UIJ UroToday International Journal®

www.urotodayinternationaljournal.com
Volume 2 - April 2009

The Value of Blood Tests Following Transurethral Resection of the Prostate

Abdul R Hakeem, Krishnamurthy Sairam, Roger O Plail
Department of Urology, Conquest Hospital, East Sussex, England
Submitted on January 19, 2009 - Accepted for Publication on February 2, 2009

ABSTRACT

INTRODUCTION: Transurethral resection of the prostate (TURP) is an invasive procedure that can result in significant blood loss. Major national urological associations do not have specific recommendations regarding post-TURP blood testing, although this testing is performed routinely in many hospitals. The aim of the present study was to identify the need for routine blood testing post-TURP and to investigate the financial implications of performing such tests.

METHODS: The authors retrospectively studied pre and postoperative hemoglobin, sodium, potassium and creatinine values of 137 patients. The data collected included demographics, the value of blood tests pre and post TURP, transfusion rate and TUR syndrome rate.

RESULTS: Of the 137 patients, only 1 required blood transfusion in the postoperative period. Although 2 patients had low postoperative sodium, there was no TUR syndrome in any patient. There were no significant changes in the creatinine levels post TURP. The cost of postoperative blood tests in each patient was approximately £30 (US $45), which included all of the administrative costs for processing the tests.

CONCLUSIONS: Routine postoperative blood tests after TURP do not alter clinical management. The authors recommend selective blood testing based on clinical need.

KEYWORDS: TURP; Transurethral resection; Prostate; Blood transfusion; Hemoglobin; Creatinine; Benign prostatic hyperplasia

CORRESPONDENCE: Abdul Hakeem, Senior House Officer, Department of Urology, Conquest Hospital, East Sussex Hospitals NHS Trust, St Leonard's-On-Sea, East Sussex, TN37 7RD, England, drhabdulrahman@yahoo.com

INTRODUCTION

Lower urinary tract symptoms due to benign prostatic obstruction (BPO) or benign prostatic hyperplasia (BPH) are common in men over 40 years old. Although surgical management of BPH in the modern era has involved several minimally invasive options, transurethral resection of the prostate (TURP) remains the gold standard [1].

Complications after TURP can be high [2], depending upon the skill of the surgeon [3] and other factors, but their incidence has decreased considerably over the past few decades because of standardization of the procedure as well as better anesthetic techniques [4]. Bleeding requiring transfusion, urinary tract infection, urinary incontinence, urinary retention, sexual dysfunction, retrograde ejaculation, low semen volume, surgical revision, and transurethral resection syndrome are the complications of having a TURP [5]. The more serious of these complications have become rare due to better understanding of clinical predisposing factors and routine preassessment of these patients.

Though TURP is one of the most common urological procedures performed currently, there is doubt as to whether

routine postoperative blood tests should be performed on these patients. The purpose of the present investigation was to evaluate the need for routine postoperative blood tests after TURP and to examine the economic implications of carrying out such tests.

METHODS

The authors studied the records and extracted data from 200 consecutive patients who underwent TURP between February, 2004 and May, 2006. Only those patients with both preoperative and postoperative (within 48 hours post-TURP) blood tests were included in the study. All of these patients were preassessed at least 1 week before the procedure (mean = 6 days; range = 2 - 14). Their preoperative screening included full blood count (FBC), urea, creatinine, electrolytes, clotting profile and blood group.

Any patient who had low hemoglobin (less than 9 g/dL) was transfused appropriately before the procedure to optimize their oxygen carrying capacity. Pre and postoperative hemoglobin, creatinine and electrolyte values were extracted from the patient records and electronic laboratory systems. Those patients who had transfusion post-TURP were identified from the case notes. The authors also thoroughly examined the case notes to identify any patient with TUR syndrome. They defined TUR syndrome as hyponatremia with 1 or more clinical symptoms or signs such as nausea, vomiting, headaches, confusion, convulsions or coma.

TURP was carried out routinely using a 27 Fr Olympus continuous flow resectoscope. The procedures were done by consultants, staff grade and specialist registrars. Changes in blood and serum parameters were evaluated using Microsoft Excel. Cost analysis of the blood tests was undertaken using current hospital tariff.

The statistical analysis was performed using SPSS version 15. Changes in the pre and postoperative Hb and Cr were examined with the help of Student's paired t test. A p-value of < 0.05 was considered statistically significant.

RESULTS

Of the 200 patients who had TURP during this period, 137 had blood tests done in the postoperative period and only these were included in the study. Mean age was 71.6 years (range 48 – 90). The mean preoperative Hb was 13.4 g/dL (SD = 1.64; range = 9.4 - 18.5) and the mean postoperative Hb was 12.3 g/dL (SD = 1.89; range = 6.8 - 16.5).

Only one patient was transfused preoperatively because of low hemoglobin (8.2 g/dL). Postoperative hemoglobin drop varied between 0 and 4.7g/dL and the mean change was 2.2 g/dL (SD = 1.03). The pre and post-TURP hemoglobin differences are displayed in Figure 1. Of the 137 patients, only 1 required blood transfusion in the postoperative period. This patient had

Figure 1: Pre and Post-TURP Hemoglobin Difference for All Patients (N = 137)

doi:10.3834/uij.1944-5784.2009.04.05f1

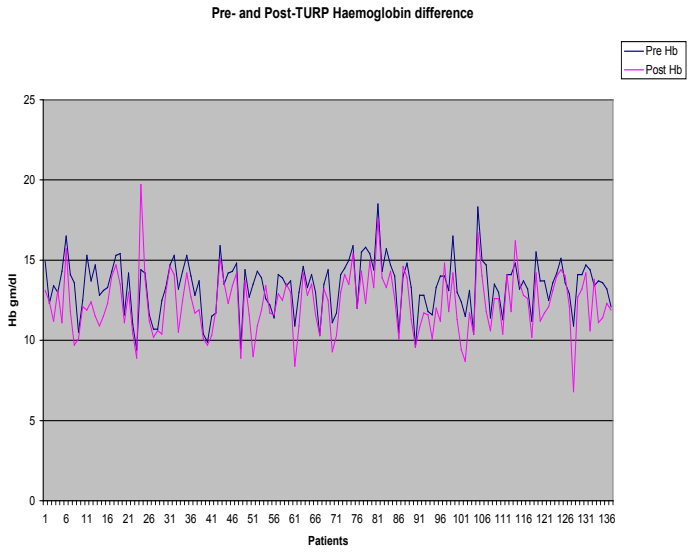
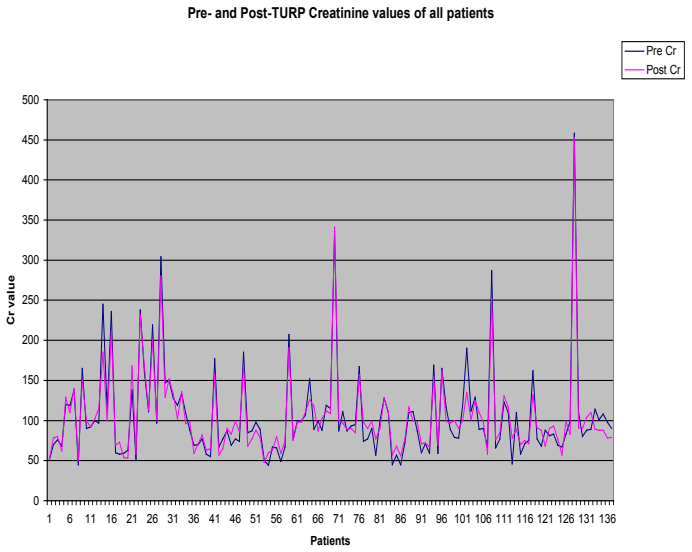


Figure 2: Pre and Post-TURP Creatinine Difference of all Patients (N = 137)

doi:10.3834/uij.1944-5784.2009.04.05f2

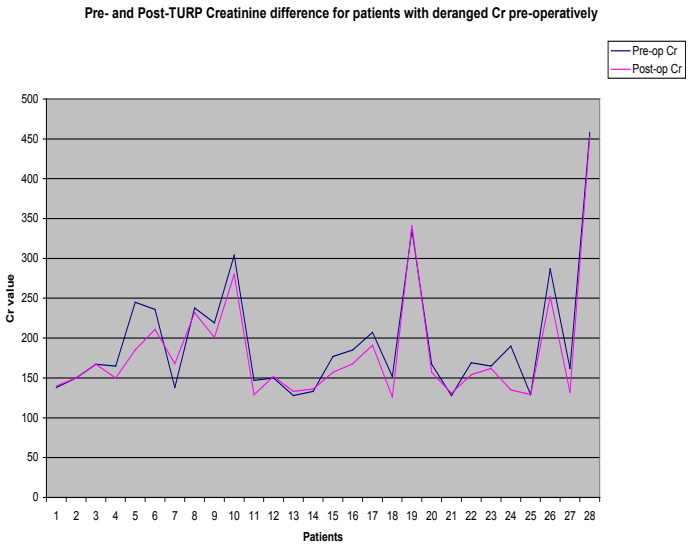


a preoperative Hb of 10.9 and his postoperative Hb was 6.8, needing 3 units of transfusion. This patient had a very large vascular prostate and significant bleeding was noticed during TURP, thereby providing a clue that he would need hemoglobin check in the postoperative period. The transfusion rate for the patients in this study was only 0.73%. There was a significant decrease in the Hb concentration post-TURP ($p < .0001$), although this finding was clinically insignificant.

The mean pre-TURP creatinine values for all patients was 105.6 mmol/L (SD = 59.4; range = 44 - 458); the mean post-TURP creatinine was 104.8 mmol/L (SD = 53.7; range = 48 - 45). Figure 2 shows the pre and postoperative values for all patients. Deranged preoperative creatinine (>120 mmol/L) was seen in 28 patients. The mean preoperative creatinine value for patients with deranged creatinine was 179 mmol/L (SD = 84.4; range = 128 - 458); the mean postoperative creatinine was 183 mmol/L (SD = 80.9; range = 124 – 453). There were no significant changes in post-TURP creatinine values among those who had abnormal values preoperatively, as displayed in Figure 3.

Deranged electrolytes (Na < 130 or >145 mmol/L; K <3.5 or >5.5 mmol/L) were seen in 4 patients. These patients needed no active intervention before surgery. Although 2 had very low sodium (<120 mmol/L) postoperatively, TUR syndrome was not seen. These sodium values did not necessitate any intervention or prolonged hospital stay. Serum potassium level was 5.7 mmol/L in 1 patient preoperatively, but improved to 5.1 mmol/L in the postoperative period. Those who had abnormal preoperative electrolytes or creatinine either had normal values or no significant change in their postoperative values.

Figure 3: Pre and post-TURP Creatinine Difference for Patients with Deranged Creatinine Preoperatively (n = 28). doi:10.3834/uij.1944-5784.2009.04.05f3



The cost of postoperative blood tests in each patient was £30 (US $45), which included phlebotomy time, transportation charges, laboratory charges, and all other administration charges (FBC £2.87; U&Es/Cr £6; other charges £21).

DISCUSSION

Benign prostatic hyperplasia (BPH) is the most common benign neoplasm in males. It frequently has a significant detrimental impact on the patient's quality of life. If the disease is left untreated it may progress in severity, leading to recurrent bladder infections, bladder calculi, and acute urinary retention (AUR), which may eventually need surgical treatment [6].

TURP has been the gold standard for the treatment of obstructive benign prostatic hyperplasia since the 1970s and still is considered the treatment of choice in most centers around the world [7]. TURP has shown to be effective not only in small prostates, but also in large, vascular prostates [8]. Advances in techniques, instrumentation, and surgical and perioperative management, including anesthesia, have made TURP a relatively safe procedure, and it remains a safe and effective means of treating patients with BPH [9]. Macroscopic hematuria up to a month following TURP is a well recognized complication [10]. Resected prostate size, size of prostate on digital rectal examination (DRE), operating time, and preoperative urinary tract infection have been considered the risk factors for increased bleeding post-TURP [11]. Among these risk factors, only preoperative urinary infection has been shown as reversible [11].

The standard teaching during the 1970s was to cross-match 2 units of blood for all patients undergoing TURP [12]. In 1984, Fraser and his colleagues concluded that routine cross-matching is unnecessary for TURP unless the preoperative Hb is less than 11.5 g/dL, or there is significant medical risk or a positive antibody screen [13].

There are few studies that have investigated the appropriateness of testing blood following TURP. Shah and Nethercliffe [14] performed a retrospective study on 106 patients. They showed that routine postoperative Hb is not necessary in patients following TURP. They measured pre and post-TURP Hb levels (within 48 hrs after TURP), along with the rate of blood transfusion and weight of resected prostatic tissue minus blood clots. They showed a statistically and clinically insignificant transfusion rate of 0.85%, with a mean weight of resected

prostate of 18.09 g. They concluded that routine postoperative Hb check following a straightforward TURP is unnecessary.

Table 1 contains a comparison of post-TURP transfusion rates that were found in various studies. The postoperative transfusion rate of 0.73% is much lower in the present study, when compared with most other studies published in the literature. Some studies have shown correlations between mean resected prostate weight and transfusion rates [15-17]. Another study showed that patients with a normal preoperative Hb and undergoing resections of < 30 g do not usually require transfusion [18].

In the present study, 28 patients who had deranged preoperative creatinine had similar values post-TURP. Out of 4 patients who had deranged preoperative sodium, 2 had very low Na^{2+} (<120 mmol/L) in the postoperative period, but neither developed TUR syndrome.

The current study shows that routine blood tests following TURP did not change the management of patients. These blood tests can be justified for patients with low preoperative Hb, large vascular prostate, prolonged procedure, increased bleeding intraoperatively, and symptomatic anemia in the postoperative period. It costs £30 (US $45) for each set of full blood count, urea, creatinine and electrolytes, and has significant financial implications.

Table 1: Post-TURP Transfusion Rates in Various Studies
doi:10.3834/uij.1944-5784.2009.04.05t1

First Author, Year Published [Reference Number]	N	Mean Resected Prostate Weight (g)	Mean Change in Hb (g/dL)	Transfusion Rate (%)
Fraser 1984 [13]	255	15	2.0	8.5%
Mebust 1989 [15]	3885	22	1.9	3.9%
Thorpe 1994 [16]	1400	27	2.5	2.5%
Borboroglu 1999 [17]	520	18.8	2.0	0.4 %
Shah 2004 [14]	106	18.1	1.5	0.85%
Current Study	**137**	**---**	**2.2**	**0.73%**

CONCLUSIONS

Routine postoperative blood testing following TURP adds little to clinical management and is a waste of resources. Almost all patients are assessed preoperatively for their fitness for surgery and most are discharged the next day without need for further intervention. The authors therefore recommend blood testing based on clinical need or following technically demanding operations.

REFERENCES

[1] Ho HS, Cheng CW. Bipolar transurethral resection of prostate: a new reference standard? *Curr Opinion Urol.* 2008;18(1):50-55.

[2] Lim KB, Wong MY, Foo KT. Transurethral resection of prostate (TURP) through the decades--a comparison of results over the last thirty years in a single institution in Asia. *Ann Acad Med Singapore*. 2004 Nov;33(6):775-779.

[3] Furuya S, Furuya R, Ogura H, Araki T, Arita T. A study of 4,031 patients of transurethral resection of the prostate performed by one surgeon: learning curve, surgical results and postoperative complications. *Hinyokika Kiyo.* 2006 Aug;52(8):609-614.

[4] Reich O, Gratzke C, Bachmann A, et al. Morbidity, mortality and early outcome of transurethral resection of the prostate: a prospective multicenter evaluation of 10,654 patients. *J Urol* . 2008;180(1):246-249.

[5] Uchida T, Ohori M, Soh S, et al. Factors influencing morbidity in patients undergoing transurethral resection of the prostate. *Urology*. 1999 Jan;53(1):98-105.

[6] Kirby RS. The natural history of benign prostatic hyperplasia: what have we learned in the last decade? *Urology.* 2000;Nov 1;56(5 Suppl 1):3-6.

[7] Kaplan SA. Transurethral resection of the prostate--is our gold standard still a precious commodity? *J Urol*. 2008 Jul;180(1):15-26.

[8] Managadze LG, Khvadagiani GG, Abdushelishvili KO, Managadze GL, Berulava DT. Some aspects of transurethral resection of large benign prostatic hyperplasia. *Georgian Med News*. 2007 Feb;(143):53-57.

[9] Issa MM. Technological advances in transurethral resection of the prostate: bipolar versus monopolar TURP. *J Endourol*. 2008 Aug;22(8):1587-1595.

[10] Normand G, Guignet J, Briffaux R, Merlet B, Irani J, Doré B. Macroscopic haematuria after transurethral resection of the prostate. *Prog Urol*. 2006 Sep;16(4):461-463.

[11] ElMalik EM, Ibrahim AI, Gahli AM, Saad MS, Bahar YM. Risk factors in prostatectomy bleeding: preoperative urinary infection is the only reversible factor. *Eur Urol*. 2000 Feb;37(2):199-204.

[12] Blandy JP. *Operative Urology*. Oxford: Blackwell Scientific Publications; 1978:142.

[13] Fraser I, Scott M, Campbell I, Wood JK, Gordon Smart J, Osborn DE. Routine cross-matching is not necessary for a Transurethral Resection of the Prostate. *Br J Urol.* 1984 Apr;56(2):198-201.

[14] Shah J, Nethercliffe J. Is routine post-operative haemoglobin measurement required after transurethral resection of prostate? *Transfus Med*. 2004 Oct;14(5):343-346.

[15] Mebust W, Holtgrewe H, Cockett A, Peters P. Transurethral prostatectomy: immediate and postoperative complications. A cooperative study of 13 participating institutions evaluating 3885 patients. *J Urol*. 1989 Feb;141(2):243-247.

[16] Thorpe A, Cleary R, Coles J, Vernon S, Reynolds J, Neal D. Deaths and complications following prostatectomy in 1400 men in the Northern region of England. *Br J Urol*. 1994 Nov;74(5):559-565.

[17] Borboroglu P, Kane C, Ward J, Roberts JL, Sands JP. Immediate and late post-operative complications of transurethral resection of the prostate in the 1990s. *J Urol.* 1999 Oct;162(4):1307-1130.

[18] Kirollos M, Campbell N. Factors influencing blood loss in transurethral resection of the prostate (TURP): auditing TURP. *Br J Uro*l. 1997 Jul;80(1):111-115.

TO CITE THIS ARTICLE: Hakeem AR, Sairam K, Plail RO. The value of blood tests following transurethral resection of the prostate *UIJ*. 2009 Apr;2(2) doi:10.3834/uij.1944-5784.2009.04.05