

Open Prostatectomy in the Management of Benign Prostate Hyperplasia in a Developing Economy

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Abstract

Background: Open prostatectomy (OP) is still relatively common in developing countries and remains a useful benchmark against which the minimal access surgical techniques are compared. This study aims to document the indications and outcomes of OP in a typical developing economy. **Method:** The records of patients with benign prostate hyperplasia (BPH) who had OP in our university teaching hospital between July 2004 and June 2014 were retrospectively reviewed. Some analyzed parameters include the demographic characteristics, indications, pre-operative work-up, anaesthetic techniques, OP type, complications, histopathology results and follow-up duration. **Results:** A total of 247 cases were studied. Mean age was 67 years while the commonest surgery indication was recurrent acute urinary retention. Average prostate specific antigen (PSA) was 8.4 ng/ml while hypertension was the most common co-morbidity (44.1%). Regional anaesthesia was mainly used (79.4%) while retro-pubic prostatectomy was the commonest OP type done (58.7%). The enucleated specimen weighed above 60 g in 91.9% of cases. All our patients were able to micturate spontaneously with urine stream above 20 mls/second on follow-up one week after discharge. Mean duration of hospital admission and follow-up were 7 days and 9 months respectively. Complications occurred in 90 patients (36.4%), of which surgical site infections were the commonest (9.8%). There was 0.4% mortality. Histopathology results showed BPH (95.5%), (incidental) prostate adenocarcinoma (2.4%) or prostatic intra-epithelial neoplasia (2.1%). **Conclusion:** OP remains an important therapeutic option for management of BPH in developing countries partly due to relatively large prostate size and presence of BPH complications from late presenta-

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tion in many patients. The surgery is efficient and has relatively low morbidity and minimal mortality.

Keywords

Open Prostatectomy, Benign Prostate Hyperplasia, Developing Economy, Nigeria

1. Introduction

Open prostatectomy (OP) is a “first generation” operation for benign prostate hyperplasia (BPH) and remains a commonly performed procedure by urologists in developing countries [1]. Transurethral resection of the prostate (TURP) on the other hand is termed a “second generation” procedure and is traditionally believed to be the gold standard for the surgical management of BPH worldwide especially if the prostate is relatively small (<60 g) [2]. OP is however still a common procedure in many developing countries especially in Africa partly due to poor availability of endoscopic equipment, scarcity of trained endoscopic personnel and the fact that the relatively larger prostate volumes encountered in Africans compared to Caucasians may not be amenable to TURP [2] [3].

International guidelines on treatment of BPH recommend OP or minimal access techniques like holmium laser enucleation of the prostate (HoLEP) for patients in whom large prostate size limits the use of conventional TURP [4] [5]. However, inadequate equipment and expertise on HoLEP and other novel minimal access techniques that can cater for large prostate volume make OP the only viable option for majority of BPH patients in our environment. When compared with endoscopic treatment, OP is cheaper, more effective [6] and can be used to simultaneously treat complications such as bladder diverticulum and bladder calculi, which are relatively common in most developing countries due to late presentation of patients [2].

With increase in the training and number of urology personnel, provision of more endoscopic equipment and strengthening of health insurance schemes, TURPs and other minimal access treatment options for BPH are expected to sharply increase in the nearest future in/around our domain. It is thus important to conduct studies like this on OP, as it will serve as a traditional reference benchmark to which endoscopic treatment of BPH can be compared. We therefore set out to document the indications and outcomes of OP in our developing economy.

2. Materials and Methods

A retrospective study of all patients that had OP between July 2004 and June 2014 at our university teaching hospital was done. The hospital is a 733-bedded tertiary centre that serves as referral centre for patients mainly in South-western and parts of North-central Nigeria.

Information extracted and analyzed after obtaining ethical approval were the demo-

graphic characteristics, symptom duration, surgery indication, co-morbidities, investigation results, anaesthetic considerations (American society of Anaesthesiologists [ASA] classification & anaesthetic technique), OP type, histopathology results, complications from the procedure, duration of admission and follow up. The data was entered into a proforma designed for the study and analyzed using the IBM Statistical Package for Social Sciences (SPSS) Version 20. Mean values and other frequency data were calculated as appropriate and results displayed using relevant statistical instruments.

3. Results

The hospital incidence of BPH was 1861.2/100,000 during the period under review. A total of 337 patients had simple prostatectomy for BPH during this 10-year period, which accounted for 2.8% of all surgeries done in our hospital during this time. Of these, 21 (6.3%) were TURP and excluded from the study. The remaining 316 (93.7%) were OP, out of which 247 (78.2%) patients were studied. The remaining 69 (21.8%) patients had incomplete data and were excluded from the study.

Their ages ranged from 43 - 91 years with mean age of 67 years (**Figure 1**). The commonest surgery indication was recurrent acute urinary retention (60; 24.3%) (**Figure 2**). Symptom duration was less than six months in 33 patients (13.3%), between 6 - 12 months in 75 (30.4%) and greater than 12 months in the remaining 139 (56.3%) patients. The mean serum prostate specific antigen (PSA) was 8.4 ng/ml. Their PSA was grouped into 0 - 4.0 ng/ml (79; 32%), 4.1 - 10.0 ng/ml (149; 60.3%) and > 10 ng/ml (19; 7.7%). Pre-operative urethroscopy was done in 185 patients (74.9%). Prior to surgery, 148 (59.9%) were on urethral catheter, 6 (2.4%) were on suprapubic catheter while the remaining 93 (37.7%) were not on any form of catheter. Eighty-six percent of our patients had at least one co-morbid condition, mostly hypertension (44.1%). Other co-morbidities in our patients were diabetes mellitus (18.2%), co-existence of hypertension and diabetes mellitus (15.8%), Asthma/chronic obstructive pulmonary disease (5.7%) and Parkinsonism (2.8%). There were 176 patients (71.3%) in ASA physical status class II, whereas the remaining belonged to ASA physical status classes I (10.1%), III (17.8%) or IV (0.8%) (**Table 1**).

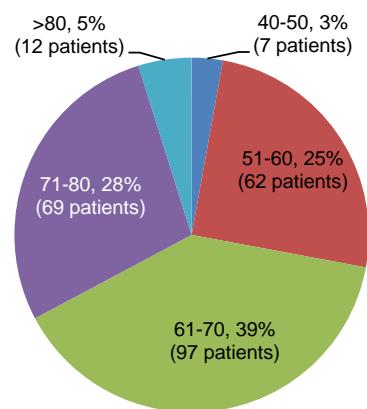


Figure 1. Age distribution of patients.

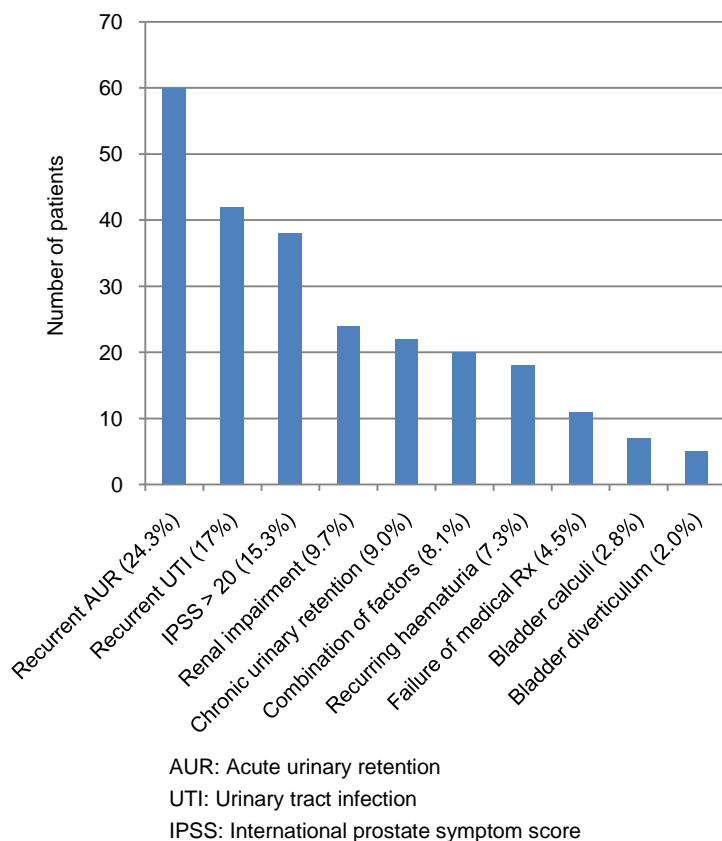


Figure 2. Indications for surgery.

Table 1. Anaesthetic considerations and surgery details.

1	Anaesthesia Type	Freq (n = 247)	Percentage (100%)
	Spinal	145	58.7
	General (GA)	47	19.1
	Epidural	29	11.7
	Combined spinal epidural	22	8.9
	Failed spinal, converted to GA	4	1.6
2	Surgery Performed	Freq (n = 247)	Percentage (100%)
	Retropubic prostatectomy alone	108	43.7
	Transvesical prostatectomy alone	87	35.3
	Retropubic prostatectomy + inguinal herniorrhaphy	36	14.6
	Transvesical prostatectomy + cystolithotomy	7	2.8
	Transvesical prostatectomy + inguinal herniorrhaphy	5	2.0
	Transvesical prostatectomy + diverticulectomy	3	1.2
	Retropubic prostatectomy + hydrocelectomy	1	0.4

Retropubic prostatectomy was the commonest type done (**Table 1**) and the enucleated specimen weighed 30 - 59 g in 20 patients (8.1%), 60 - 100 g in 138 patients (55.9%) and above 100 g in the remaining 89 (36.0%), with a mean weight of 81.1 g. Estimated blood loss was <500 mls in 139 patients (56.3%), 500 - 999 mls in 79 patients (32.0%) and 1000 - 2000 mls in the remaining 29 patients (11.7%). We transfused 34 patients (13.8%). Of these, 14 (5.7%) had one pint, 12 (4.9%) had two pints, 5 (2.0%) had three pints while 3 (1.2%) had more than 3 pints transfused. The urethral catheter was removed once the urine was clear, usually between 4 - 6 days post-operatively in the 223 (90.3%) patients without SPC. In those that had SPC, the suprapubic catheter was removed 24 - 48 hours post-operatively followed by urethral catheter removal 7 - 10 days after SPC removal, depending on the state of the suprapubic wound. Bladder training was not done before urethral catheter removal in any of the patients.

Histology of the prostatectomy specimen confirmed BPH in 236 (95.5%), but showed prostatic adenocarcinoma in 6 (2.4%) and prostatic intra-epithelial neoplasia in the remaining 5 (2.1%) patients.

The duration of admission ranged from 4 - 15 days (mean 7 days). All our patients were able to void spontaneously with urine flow >20 mls/second at their first post-operative clinic visit usually one week after discharge. Average follow-up duration was 9 months.

Post-operative complications occurred in 83 patients (33.6%), and were grouped using the modified Clavien system [7]. They include surgical site infection (9.8%), primary haemorrhage necessitating transfusion (9.4%), bladder neck stenosis (3.2%) among others (**Table 2**).

4. Discussion

BPH remains a major cause of morbidity, impaired quality of life and loss of man hours in middle aged and elderly men. Its surgical management has progressively shifted toward the minimal access treatment options such as TURP, laser vaporization and holmium laser enucleation over the years worldwide. The high cost of equipment and limited availability of expertise for these procedures, as well as relatively large prostate size make OP the mainstay for surgical management of BPH in many developing countries such as ours [2] [8].

Open enucleation was used in 93.7% of all the prostatectomies done in our hospital during the period under review. This is comparable to 90% reported from another university teaching hospital in Nigeria [3] but slightly higher than values of 81% and 79.3% for OP quoted from Kenya [9] and Ghana [10] respectively. Our practice, as well as those from most other developing countries is however in stark contrast to documented experience from Europe and America, as OP accounted for only 3% of prostatectomies in the United States of America [11], 12% in Sweden [12] and 14% in France [13]. The difference may be explained by the technological advancement in Europe and America with easier access to endoscopic equipment as well as because Caucasians have relatively smaller prostate volumes easily amenable to TURP [14].

Table 2. Complications of surgery.

Modified Clavien Grade	Sub-Grade	Complication	Frequency (%)	Management	
I	-	Any deviation from the normal postoperative course with no need for pharmacological treatment or surgical, endoscopic, and radiological interventions	Vesico-cutaneous fistula (Id)	4 (1.6)	Urethral catheterization + continuous bladder drainage
		Retrograde ejaculation	2 (0.8)vb	Masterly inactivity	
		Transient urinary incontinence (Id)	2 (0.8)	Perineal physiotherapy	
II	-	Complications requiring pharmacological treatment. Blood transfusions and total parenteral nutrition are also included	Intra-operative haemorrhage	23 (9.4)	Blood transfusion
			Post-operative anaemia	9 (3.6)	Blood transfusion
		Secondary haemorrhage	2 (0.8%)	Antibiotics, Bladder irrigation, Blood transfusion	
		Surgical site infection	24 (9.8)	Wound dressing; antibiotics	
		Urosepsis	4 (1.6)	Antibiotics	
		Epididymo-orchitis	3 (1.2)	Antibiotics	
		Osteitis pubis	1 (0.4)	Analgesics	
III	IIIa: Intervention not under general anaesthesia	Complications requiring surgical, endoscopic, or radiological intervention	Clot retention	3 (1.2)	Cystoscopic clot evacuation
			Bladder neck stenosis	8 (3.2)	Bougination
			Urethral stricture (incomplete)	2 (0.8)	Bougination
			Partial wound dehiscence	2 (0.8)	Secondary suturing
			IIIb: Intervention under general anaesthesia	-	-
IV	IVa: Single organ dysfunction (including dialysis) IVb: Multi-organ dysfunction	Life-threatening complications requiring intensive care unit stay	-	-	-
			-	-	-
V	-	Death of the patient	Perioperative mortality	1 (0.4)	Massive pulmonary embolism
			Total	90 (36.4)	

Suffix (d) ("disability"): If the patient has a complication at the time of discharge, suffix (d) is added to the respective grade of complication.

In this series, the mean age of the patients was 67 years, similar to findings in our previous report [15] as well as those by other authors [10] [16] [17] and a reflection of the predominant age of BPH occurrence in men.

Symptom duration greater than one year in many of our patients (139, 56.3%), and fact that more than two-thirds (72.1%) of them already had complication(s) from the BPH at presentation is a pointer to their poor health seeking behavior possibly secondary to their poor socioeconomic status, since our patients are mostly poor peasant farmers, traders and artisans. Many of our patients also believe in and actively seek after alternate medicine options, and this is an additional strong contributory factor to their

late hospital presentation. This late presentation of our patients may equally explain why the commonest indications for prostatectomy in our study were complications of BPH such as acute urinary retention (24.3%) and recurrent urinary tract infection (17.0%). Authors in other settings similar to ours have reported findings not too different from this [8] [10].

We found PSA to be within the normal range of 0 - 4 ng/ml in only 32% of our patients, though histology of the prostatectomy specimen confirmed BPH in 95.5% of cases. Co-existence of prostatitis with BPH, repeated urethral catheterization, acute or chronic urinary retention as well as the large prostate volumes encountered in most of our patients may account for the elevated PSA values, as it is a known fact that the higher the prostate volume, the more the PSA elaborated by the prostatic epithelium [18]. Similarly, elevated PSA values in patients with histologically confirmed BPH have also been found in studies by other authors, as mean PSA values of 9.6 ng/ml and 17.1 ng/ml were reported by Suer *et al.* [17] and Kyei *et al.* [10] respectively.

Pre-operative urethroscopy was done in about two-third of our patients, usually as a day-case procedure in our dedicated day case theatre suite [19]. Urethroscopy has only a limited role in the evaluation of BPH and is not mandatory for all patients [20]. In our practice, pre-operative urethroscopy before OP is indicated in patients with haematuria and those being planned for retropubic prostatectomy in order to rule out co-existing intravesical pathology whenever pelvic ultrasound result was inconclusive.

The most common co-morbid condition in our patients was hypertension followed by diabetes mellitus. This is comparable to findings from other settings similar to ours, which showed hypertension and diabetes mellitus as being the commonest co-morbid conditions in patients scheduled for OP [8] [9]. Despite the preponderance of hypertension in our study, it did not translate to excessive hemorrhage in our patients unlike the experience from other series [9]. In addition to the meticulous hemostasis ensured during surgery, adequate preoperative optimization and the predominant use of regional anaesthesia for our surgeries were probably contributory factors to reduce blood loss.

Retropubic prostatectomy has remained famous among urologists since its introduction by Terrence Millin in 1945 [21]. It is highly favored in our urology unit because of its technical ease for enucleating the large prostate glands commonly encountered in our patients. Furthermore, it has an added advantage of better haemostatic control with resultant faster resolution of haematuria post-operatively. Retropubic drain was not used routinely after retropubic prostatectomy as we have not found it to convey any additional benefit to our patients.

We considered the transvesical approach in those with SPC *in-situ* and those with co-existing bladder pathologies such as calculi or diverticulum, which were attended to during same surgery. A review of practice from other hospitals revealed that retropubic prostatectomy is the sole form of OP done by some surgeons while for others, there was a preference for transvesical prostatectomy [3] [16] [22]. Some other authors however

practice both forms of prostatectomy, in similar manner to our practice [9] [10] [23].

We routinely weighed the specimen after enucleation, before inserting it in formalin. About 90% of the enucleated prostatic specimen weighed above 60 g. The largest gland in our series weighed 398.5 g. The high proportion of patients with large prostate weight further lays credence to the popularity of OP in our practice [2].

There was no need for bladder training in any of our patients before urethral catheter removal. The mean duration of admission (7 days) is similar to the average hospitalization of 6.74 days and 8.8 days observed from studies by Ugwumba *et al.* [8] and Suer *et al.* [17] in similar climes. The fact that all the patients reviewed were able to void spontaneously with good urine flow (>20 mls/second) post-operatively is a pointer to the efficacy of the procedure.

Our total complication rate was 90 (36.4%). Ceylan *et al.* [24], in a review of OP in Asia reported a total complication rate of 34.6%, while researchers on the African continent have reported values between 40.1% and 42.3% [16] [22]. The modified Clavien system popularized by Dindo *et al.* [7] was used to classify the complications from our study (Table 2). Other researchers have equally embraced it to assess their outcome after OP surgery [6] [16] [22]. The grade II complications were the most common from our study, of which the commonest was haemorrhage, similar to reports by other researchers [9] [16] [22]. This was managed by hematinics and/or blood transfusion. We transfused 34 patients (13.8%). Similar rates of 12.7% and 13.0% respectively were observed by Suer *et al.* [17] and Kyei *et al.* [10]. In contrast, rates of 24.5% and 36.8% were observed from studies done in some other hospitals [22] [25]. Transfusion of only one pint of blood to a patient means the blood was probably not required [8], so it may be safely assumed that the one pint of blood given in 5.7% of our patients were unnecessary. If these are subtracted from the 13.8% that had blood transfusion in our study, our transfusion rate would have been 8.1%, similar to transfusion rate of 7.5% obtained from a multi-center study on OP in Europe [26].

Surgical site infection (SSI) was the second commonest complication from our study, found in 9.8% of patients. This was slightly higher than the 4%, 6.9% and 7.5% SSI rate recorded by Kyei *et al.* [10], Oranusi *et al.* [16] and Ahmed *et al.* [27] respectively; but less than the 35% SSI rate reported by Kiptoon *et al.* [9]. The occurrence of SSI may be partly explained by a high rate of pre-operative catheterization among our patients as well as immunosuppression from diabetes mellitus present in some of them.

Recalcitrant clot retention, requiring cystoscopic clot evacuation was relatively low in our series 3 (1.2%), unlike 7.5% recorded by Ahmed *et al.* [27] and 13.5% by Ugwumba *et al.* [8]. The use of silicone coated 3-way 22Fr foleys' urethral catheter for bladder drainage post operatively is a strong contributory factor, because the silicone coated catheters kink less compared to the latex catheters of same size [28].

One of our patients (0.4%) died 4 days after the procedure from massive pulmonary embolism. We have since modified our practice to include more aggressive routine calf physiotherapy in the peri-operative period, early post-operative mobilization, and use of compression stockings in selected patients. Similar low mortality (0.4%) was expe-

rienced by Ahmed *et al.* [27], while other researchers equally had low mortality between 1% - 1.2% [8] [22].

Limitations of our study are in its retrospective nature which affected the range of parameters that could be studied as well as the fact that this is a single-centred study.

5. Conclusion

Open prostatectomy is still an important therapeutic option for management of BPH in most developing countries such as ours partly due to large prostate size, late presentation and presence of BPH complications in many patients. It is efficient and has relatively low morbidity and minimal mortality.

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List of Abbreviations

OP: Open prostatectomy
BPH: Benign prostate enlargement
PSA: Prostate specific antigen
TURP: Transurethral resection of the prostate
SPC: Suprapubic cystostomy
ASA: American Society of Anaesthesiologists
IPSS: International Prostate Symptom Score
AUR: Acute urinary retention
UTI: Urinary tract infection



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