

Peri-operative Blood Transfusion in open Suprapubic Transvesical Prostatectomy: Relationship with Prostate Volume and Serum total Prostate Specific Aantigen (TPSA)

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ABSTRACT:

INTRODUCTION: Open simple prostatectomy is the most effective and the most durable method of controlling symptoms associated with benign prostatic hyperplasia, especially in sub-Saharan Africa, where TURP set and expertise are unavailable in most health institutions. The risk of perioperative heterologous blood transfusion in open transvesical prostatectomy varies widely from one centre to another, and this risk is documented to improve over time in any given centre.

AIM: To determine the perioperative blood transfusion rate in our centre and to determine its relationship with the prostate volume estimated with transabdominal ultrasonography and serum total PSA.

METHOD: A Retrospective study of patients surgically managed for BPH in 25 months (from March 2009 to March 2011).

RESULTS: A total of 36 patients were included. Eighty-six percent of these patients had indwelling urinary catheter introduced earlier due to acute or chronic urinary retention, while 19.6% had macroscopic haematuria at presentation. The mean prostate volume was 90.4cm³ (36-164), with 67% of cases having volumes greater than 70cm³. Ninety-one percent of the patients had serum tPSA greater than 4ng/ml (1.5-85.3ng/ml, mean was 22.8ng/mL). The perioperative transfusion rate was 8.3% and it is not affected by the prostate volume ($X^2_{Yates} = 0.884$), or serum total PSA ($X^2_{Yates} = 0.417$). There was no perioperative mortality.

CONCLUSION: Open suprapubic transvesical prostatectomy is still a safe procedure; with a perioperative blood transfusion rate of 8.3% in our centre. This risk appears to be unrelated to preoperative prostate volume and serum tPSA.

KEY WORDS: Transvesical prostatectomy, Benign prostatic hyperplasia, Prostate volume, Perioperative blood transfusion.

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INTRODUCTION:

Open suprapubic transvesical prostatectomy has emerged alongside open retropubic transcapsular prostatectomy, since the beginning of the 20th century, as the most efficient method of controlling lower urinary tract symptoms due to benign prostatic hyperplasia (BPH). Hitherto, a variety of procedures were attempted on

patients presenting with BPH-related symptoms: these procedures were aimed at re-establishing urine flow and reducing suffering, but these aims were neither achieved satisfactorily nor sustained over a long period of time. Present day modern urology is based on open prostatectomy. Generally, surgery has been identified as the most efficient treatment option for patients suffering from lower urinary tract symptoms due to BPH; specifically, open prostatectomy has emerged in the concluding statements of most meta-analytical works as the most effective method of relieving symptoms and obstruction, albeit the most invasive and the costliest.² A comparison of the two different techniques of open simple prostatectomy namely; suprapubic transvesical prostatectomy and retropubic transcapsular prostatectomy has not shown any significant differences in pre-operative data and post-operative results. Choice of surgical technique is often based on surgeon's preference. Over the years, complications associated with the open procedures, including perioperative heterologous blood transfusion and mortality have reduced appreciably making the procedures safer. Also noted is the trend towards reduction in complication rates over time when long term data from single centres are analyzed.

Presently, due to the invasiveness of open suprapubic transvesical prostatectomy, transurethral resection of the prostate (TURP) has emerged as the gold standard in the surgical management of BPH and the most commonly used surgical treatment option in Europe and North America; open prostatectomy accounting for less than 30% of surgical procedures in BPH management.⁶ Holmium Laser Enucleation of the Prostate (HoLEP) is gaining popularity lately. Laparoscopic extraperitoneal transvesical- and retropubic- prostatectomy are also being offered in a number of centres for larger prostate volumes⁶. However, open prostatectomy is commonly done in sub-Saharan Africa because of lack of equipment and surgical expertise for TURP in most centres of the region. In Nigeria, TURP is also costlier than open prostatectomy. This leaves the average Urologist especially the younger, recently qualified Urologist working in the public setting with no alternatives in the surgical management of BPH-related symptoms. So, open suprapubic transvesical prostatectomy and retropubic transcapsular prostatectomy have been and are likely to remain standard parts of urology training.

Historically, various attempts have been made to reduce intraoperative blood loss during open transvesical prostatectomy and hence reduce the risk of heterologous blood transfusion: use of intravesical packing, Malement suture technique, urethral catheter traction are but a few.^{8,13} Perioperative heterologous blood transfusion has been recognized as a complication of the procedure,^{8,11} rather than an acceptable part of the procedure. A wide perioperative blood transfusion rate of 0-57% across various centres, suggests, amongst other factors, that the surgeon's resilience may contribute significantly.^{1,6.}

Many factors have been identified to affect perioperative blood loss: age above 70years, use of antithrombotic drugs, general anesthesia, weight of prostate tissue above 70g, transvesical approach, systolic blood pressure above 140mmHg, duration of surgery and surgeon's expertise (the learning curve).¹⁴

In this study, we want to evaluate our perioperative transfusion rate in open suprapubic transvesical prostatectomy and relate it to the preoperative prostate size as determined using transabdominal ultrasonography. We recognize that there may be some differences between sizes of prostate estimated using transabdominal ultrasonography (TAUS) and using transrectal ultrasonography (TRUS), but these differences are consistently statistically insignificant. TRUS is not available yet in our centre, so all patients presenting with BPH related symptoms undergo TAUS for assessment of prostate volume. It has also been documented that serum total prostate specific antigen (PSA) correlates with size of prostate, so we also want to relate our perioperative transfusions to serum total PSA values.

AIMS AND OBJECTIVES:

To assess perioperative blood transfusion rate for open transvesical prostatectomy in our centre.

To identify, if any, the relationship between perioperative blood transfusion and prostate volume.

To relate the perioperative blood transfusion to the preoperative serum tPSA.

MATERIALS AND METHODS:

This study was a retrospective analysis of cases of BPH surgically managed in our centre from March, 2009 to March, 2011; a period of 25 months with a minimum follow-up period of 3 months post operatively. The approval of the ethical committee was obtained. The case notes of all patients managed surgically for a preoperative diagnosis of BPH were retrieved for analysis. Digitally-guided transrectal biopsy of the prostate was done on patients with Serum PSA greater than 10ng/mL to exclude prostatic malignancy. Also excluded were all cases with postoperative (incidental) confirmation of malignancy in

the enucleated specimen. Open suprapubic transvesical prostatectomy was the surgical procedure of choice, and all the surgical operations were done by one surgeon. The packed cell volume (PCV) was at least 32% and the serum creatinine was not greater than 130 μ mol/L preoperatively. All patients with systemic hypertension and diabetes mellitus achieved adequate blood pressure and blood sugar control before surgical operation. Patients who were on low dose aspirin had the drug discontinued one week before the planned surgery and recommenced once oral drugs were re-introduced postoperatively (usually 2nd postoperative day). Anaesthesia was subarachnoid or epidural block. Intraoperatively, Pfannestiel incision was used and a low anterior transverse cystotomy made. Haemostatic sutures were placed at the lateral aspects of the prostatic bed post-enucleation to achieve satisfactory haemostasis. These haemostatic sutures were placed even if there were no obvious bleeding vessels following enucleation of the prostate adenoma. Retriggerization was done mindful of the ureteric openings and urethral catheter balloon was inflated to 30-40ml in the prostatic bed for 12-24hrs before reduction to 20ml. Bladder irrigation, with the aid of a suprapubic catheter, was for 24-48hrs postoperatively. We looked at the age of the patients, indication for surgery, pre-op catheterization, pre-op prostate volume and serum total PSA, and perioperative blood transfusion. The data obtained was analyzed using IBM SPSS version 20. Test of significance was done using the Yates' Chi-squared test.

RESULTS

There were a total of 38 case notes. No patient had open suprapubic transvesical prostatectomy as an emergency. One patient was excluded because he was found intraoperatively to have bladder neck stenosis with little prostatic tissue, and posterior wedge resection of the bladder neck was done. Another patient was excluded because histology of the specimen postoperatively showed adenocarcinoma of the prostate. Therefore a total of 36 patients with a mean age of 71.0yrs (range: 48-90) were analyzed; 31% of the patients were at least 80years old.

The prostate volume was not documented in 6 patients; the range was 36-164cm³, and the mean was 90.4cm³. In 67% of cases, the prostate volume was 70cm³ or greater.

Serum total PSA was not documented for two patients. The minimum value noted was 1.5ng/mL while the maximum was 85.3ng/mL with a mean of 22.8ng/mL. The serum total PSA in 25 of the 34 patients (73.5%) was greater than 10ng/mL; and in 31 of 34 patients (91.2%) was greater than 4.0ng/mL.

Majority (86.1%) of the patients presented with an indwelling urinary catheter; 28 urethral and 2 suprapubic catheters (table 1). Macroscopic haematuria was present

in 7 (19.6%) patients at presentation.

Three patients were transfused perioperatively (a rate of 8.3%). All 3 patients transfused presented with indwelling urethral catheter. An 85yr old patient with prostate volume of 133.0cm³ and serum total PSA of 12.7ng/mL received 2 units of blood, a 68yr old patient with prostate volume of 105.2cm³ and serum total PSA of 2.5ng/mL received 1 unit, and an 62yr old with prostate volume of 75.4cm³ and serum total PSA of 41ng/mL received 1 unit of blood.

Open suprapubic transvesical prostatectomy has undergone various subtle modifications, since it was made popular in the early 20th century¹⁴. This study reveals that 86% of our patient had an indwelling urethral or suprapubic catheter prior to surgical operation. The remaining patients largely consented to surgery on account of frank haematuria. None of the patients was operated on due to high International Prostate Symptom Score (IPSS) only. This is similar to 83% with indwelling catheter by Alhasan SU, et al¹² and the finding of most patients with urinary catheter by Meier DE, et al⁸. This pattern may be due to fear of surgical operation, ignorance and poverty on the side of the patient (and relatives); or the conviction that the surgery should be earned on the part of the managing clinician. Accepting surgical management only after a terminal event in LUTS may explain large prostate volumes encountered.

The rate of perioperative blood transfusion varies widely from centre to centre^{2,6,9}. Our transfusion rate of 8.3%, though similar to documented rates in recent studies, is lower than the rate of 36.8% noted by Ngugi PM, et al¹⁵, but higher than the transfusion rate of 0.8% in TURP in Nigeria¹².

The mean prostate volume in this study is 90.4cm³, with only 33% of the patients presenting with prostate volumes less than 70cm³. It can therefore be inferred that about 67% of our patients actually had the recommended modality of treatment, since the alternatives in form of laparoscopic simple prostatectomy⁶, Holmium Laser Enucleation of the prostate (HoLEP), or Photoselective Vaporization of the prostate (PVP)⁴ are not readily available in Nigeria.

Analysis of the serum total PSA reveals that 73.5% of our patients presented with values greater than 10.0ng/mL and 91.2% with values greater than 4.0ng/mL. This underscores one of the challenges associated with use of serum total PSA in the evaluation of patients with prostate enlargement in sub-Saharan Africa. The digitally-guided transrectal prostate biopsy specimens and the post-prostatectomy specimens in these patients confirmed benign hyperplasia.

Table 1: Presentation with catheter

Presentation with catheter	Frequency (%)
YES	31 (86.1)
NO	5 (13.9)
Total	36 (100.0)

Table 2: Presentation with haematuria

Presentation with Haematuria	Frequency (%)
YES	7 (19.6)
NO	29 (80.4)
Total	36 (100.0)

Table 3: Perioperative blood transfusion

Units of Blood Transfused	Frequency (%)
ONE	2 (5.6)
TWO	1 (2.8)
NONE	33 (91.8)
Total	36 (100.0)

Table 4: PSA and Prostate volume of transfused patients

S/N	PSA (ng/mL)	Vol of prostate	Units of
1	12.7	133.0	2
2	2.5	105.2	1
3	41.0	75.4	1

Table 5: Rate of Transfusion and PSA value

	Transfusion		Total (%)
	Yes(%)	No(%)	
PSA	< 4ng/L	1(33.3) 2 (66.7)	3(100.0)
	≥ 4ng/L	2(6.5) 29(93.5)	31(100.0)
Total	3(8.8)	31(91.2)	34(100.0)

$$X^2_{Yates} = 0.252$$

Table 6: Rate of Transfusion and Volume of Prostate

		Transfusion		Total
		Yes	No	
Prostate Volume	< 70cm ³	0 (0.0)	10(100.0)	10(100.0)
	≥ 70cm ³	3(15.0)	17(85.0)	20(100.0)
Total		3 (10.0)	27(90.0)	30(100.0)

$$X^2_{Yates} = 0.417$$

None of the patients with prostate volume less than 70cm³ had blood transfusion. It therefore appears that a large prostate size increases the risk of transfusion in prostatectomy, this relationship however was not statistically significant ($X^2_{Yates} = 0.417$). Also there was no statistically significant relationship between the PSA value and need for blood transfusion ($X^2_{Yates} = 0.252$) in this study. These observations further support the assertion that blood transfusion is an avoidable complication of traditional prostatectomy for benign prostatic hyperplasia, irrespective of the prostate size and PSA value. Surgical technique and meticulous attempts at securing haemostasis, are more important determinants^{1,6,16,17}. This may also explain the decline in blood transfusion rates in more recent reports, even by the same author^{7,8,23,24}. There is need therefore for surgeons in this field, especially those in a developing economy to adopt measures to improve on the overall perfection of the surgery.

CONCLUSION:

Open suprapubic transvesical prostatectomy is still a safe procedure, and it is the treatment of choice for large prostate glands, or in cases with associated bladder calculi or diverticuli. Blood transfusion is an avoidable complication of the surgery. The risk of transfusion is not affected by the size of the patient's prostate or the serum tPSA value. Operative technique and meticulous attempts at securing haemostasis may be more important determinants of the need for blood transfusion. Adequate patient optimisation and improvements in the surgical technique will minimize the risk of perioperative blood transfusion in suprapubic transvesical prostatectomy.

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