



**Research Article**

JMR 2016; 2(6): 150-154  
November- December  
ISSN: 2395-7565  
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## A one year trend of blood loss during transurethral resection of the prostate as seen at urology department, Kilimanjaro Christian Medical Center in Moshi, Tanzania: Do we avoid unnecessary blood transfusion

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### Abstract

**Background:** Transurethral resection of the prostate (TURP) remains the Gold Standard surgical treatment of Benign Prostate Enlargement. Hemorrhage during and after TURP can lead to significant morbidity and occasionally prove fatal. **Objective:** Our study aimed to evaluate the trend of blood loss in transurethral resection of the prostate for patients who presented with benign prostate enlargement at Kilimanjaro Christian Medical Center (KCMC), Tanzania. **Methods:** This was a one year hospital based descriptive, retrospective study conducted by using a structured data collecting tool. The data were analyzed using SPSS software. **Results:** A total of 72 case notes of patients treated for Benign prostate enlargement by TURP in a period of one year were enrolled and reviewed, all of them were operated under regional spinal anesthesia of which 36.1% had prostate weight ranging from 61-80 followed by 31.9% with 41-60grams, few patients had prostate weight less than 40 grams. Majority of the patients, 63(86.7%) with prostate weight above 41 grams had more blood loss accompanied with prolonged resection time of more than 60 minutes compared with those with prostate weight less than 40grams. Most of our patients 49(68.1%) were transfused one to two unit(s) of whole blood depending on indication(s). **Conclusion:** Blood loss during TURP is correlated positively with the increase in prostate weight and resection time although the type of anesthesia might influence blood loss.

**Keywords:** Blood loss, TURP, Benign Prostate Enlargement

### INTRODUCTION

Transurethral resection of the prostate remains the Gold Standard surgical treatment of Benign Prostatic Enlargement. Hemorrhage during and after TURP can lead to significant morbidity and occasionally prove fatal. Earlier studies assessed the effects of various preoperative characteristics on estimated blood loss. (Hsu *et al*, 2007) found larger prostate volume was associated with significant blood loss during TURP, other factors such as the operating time, type of anesthesia used have also been associated with blood loss during TURP.

However bleeding may also affect the outcome measure in the event that bleeding obscures the operating field preventing adequate visualization by the surgeon possibly preventing him from fully excising the tumour, also bleeding may inspire the surgeon to operate more quickly potentially to the detriment of tumour control. It is also possible that excessive blood loss may interfere with the preservation of external sphincter and neurovascular bundles thus potentially impairing the quality of life.

Mercier in 1841 constructed an instrument designed to remove in small pieces obstructing tissue in the neck of the bladder and he should therefore be considered the first to have practiced transurethral resection of the prostate. Mercier claimed to have done 300 successful operations. For most of the 20<sup>th</sup> century, from 1909 until the late 1990's, the premier treatment of symptomatic benign prostatic hyperplasia was transurethral resection of prostate (TURP). TURP was the first successful minimally invasive surgical procedure of the modern era.

Detailed accounts of how to perform a complete transurethral prostatectomy were published in 1943 by Reed Nesbit of Ann Arbor and Rogers Barnes of Los Angeles. To this day, it remains the criterion standard

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therapy for obstructive prostatic hypertrophy and is both the surgical treatment of choice and standard of care when other methods fail.

Benign Prostatic Hyperplasia- is the increase in fibro muscular stroma and epithelial cells within the transitional zone of the prostate. It involves hyperplasia (increase in number of cells) rather than hypertrophy (a growth in the size of the individual cells). 40% of BPH comprise of smooth muscle as compared to 25% of the normal prostate

The like hood of developing an enlarged prostate increases with age, more than 90% of men over age 80 have the condition. Androgens (testosterone and related hormones) play a permissive role. This is supported by the fact that castrated boys do not develop BPH when they age. Testosterone promotes prostate cell proliferation especially when in its metabolite form of Dihydrotestosterone (Randall *et al*, 1931).

The symptoms of BPH can be divided into either irritative symptoms (increased frequency of micturition, urgency, nocturia) or obstructive (weak stream, intermittency, straining, incomplete bladder emptying, hesitancy). The severity of symptoms is measured by the IPSS score which ranges from 0-35

The management of BPH can be considered in the level of watchful waiting (Education, Reassurance and Follow up), medical treatment (alpha blockers-relax smooth muscles of the prostate and bladder neck, 5-alpha reductase inhibitors-stops the conversion of testosterone to dihydrotestosterone) and surgical intervention which can be endoscopic (TURP) or open as per Indications, contraindications and complications for TURP as reported in some studies (Martin *et al*, 2009; Hofmann *et al*, 2006)<sup>[6, 2]</sup>. From a clinical standpoint Lytton found the incidence of BPH requiring surgical intervention to increase progressively with age to a maximum of 10-9 per 1000 men older than 80 years (lytton *et al*).

In 2008, a research was done in Kathmandu University involving 100 consecutive patients who had undergone TURP over a period of one year. The study showed that there was no correlation between blood loss and the type of anaesthesia administered, resection time and weight of resected prostate, their histology, preoperative catheterization and UTI. It was apparent that there was no set pattern of blood loss related to afore mentioned variables and it was impossible to predict which patient was most likely to have increased perioperative blood loss following TURP. A meticulously performed TURP with reasonable speed and attention to details is the way forward in reducing perioperative blood loss (Kathmandu University, 2008)<sup>[13]</sup>.

In 1995 a study done in University of Toronto, Canada evaluated the effects of spinal versus general anesthetic technique on perioperative blood loss and the development of postoperative coagulopathies in 50 patients undergoing TURP. 6% of the patients developed subclinical intravascular coagulopathies which correlated with mass of resected prostate tissue (Smyth *et al*, 1995)<sup>[14]</sup>.

A study done in Germany assessed the complication of TURP including management and prevention based on technological evaluation. Technological improvements such as Video TUR and training help to reduce perioperative complication such as transfusion rate (Hoffman *et al*, 2005).

A study done in KCMC showed that the average amount of blood loss was 21.1ml/gm of resected prostate tissue. Those resected more than 40g prostate had significantly higher blood loss than those below 40g( $p < 0.001$ ) with patients who had 2 or more units of blood transfusion all having resected 40 or more grams of prostate tissue. Duration of resection in excess of 45 minutes and competence of the

surgeon were also found to be correlated with change in blood volumes. Patients operated on by residents were thrice likely to require transfusion as those operated on by qualified urologist ( $p < 0.001$ ) (Mteta *et al*, 2009)<sup>[6]</sup>, also Kirillos *et al*, 1997<sup>[3]</sup> reported transfusion rate of 10.8% in TURP and 3.6% of more than 2 units in patients undergoing TURP and the mean hemoglobin drop postoperatively of 1.5g/dl. The peri-operative blood loss, as assessed by various indicators, was equivalent to a decrease in Hb of 10-15 g/L (8-11%). The weight of the resected prostatic tissue was the most important measurable factor in determining blood loss. Regional anaesthesia was associated with less blood loss than general anaesthesia. The added use of a suprapubic catheter for irrigation appeared to have a marginal advantage in large resections. The type of presentation, elective or otherwise, and the histological nature of the prostate did not influence blood loss. Smaller transfusions were probably avoidable in patients having smaller resections and a normal pre-operative Hb.

Pickard *et al*, 1998<sup>[11]</sup>, noted that patient characteristics associated with the need for blood transfusion were large prostatic glands and age above 70 years while Luke *et al* noted that bleeding remains one of the most important problems associated with TURP. Although haemostasis is usually sufficient during surgery, re-bleeding may continue for several days requiring blood transfusion and sometimes reoperation. Lewi *et al*, 1983 noted that the risk of postoperative haemorrhage in TURP was related to both the weight of the resected prostatic tissue.

Hatch noted that general anaesthesia resulted in twice the transfusion rate as regional anaesthesia while Madsen *et al* showed a statistically significant advantage in blood loss for spinal over general anaesthesia ( $p < 0.01$ ) in a study of 180 patients. In Kenya, similar trends have been observed by Omar *et al* at the National Blood Transfusion Centre, Nairobi. While the expected blood collection for the region was 16,000 units in 2003, only 8000 units of blood has been collected. They also reported infectious rate of 6% of all screened blood in 2003

Martin *et al* stated that in trans-urethral resection of the prostate the major intraoperative complication remains hemorrhaging that requires blood transfusions. Studies in the 1970s through the 1990s reported on transfusion rates  $< 20\%$ , this rate dropped in more recent series published after the year 2000 to  $< 10\%$  and in most series even to 5%. Due to technological improvements such as improved training of TUR with video technology both the trainee and mentor comfortably observe every technical step of the procedure reducing significant bleeding during the procedure (Martin *et al*, 2009)<sup>[6]</sup>.

## OBJECTIVE

This study aimed to review the trend of blood loss in transurethral resection of prostate for patients who presented with benign prostate enlargement at KCMC for the year 2013.

## METHODOLOGY

### Study design

This was a descriptive; hospital based retrospective study that evaluated all patients treated for Benign Prostate Enlargement by TURP during the study period.

### Inclusion and exclusion criteria

All case notes of patients treated for Benign Prostate Enlargement by Transurethral resection of Prostate (TURP) at Kilimanjaro Christian Medical Centre in Moshi from Jan 2013 to Dec 2013 were enrolled.

Case notes with incomplete information which does not fulfill the requirement of this study were excluded from the study.

**Ethical issues**

Ethical clearance and permission was obtained from Community Department, Kilimanjaro Christian Medical University College and Urology department at KCMC Referral Hospital.

Confidentiality regarding patients' information was maintained; case notes of all patients treated for Benign Prostate Enlargement by Transurethral resection of Prostate (TURP) at Kilimanjaro Christian Medical Centre in Moshi from Jan 2013 to Dec 2013 were enrolled. All patients' information was kept confidential; no patient's direct identifiers were used in the data collection instrument.

**Data processing and analysis**

A structured questionnaire was used to collect data from patient's case notes. Checking of the questionnaire for completeness was done and the entered into computer for analysis where SPSS version 18 was used to analyze the information. Cross-tabulations were generated, and where comparisons were made, significance was considered at p-value of less than 0.05.

**Study limitations**

This study was done at Kilimanjaro Christian Medical Centre in Moshi, thus the findings may not reflect a true image of the trend of blood loss after TURP country wise. Incomplete documentation denied review of some case notes.

**RESULTS**

A total of 72 files were retrieved from the medical records department for the year 2013 for most of them the age was ranging from 61-70(41.7%).The mean age being 69.7[Figure 1].The main indications for TURP was Lower Urinary Tract Symptoms accounting for 54.2% of all the cases followed by hematuria which accounted for 24.6% and recurrent UTI accounted for 12.5% and others such as bladder stone, urinary catheterization accounted for 9.7%.

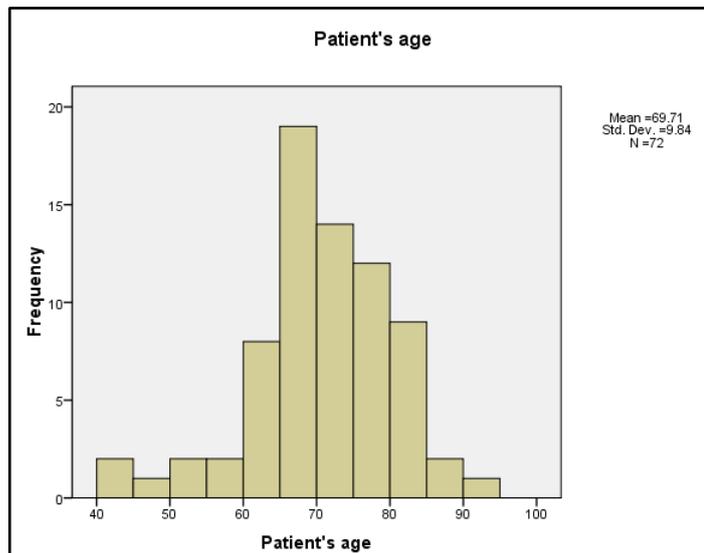


Figure 1;

**Pre-operative investigations**

Of 72 patients 41% of the patients had hemoglobin level below 13 while the rest had hemoglobin on the normal value of 13-17 before the operation.

Most of the patients' systolic blood pressure ranged from 110-150(64%) while the diastolic value was 61-80(52%) for most of the patients.

**Factors influencing blood loss**

Out of 72 patients 36.1% of them had prostate weight ranging from 61-80 and 31.9% had 41-60 range and 16.7% had prostate weight ranging from 81-100 while the rest had prostate weight less than 40 grams. As for blood loss those with prostate weight above 41 had more blood lost than those with prostate weight ranging from 20-40.[Figure 2]

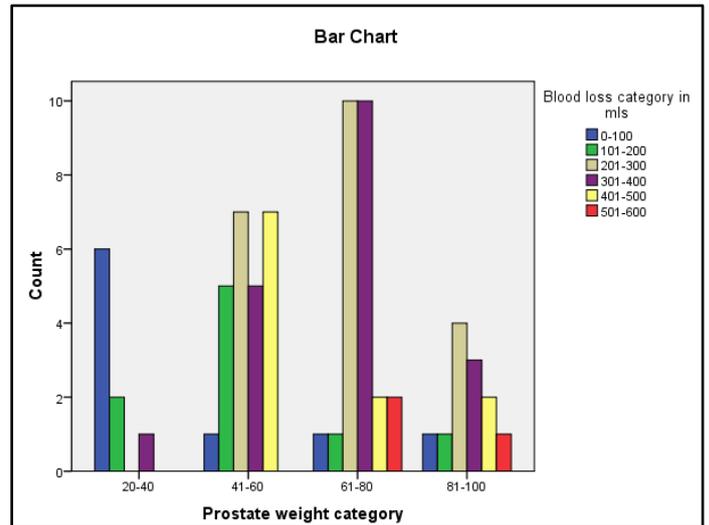


Figure 2;

**Resection time**

For most of our patients 49 (66.7%), resection time lasted for 40-60 minutes and others lasted for more than 60 minutes accompanied with an increase in blood loss.[Figure 3]

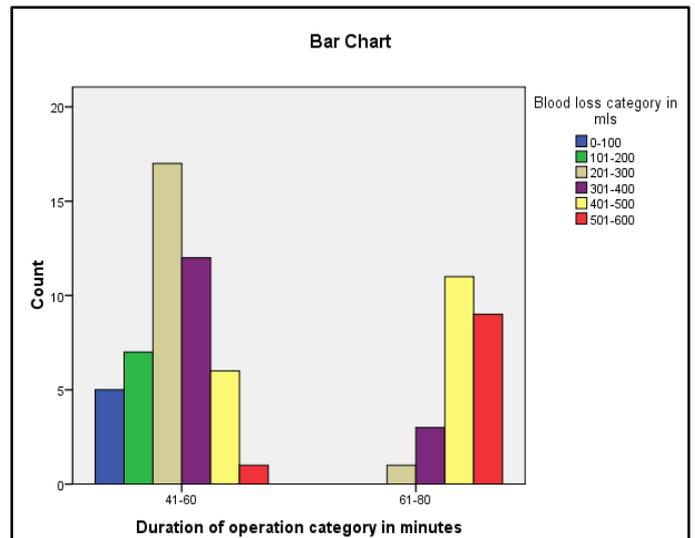


Figure 3;

**Blood transfusion rate**

Most of our patients 49(68.1%) were transfused one to two unit(s) of whole blood depending on indication(s).[Figure 4]

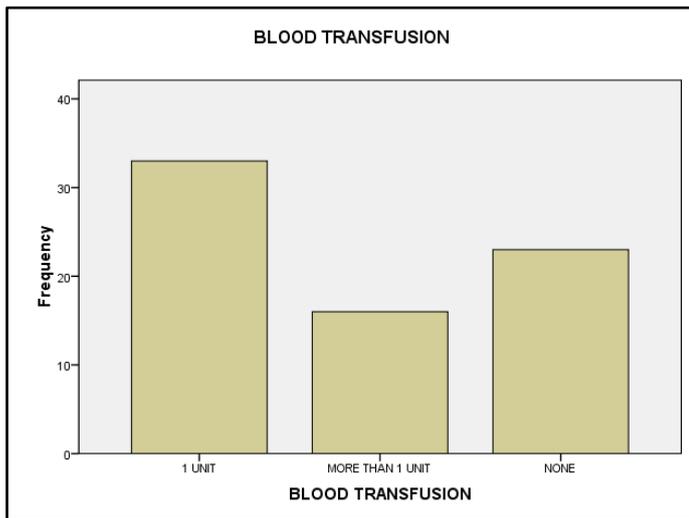


Figure 4;

## DISCUSSION

Our study did not include surgeons experience as a factor which can influence resection time and blood loss due to various reasons beyond this study. This may reduce the strength of our findings, However factors which we studied gives a picture of the trend similar to what was found in other studies (Pickard *et al.*, 1998; Mteta *et al.*, 2012)<sup>[11, 7]</sup>.

The main indication for TURP in our study presented to be Lower Urinary Tract Symptoms(LUTS) accounting for 54.2% this is contrary to the study in 2009 conducted in KCMC where the main indications for TURP presented to be urinary catheterization(58.6%) followed by LUTS which accounted for only 30.5%( Mteta *et al.*, 2012)<sup>[7]</sup>. This can possibly be due to increase of awareness to patients on symptoms of BPE so leading to patients' early access to the hospital before complete urinary retention requiring catheterization. The most frequent indication for TURP is Lower Urinary Tract Symptoms (martin *et al.* 2009)<sup>[6]</sup>, in our study it has been proved to be the case with 54.2% of the patients presenting with LUTS and Hematuria being the second most presentation. Other presentation were recurrent (Urinary Tract Infections) UTI and others were urethral or suprapubic catheterization.

Our study shows positive correlation between weight of resected prostate and blood loss of which those who had resection of more than 40grams of prostate experienced significant blood loss, This is similar to the previous which was done at KCMC in 2009 which revealed that those resected more than 40g prostate had significantly higher blood loss than those below 40g. This has shown to be the same in this year as well since the graph correlation demonstrating correlation between weight of the prostate and blood loss showed that there was a significant positive relationship ( $p < 0.001$ ) indicating that the more the weight of prostate resected the more the blood loss ( Mteta *et al.*, 2012)<sup>[7]</sup>.

Duration of resection in excess of 45 minutes and competence of the surgeon were also found to be correlated with increase in blood loss (Mteta *et al.*, 2012)<sup>[7]</sup>. However in this study it shows that the operations that lasted for more than 60 minutes had a high increase in blood loss compared to those done below 40 minutes. And these showed a linear correlation which was statistically significant ( $p < 0.0110$ ).

The hemoglobin ranged from 8-17g/dl of 72 patients and out of these 41% had haemoglobin level lower than 13g/dl and the rest had in the normal value of 13-17. The mean systolic blood pressure was 140 with a range of 90-170 while the mean diastolic blood pressure was 70 with a range of 40-100.

There was no significant relationship to correlate blood transfusion to the increase in prostate weight, duration of operation time or blood loss. Blood was transfused according to the anesthetist demand and even when a patient had no need to be transfused then since blood was released from the laboratory he had to be transfused either way. This study was comparable to the other study which found that patient undergoing surgery were over transfused blood due to lack of principle of fluid replacement ( Mungai *et al.*, 2007)<sup>[8]</sup>.

## CONCLUSION

Blood loss during TURP is correlated with the increase in prostate weight 15-40mls/g and resection time. The more the increase of these characteristics the more risk of increase in blood loss. Blood transfusion rate was found to high without clear indications apart from anaesthetists demand. Proper documentation of post-operative notes especially estimated blood loss was found in our study. We therefore remind Practicing clinicians on the importance of proper documentation of patients' information. Transfusion protocol in the department should follow the National Blood Transfusion guideline(s) given by the Ministry of Health and Social Welfare as recommended by World Health Organization (WHO).

## ACKNOWLEDGEMENTS

Authors are thankful to the Department of Community Health for the help and support they offered in the preparation of the research proposal.

Special thanks to staffs from various departments for their support at different stages of this work.

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