

Preoperative and Postoperative Complications in Men with Benign Prostate Enlargement Undergoing Open Retropubic Prostatectomy and the Choice of Antibiotics: A Single Surgeon Experience

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ABSTRACT

Objective: To determine the preoperative and postoperative complications, organisms, and appropriate choice of antibiotics in men with benign prostatic hyperplasia complicated by acute urinary retention who required prostatectomy. **Materials and Methods:** The data of 65 patients who underwent open retropubic prostatectomy was reviewed. They were divided into two groups those with urinary tract infection and those without it. Intervention was urethral catheterization, antibiotics and open retropubic prostatectomy. The main outcome were urinary tract infection and choice of antibiotics. **Results:** The number of patients per group, mean age, mean prostate volumes were 36 and 29, 69.7 years and 70.7 years, 144ml and 143ml, respectively. Of 267 men with BPH, 65(24.3%) had surgery. Preoperative urinary tract infections were 55.4% while the preoperative and postoperative complications were in group I (70.8% and 13.8%) and in group II (24.6% and 9.2%) respectively. Overall persistent postoperative UTI was 4.6%. The commonest organisms isolated in those with acute urinary retention were *E. coli* 41.6%, *klebsiella* species 27.8% and *Pseudomonas aeruginosa* 13.9%. Majority of the organisms isolated were most sensitive to nitrofurantoin 23(64%) followed by gentamicin 12(33%), ceftriaxone 11(31%), Augmentin 11(31%), ciprofloxacin 10(28%) and ofloxacin 8(22%). There was statistically significant difference between the ages ($p < 0.05$) and indications for surgery ($p < 0.05$) in both groups. A positive correlation among indications for prostatectomy, urinary tract infections and catheterization ($p < 0.05$). **Conclusion:** The most sensitive antibiotics were nitrofurantoin, gentamicin, ceftriaxone, and Augmentin and these should be chosen in men with benign prostatic antibiotics who requires catheterization. There is a correlation among indications for prostatectomy, urinary tract infections and catheterization.

Keywords: antibiotics, benign prostatic hyperplasia, open retropubic prostatectomy, organisms, urinary tract infection.

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INTRODUCTION

Benign prostatic hyperplasia (BPH)/benign prostate enlargement (BPE) is major public health disease because it causes a lot of discomfort to men who are symptomatic. It occurs with increase in age. In Nigeria, the prevalence in the 5th decade varies from 6% - 10.4% and in the 7th decade and above varies from 42.9% - 69.9% with an overall prevalence of 23.7% among rural Africans [1,2]. Yeboah reported a worldwide prevalence of 20-62% in men over 50 years [3].

The men with BPH/BPE often present with storage and voiding lower urinary tract symptoms such as frequency, nocturia, urgency, poor stream, straining, intermittency and feeling of incomplete bladder emptying [4]. The common complication at presentation includes acute urinary retention in 31.7% [4] and up to 60% in some study [3] while haematuria is seen in 17.5% and 28.6% respectively [3,4]. Preoperative urinary tract infections in men with BPH varies from 35.9% to 62.5% in our environment. [5,6].

Open prostatectomy can either be suprapubic transvesical popularised by Freyer in 1912 or retropubic popularised by Millin's in 1945. Both approaches have a reduced retreatment rate. Transvesical prostatectomy is often indicated when there is a need to treat concomitant bladder stone, huge middle prostate lobe/intravesical prostatic protrusion, and bladder diverticulum. Persistent or recurrent urinary tract infection, haematuria, and prostate volume greater than 75g are other indications for open prostatectomy. Retropubic prostatectomy is associated with less intraoperative bleeding and postoperative complications [7,8,9] while suprapubic / transvesical prostatectomy was associated with late minor postoperative complications [8]. Open prostatectomy is safe and is commonly performed in environment where minimal invasive facility is neither affordable nor available [9,10]. Zargooshi reported a positive correlation between acute urinary retention and urine culture [9]. While Pourmand et al, isolated *E. coli/pseudomonas* and *E. coli/klebsiella* species from urine [4].

Hence, the aims of this study were to determine the preoperative and postoperative complications, to identify the organisms isolated and antibiotics sensitivity to determine the appropriate antibiotics of choice in men with benign prostate enlargement complicated by urinary retention who were relieved of obstruction and underwent open retropubic prostatectomy. And to determine the correlation or association between preoperative and postoperative complications, age, prostate volume and urethral or suprapubic catheterisation.

MATERIALS AND METHODS

Type of study: Retrospective.

Setting: Tertiary hospital.

Inclusion criterium: Men with BPE complicated by acute urinary retention necessitating bladder catheterisation who underwent open retropubic prostatectomy.

Exclusion criteria: Men with BPE who were treated with medications either monotherapy or combination therapy who had successful trial of voiding without catheterisation. Men with overactive bladder.

Study Design / Data collection

The patients were divided into two groups I (36) were patients with preoperative urinary tract infection and while those in group II (29) without urinary tract infection (group II). Both groups had open retropubic prostatectomy. The parameters studied were age, prostate volume, preoperative and postoperative complications, clinical presentation, preoperative intervention in the form of urethral catheterisation, suprapubic cystostomy, and treatment offered such as antibiotics and surgery. Others include the timing of blood transfusion described as preoperative, intraoperative and postoperative. As well as the quantity of blood transfused.

Preoperative Intervention: urethral catheterization and antibiotics to treat urinary tract infection.

Treatment: open retropubic prostatectomy.

Main outcome measures: urinary tract infection and the choice of antibiotics.

Data analysis: The data was analysed with statistical software for social sciences Version 22 (Chicago, Illinois). Pearson's correlation was used to determine if there was any correlation between the groups for age, prostate volume, preoperative intervention either urethral or suprapubic catheterisation, and urinary tract infection. Correlations between Preoperative and postoperative complications was determined. The p-value < 0.05 was regarded as statistically significant.

Ethical issue: Ethical approval was obtained from the university of Ibadan/university college hospital ethics committee (UI/UCH EC) with registration number NHREC/05/01/2008a and approval number UI/EC/21/0327.

RESULTS

A total of 267 men with benign prostate enlargement were managed of which 65 of them underwent open retropubic prostatectomy with an operation rate of 24.3%.

Table 1 shows the characteristics of the men who underwent open retropubic prostatectomy for group I and II, the number of patients per group, the mean age, and mean prostate volumes were 36 and 29, 69.7 years and 70.7 years, 144ml and 143ml, respectively. The commonest indication for surgery in group I was acute urinary retention alone or in combination with haematuria in 39 (44.5%) compared to LUTS in 10 (15.4%) and AUR in 7 (11%) respectively in group II. Similarly urethral/suprapubic catheter was inserted in 30 (46.1%) patients in group I compared to 16 (24.6%) patients in group II.

The preoperative urinary tract infection (UTI) rate among men with BPE who underwent open retropubic prostatectomy was 55.4%. The total preoperative and postoperative complications were 46 (70.8%), 9 (13.8%) and 16 (24.6%), 6 (9.2%) for groups I and II respectively. However, persistent postoperatively UTI were 3.1%, 1.5% with an overall of 4.6% as shown in Table 2. The commonest preoperative complication was urinary tract infection seen in 36 (55.4%) patients while the

commonest postoperative complications was clot urinary retention 6 (9.2%) and 2 (3.1%) in groups I and II respectively. Of importance is the transfusion rate of 32.3%, 20% and 52% in groups I, II and overall, among patients who had open prostatectomy. While the commonest postoperative complications were clot urinary retention and acute epididymo-orchitis 6 (9.2%), 5 (7.7%) in group I and clot retention 2 (3.1%) in group II. Blood transfusion was higher among patients with preoperative UTI, 21 of 36 patients than those without UTI 13 of 29 patients. Others are as shown in table 2.

Table 3 shows that overall, there were positive Pearson's correlations (r) with statistical significance between the mean ages of men ($r = 0.405$, $p < 0.05$) and the indications for surgery ($r = 0.401$, $p < 0.05$) for groups I and II respectively. Similarly, between urinary tract infection and postoperative complications ($r = 0.260$, $p < 0.05$), indication for surgery versus preoperative intervention with reference to catheterization ($r = 0.277$, $p < 0.05$), and blood transfusion versus postoperative complications ($r = 0.325$, $p < 0.05$). However, a negative Pearson's correlation with statistical significance between preoperative and postoperative complications ($r = -0.288$, $p < 0.05$) in tandem with the preoperative UTI 55.4% and postoperative UTI 4.6%.

Table 3 further shows in group I, there was statistically significant negative correlations between preoperative complications and postoperative complications ($r = -0.467$, $p < 0.05$) as well moderate positive correlations and statistical significance between the indication for surgery and preoperative intervention in the form of urethral catheterization and insertion of suprapubic catheter ($r = 0.404$, $p < 0.05$). Whilst in groups II, there was a negative correlation between prostate volume versus preoperative complications ($r = -0.361$, $p < 0.05$) and positive correlations between age and timing of blood transfusion ($r = 0.380$, $p < 0.05$). Whereas there was a negative correlation between the overall indications for surgery and the quantity of blood given ($r = -0.300$, $p < 0.05$).

The commonest organisms isolated in those with acute urinary retention were *E. coli* 41.6%, *klebsiella*

species 27.8% and *Pseudomonas aeruginosa* 13.9% as shown in Figure 1.

The antibiotics sensitivity is as depicted in Figure 2. Majority of the organisms isolated were most sensitive to nitrofurantoin 23(64%) followed by gentamicin 12(33%), ceftriaxone 11(31%), Augmentin 11(31%), ciprofloxacin 10(28%) and ofloxacin 8(22%).

Table 1: Characteristics of men with BPE who underwent open retropubic prostatectomy.

	Group I n (%)	Group II n (%)	Overall Total
Number of patients/groups	36	29	65
Mean Age (years)	69.1	70.3	70
Mean Prostate volume (cm ³)	144	142.3	136
Preoperative urinary tract infection	36(55.4)	0(44.6)	65
Open retropubic prostatectomy	36(55.4)	29(44.6)	65
Indications for ORP	n (%)	n (%)	Total
Acute urinary retention	15(23)	7(11)	22(34)
AUR & Haematuria	14(21.5)	5(7.7)	19(29)
LUTS	05(7.7)	10(15.4)	15(23)
Haematuria	02(3)	07(11)	09(14)
Preoperative Intervention (UC/SPC)			
Urethral catheter	24(36.9)	15(23.1)	39(60)
Suprapubic catheter	6(9.2)	1(1.5)	7(10.8)
No catheter	6(9.2)	13(20)	19(29.2)

Table 2: Preoperative and postoperative complications in men who had open retropubic prostatectomy

	Group I n (%)	Group II n (%)	Overall Total
Preoperative complications			
Urinary tract infection	36(55.4)	0(0)	36(55.4)
Unilateral acute epididymoorchitis	2(3.1)	4(6.2)	5(7.7)
Bilateral hydroceles	2(3.1)	2(3.1)	4(6.2)
Chronic kidney disease	1(1.5)	0(0)	1(1.5)
Unilateral inguinal hernia	2(3.1)	1(1.5)	3(4.6)
Urethral stricture	2(3.1)	1(1.5)	3(4.6)
Clot urinary retention	0(0)	0(0)	0(0)
Erectile dysfunction	1(1.5)	1(1.5)	2(3.1)
Total Preoperative complications	46(70.8)	9(13.8)	55(84.6)
Postoperative complications			
None	20(30.8)	23(35.4)	43(66.1)
Clot urinary retention	6(9.2)	2(3.1)	8(12.3)
Unilateral acute epididymoorchitis	5(7.7)	0(0)	5(7.7)
Persistent UTI	2(3.1)	1(1.5)	3(4.6)
Wound infection	1(1.5)	0(0)	2(3.1)

Bladder neck stenosis	0(0)	1(1.5)	1(1.5)
Mortality	1(1.5)	1(1.5)	2(3.1)
Retained urethra catheter	1(1.5)	1(1.5)	2(3.1)
Total postoperative complications	16(24.6)	6(9.2)	22(33.8)
Blood transfusion	21(32.3)	13(20)	34(52.3)

Table 3: Pearson's correlations among the variables studied in men with or without urinary tract infections who underwent open retropubic prostatectomy.

Variable	r	p-value
Overall (n=65)		
Mean ages in Group I and II	0.405	< 0.05
Indication for surgery in G1 versus G2	0.401	<0.05
UTI and Postoperative complications	0.260	< 0.05
Preop. Complications vs. Postop. Complications	-0.288	<0.05
Postoperative complications versus Timing of blood transfused	0.330	<0.01
Blood transfusion vs. postoperative complications	0.325	< 0.05
Indications for surgery versus Preoperative intervention	0.277	<0.05
Indications for surgery versus quantity of blood given	-0.300	<0.05
Group I (36)		
Preoperative complications vs postoperative complications	-0.467	<0.05
Indications for surgery versus preoperative intervention	0.404	<0.05
Group II (n=29)		
Age(years) vs. blood transfusion timing	0.380	<0.05
Prostate volume versus Preop. complication	-0.361	<0.05

ORP – open retropubic prostatectomy, UTI – urinary tract infection, UC – urethral catheterisation, SPC – suprapubic cystostomy.

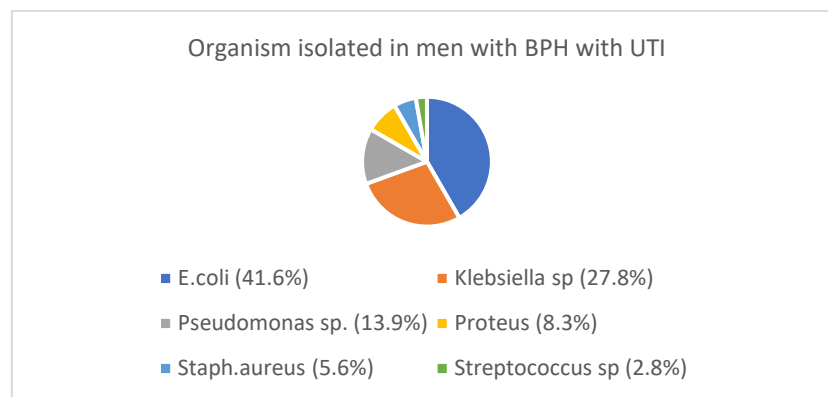


Fig.1: Organisms isolated in men with benign prostate enlargement and urethral catheterisation.

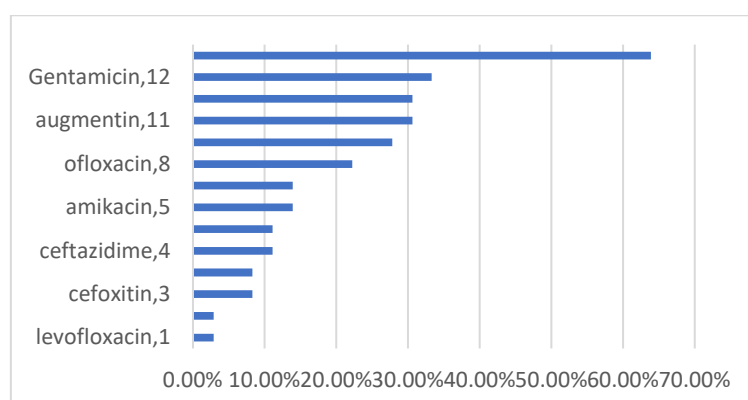


Fig. 2: Antibiotics sensitivity to isolated organisms in men with BPE complicated by acute urinary retention.

DISCUSSION

The mean ages of men with benign prostate enlargement in groups I, II and overall falls in the 7th decades of life and is comparable to reports from Saudi Arabia, middle East, northern Nigeria, southern and eastern Nigeria respectively. [6,7,11,12]. The prostate volumes in this study doubles those reported in middle East, East Africa and parts of Nigeria where the mean volume varies from 72mL to 79.35mL. [7, 9-11]. The reason for this finding is not known, although Liu et al in Taiwan [13] reported a positive correlation between prostate volume and age this was not the case in this study rather there was a positive correlation of prostate volume with preoperative complications in men without urinary tract infection whose major indication for surgery was worsening lower urinary tract symptoms. The doubled prostate volume may account for the increased incidence of blood transfusion and the timing of blood transfused which is in consonance with the observation by Carneiro et al that the bigger the prostate the higher the chances of bleeding. [14].

The commonest indication for prostatectomy in this study was acute urinary retention as reported in the sub-Saharan Africa and middle East as 60% [2], 31.7% [4], and 24.3% [15]. However, the second common indication in this study was the combination of acute urinary retention and hematuria. This hematuria followed relief of the urine retention by urethra or suprapubic

catheterization. This was probably due to rupture of the superficial submucous bladder veins in a distended bladder.

The commonest preoperative complication in this series was urinary tract infection. This was statistically related to the urethral or suprapubic catheterization as reported by Tolani et al. [5] The next common indication for surgery in group I was a combination of acute urinary retention and hematuria. This may also contribute to the higher incidence of blood transfusion in those patients with UTI who had urethral or suprapubic cystostomy. Thirdly, there was a negative correlation between the preoperative and postoperative complications. The implication is that appropriate treatment of urinary tract infection based on the pattern of sensitivity of urinary isolates may explain the reduction in the postoperative UTI.

In this study the commonest organisms isolated was *E. coli* (41.6%) which is consistent with reports from north central Nigeria and quite different from *Proteus mirabilis* reported by Akobi et al from the southern Nigeria. [16] With reference to the antibiotic sensitivity, organisms were mostly sensitive to nitrofurantoin (23, 35.4%) followed by gentamicin (12, 18.5%), ceftriaxone (11, 16.9%), Augmentin (11, 16.9%) and ciprofloxacin (10, 15.4%) respectively. The implication of this finding is that in the management of men with BPE/BPH complicated by acute urinary retention, the following antibiotics nitrofurantoin, gentamicin, ceftriaxone, Augmentin, and ciprofloxacin should be considered in decreasing order.

Irrespective of the huge size of prostate open prostatectomy has been adjudged to be safe in low economy countries where facility or expertise for Holmium laser enucleation of the prostate (HoLEP) is not available [8,10,14,17,18]. One limitation of HoLEP is prostate size about 400ml, in such cases, a perineal urethrostomy would obviate the inability of the sheath to get to the bladder neck. Otherwise, an open prostatectomy or laparoscopic prostatectomy is preferred by some authors [19]. The operation rate for BPE/BPH in this study of 24.3% was much higher than that reported by Lee et al of 2.1% in Korea. The difference in this rate may be explained by the fact that this was a hospital-based study of patients who were referred, unlike the Korean study that was a community study. [20].

The overall commonest preoperative and postoperative complication in this series was unilateral acute epididymo-orchitis in 5(7.7%) and 7(10.8%). This is much higher than reported by Tiwari et al [17]

The post open prostatectomy complications of wound infection 1.2% [9], 4% [18], clot urinary retention 1.3% [17], urinary tract infection 5.3% [17], 3.1% [18], bladder neck stenosis 2.2% [18] were comparable to what was found in this study.

CONCLUSION

The risk factors for urinary tract infection in patients with benign prostate enlargement were acute urinary retention and urethral or suprapubic bladder catheterisation. The most sensitive antibiotics were nitrofurantoin, gentamicin, ceftriaxone, and Augmentin. There was a correlation among indications for prostatectomy, urinary tract infections and catheterisation.

Recommendation: In men with acute urinary retention due to prostate disease, oral nitrofurantoin or parenteral nitrofurantoin should be administered as prophylactic antibiotics.

Study Limitations: None

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Conflict Interests: No conflict of Interest is declared.

Ethical Approval: Ethical approval was obtained from the University of Ibadan-University College Hospital Ethical Committee (UI/UCH EC) with registration number: NHREC/05/01/2008a. The UI/UCH Ethics Committee approval number was UI/EC/21/0327.

Informed Consent: Written Informed consent was obtained for the surgery. Informed consent for the purpose of publication was not obtained from the patients as this was a retrospective study without identification of the patient in line with Helsinki declaration for human and animal rights.

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