.0%
0.7	1	6.0%
0.9	3	2.0%
1.1	1	8.0%
1.2	4	4.0%
1.3	2	6.0%
1.4	3	8.0%
1.5	4	6.0%
1.6	3	6.0%
1.7	3	6.0%
1.8	6	12.0%
1.9	4	8.0%
2.0	1	2.0%
2.1	4	8.0%
2.2	3	6.0%
2.3	4	8.0%
2.5	1	2.0%
4.1	1	2.0%
Total	50	100.0%

Total	Mean	Maximum	Mode	Minimum
50	1.686	4.100	1.800	0.500

"t", testing whether mean differs from zero.

Chart 4. shows the difference and the percentage representation between the pre and post operative hematocrit

Difference between pre and post hematocrit	Frequency(number of patients)	Percentage (%)
1	1	2
2	4	8
3	11	22
4	13	26
5	14	28
6	5	10
7	1	2
8	1	2
total	50	100

Chart 5 indicates the percentage of patients who received blood transfusion after the operation.

Number of patients	Blood transfused patients	Percentage transfusion (%)
50	0	0

The results obtained showed that the lowest hemoglobin value recruited for the study was 10g/dl and that the highest was 15.2g/dl. These patients had hematocrit of 30 and 45% respectively.

The mean difference of the hemoglobin pre and postoperative was 1.686g/dl with the lowest being 0.5g/dl and the highest being 4.1g/dl. Hematocrit percentage difference was averaging 4.18 the minimum being 1.000 and the maximum being 8.000%.

The mode in hemoglobin frequency was 1.8g/dl while for hematocrit it was 5%. These made about 12% of the total number of studied patients.

Out of the 50 patients recruited in the study none of them had to receive blood transfusion.

DISCUSSION

Transversical prostatectomy is one if the not the commonest operation performed in patients with BPH. This study showed that TVP is an acceptable procedure by many patients and it was tolerated well considering the fact that there was no significant short term complication after the procedure.

It should be noted here that there was a large number of patients who had hematocrit difference of 5%. This number represents about 28% of total population studied as is shown in charts 1 and 4.

Hematocrit was done because it is quite more sensitive and shows quick change when there is any blood loss compared to the hemoglobin which takes some bit of time. Comparing the two tables, chart 1 and chart 2a, they show normal distribution curve.

The method of assessing blood loss was adapted from Jeffrey et al (39) who estimated the blood loss after TVP to be about 1.67g/dl. There was a much higher figure of 3.7g/dl reported at the University of Virginia in a March 2003 study. This compares well with our findings in the study as shown in charts 2a and b. where the average blood loss was 1.687g/dl.

It is estimated that 400mls blood equals 1g/dl of haemoglobin. A comparison study done by Thomas A (40), he found that in open,

laparoscopic and Robotic assisted laparoscopic prostatectomy there was an estimated blood loss of 0.94g/dl, 1g/dl and 0.29g/dl respectively. In a study done by Bapat R D et al, it was found that the blood loss on an average was between 0.25 to 0.625g/dl (38). These compares well with what was found in this study.

Transversical prostatectomy patients lost 3.7g/dl of blood compared to those who received robotic assisted prostatectomy. This was in a study of prostatectomies done at University of Virginia in March 2006. If this is compared with what was found in the study, the blood loss was far too much than ours.

In a study done Jeffrey et al, the mean estimated blood loss was lower in TURP group than in the standard transversical prostatectomy group, 0.59g/dl and 1.67g/dl, respectively. Postoperatively, there were no significant complications in either group (39). These figures are similar to what was found in our study were the average blood loss was 1.687g/dl, which is about 680mls of blood.

With the suturing of the prostatic bed with chromic cat gut suture there was significant reduction in blood loss post operatively such that in our series the complication resulting in blood transfusion was not an issue as seen in chart 5.

In this prospective study, it has shown that transversical prostatectomy has minimal complications with significant improvement in clinical symptoms of BPH. No one patient received blood transfusion after undergoing the operation in this study. One of the intraoperative complications associated

with either TURP or TVP is intraoperative bleeding. Mallaya showed that there was a high rate of blood transfusion during and after open prostatectomy.

The patients were followed up in the hospital before discharge and the short follow up was inadequate to comment on the late complication. The post operative stay in the hospital was not more than 7 days.

Transversical prostatectomy should be considered when the prostate is > 75 g; it is also the procedure of choice for men who have a concomitant bladder condition, e.g. symptomatic bladder diverticulum or a large, hard bladder calculus. It can be considered in patients with unilateral or bilateral inguinal hernias, as these can be repaired preperitoneally at the same time through the same incision (36). Another indication for transversical prostatectomy is ankylosis of the hips, which prevents proper placement of the patient in the dorsal lithotomy position for TURP (37).

With larger glands the operative duration is longer than for TURP, with an increased chance of TUR syndrome, and thus TVP is a better option. It was seen from the study that the time taken to complete the operation was within one hour.

There was no significant complication for the short period follow up within the hospital which averaged 6 to 7days post operative stay.

CONCLUSION

From the study, it can be concluded that the mortality and morbidity in patients undergoing TVP is reduced after controlling the bleeding by suturing the prostatic bed.

It can also be concluded that the hematocrit and hemoglobin change pre and post operation is minimal and within acceptable limits.

All in all, the operation can be done within an hour without any patient receiving blood transfusion thereafter and therefore rendering the operation safe for treating BPH.

RECOMMENDATIONS

1. There still need to train surgeons to use safer TVP as long bleeding control is done to avoid too much blood loss intra and post operatively.
2. Complications are minimal in TVP and therefore it can be performed safely even in district hospital by trained medical doctor

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EVALUATION FORM

1. Personal details

b) Patient number.....

c) Age/sex.....

d) Hospital number.....

2. Date of admission.....
.
3. Date of discharge.....
...

2. Operation assessment

- Hb/ Hematocrit before operation.....
- Hb/ Hematocrit after operation.....
- Duration of operation (in minutes).....

<30	>30<60	>60<	>120

- Post operation stay.....
- Any subsequent operation.....
- Complications.....
  .....
  .....
  .....