Original Article

An appraisal of a technical modification for prevention of bladder neck stenosis in retropubic prostatectomy: An initial report

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Abstract

Objective: To report the experience with our technical modification of the trigone-bladder neck complex management in the prevention of bladder neck stenosis (BNS) following open simple retropubic prostatectomy.

Materials and Methods: It was a retrospective review of data of patients that underwent open simple retropubic prostatectomy with technical modification of the trigone-bladder neck complex in two Nigerian tertiary hospitals, by a single surgeon, from January 2007 to December 2011. The data analysed included the demographic variables, the modes of presentation, need for blood transfusion, duration of catheterization and the duration of hospital stay. The primary end-point was the development or otherwise of BNS.

Results: Eighty-seven patients' data were available for analysis from a total of 91 patients. The mean age (±standard deviation [SD]) was 65.14 years (±10.55). Preoperative urinary retention was present in 58% of the patients. The maximal flow rate (Qmax) was 12.05 ml/s among the 20 patients that had preoperative uroflowmetry. The transfusion rate was 35%, but almost two-third of them had only one unit of blood transfused. The mean weight (±SD) of the enucleated adenoma was 82.64 g (±36.63). Bladder irrigation was required in 14% of the patients, majority of the patients had urethral catheter removed after 96 h and the mean hospital stay was 6.52 days. No patient developed BNS after a mean follow-up duration of 16.39 months.

Conclusion: Bladder neck stenosis can be a distressing complication of prostatectomy. The result of our technical modification of managing the trigone-bladder-neck complex looks promising for prevention or delaying the onset of BNS. A long-term observation and a prospective randomised control trial to ascertain this initial experience is needed.

Key Words: Benign prostatic obstruction, bladder neck stenosis, retropubic prostatectomy, technical modification, trigone-bladder neck complex

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INTRODUCTION

Benign prostate hyperplasia (BPH) is the commonest urologic condition seen in adult and open prostatectomy (OP) is the commonest procedure done in many parts of the West African sub-region.[1-4] Several options are available in the treatment of benign prostatic hyperplasia, however, trans-urethral resection

of the prostate (TURP) is considered to be the "gold standard" of treatment with which other forms of treatment are compared.[5,6] The dearth of facility for TURP in most of the centres in the developing world still allowed for OP as a veritable option in the surgical management of BPH;[4,7-9] thus OP, by strict criteria, can be considered the "gold standard" of treatment in many parts of the developing nations of the world where facilities, and thus the expertises for electro-resection, are grossly lacking. In patients with very large volume of BPH, that are not technically amenable to TURP or other minimally invasive options of treatment, OP also became handy; even in technologically advanced nations.[10-12]

The indications for prostatectomy and the complications of the procedure have been well documented with haemorrhage and bladder neck stenosis (BNS) having a very prominent place on the list.[7-10,13,14] Some modifications of the various original techniques of OP have been made in the past; especially to control haemorrhage.[13,15-18] To the best of the authors' knowledge there has been no active modification in technique to prevent BNS. We described our modification of a technique in managing the trigone-bladder neck complex that serves the dual purpose of haemostasis and prevention of BNS.

MATERIALS AND METHODS

We retrospectively reviewed the case notes of all the patients that underwent OP for benign prostatic hyperplasia, by a single surgeon (AAA), using our technical modification of managing the trigone-bladder neck complex in retropubic prostatectomy. The study took place in two Nigerian tertiary hospitals and it spanned from January 2007 to December 2011 so as to allow for opportunity of at least 2-year follow-up period of all patients. The primary end-point was the occurrence, or otherwise, of BNS. The protocol for diagnosis of postoperative BNS was based on the occurrence of lower urinary tract symptoms (LUTS); this is followed by combined retrograde urethrogram and micturating cystourethrogram, and finally urethrocystoscopy. All the patients were evaluated clinically with history, physical examination including digital rectal examination and appropriate investigations. The data extracted included the demographic variables of the patients, the modes of presentation, the premorbid condition, the preoperation packed cell volume (PCV), the need for transfusion and postoperation PCV. In addition, the weight of the prostate removed, the duration of postoperation catheterization, length of hospital stay, the uroflowmetry findings postoperation and the follow-up period were documented. Those with <24 months follow-up were contacted for further interview on phone. The data were analyzed using the SPSS version 14 computer software.

Technique

All our patients were routinely evaluated in the out-patient clinic and only admitted a day prior to operation; except for those that had emergency prostatectomy due to bleeding BPH.

The anaesthetic technique was usually epidural or sub-arachnoid block but general anaesthesia was occasionally employed. The patients were routinely given intravenous antibiotic (ciprofloxacin and metronidazole) at induction. Abdominal prep was made in the usual manner from the nipple-line down to the mid thigh and draping only exposes the suprapubic region in supine position.

I preferred Pfannestiel incision, about 6–8 cm long, to expose the rectus sheath which is then open transversely along the plane of the skin incision. A sub-umbilical mid-line incision may also be used. A flap of the rectus sheath is then raised, off the rectus muscle, both superiorly and inferiorly. The superior flap would go as far as the midpoint between the umbilicus and the pubic symphysis, while the inferior flap terminates at the level of the pubic symphysis; this was to allow an unhindered separation of the rectus muscle to allow for adequate access. The prevesical space is exposed once the belly of the rectus muscle is separated in the midline; this space is then developed into the retropubic space. The vesico-prostatic junction can then be seen and palpated. The lateral sides of the bladder neck and the prostate are packed with three pieces of gauze on each side; this helped in stabilizing the prostate, it rendered the preprostatic venous plexus stouten and quite unproblematic to secure with ligature. A self-retaining Gosset retractor (Surtex instruments, UK) is put in place for adequate exposure at this stage and the preprostatic plexuses of vein were secured with absorbable suture ligation. As a matter of preference, I avoid diathermy coagulation as much as possible from this stage onwards. Two stay sutures are applied on the prostatic capsule; the proximal one is at about 1 cm distal to the vesico-prostatic junction depending on the degree of obtuseness of the sub-pubic angle.

A transverse capsulotomy incision is then made on the prostate capsule in between the stay sutures with no. 11 scalpel, a curve scissor is use to develop the cleavage between the adenoma and the surgical capsule after which digital enucleation of the adenoma is done. The prostatic fossa is parked with gauze soaked in warm saline for about 5 min to reduce the bleeding.

The ureteric orifices are then identify and protected from injury, while the posterior lip of the bladder neck is catch with Babcock forceps (Surtex instruments, UK) on each side and divided in the midline longitudinally and about one inch upwards onto the trigone. Each of the divided lip is then

taken separately with 0 polyglactin (vicryl), incorporating the 5 O'clock and 7 O'clock on the left and right side respectively, and sutured to the postero-lateral sides of the prostatic fossa [Figure 1]. This modification allows for widening of the bladder neck following which the raw area between the divided trigone will later be covered by urothelium migrating from the edges of the divided trigone within days. In addition, this manoeuvre interposes epithelium on the posterior part of the bladder neck and the prostatic fossa thus theoretically preventing circumferential contracture of the bladder neck thus reducing the risk of BNS; a complication that may follow prostatectomy. It also secures the prostatic vessels at the lateral angles at the same time, thus major haemostatic measure is often needless. The minor bleeding from the other part of the fossa is then dealt with and usually the field is often dry before closure of the wound. If the re-trigonization is done well, the size 22 FR three-way urethral catheter would pass easily into bladder riding freely over the trigone without any hindrance in positioning the catheter into the bladder.

The capsulotomy incision is then closed water-tight with continuous or interrupted suture of 0 vicryl. The gauze packs on the sides are removed and the wound copiously irrigated with normal saline, a close tube drain is inserted through a separate stab wound into the space of Retzius. Rectus muscle is loosely apposed with 2/0 vicryl and the rectus sheath sutured with 0 PDS. The skin closure is done with nylon 2/0.

Postoperation management

The postoperative care essentially entails analgesic, antibiotics and fluid management. Most of the patients hardly require irrigation of the bladder, they commence oral feeding on the 2nd day of operation, the retropubic drain is removed after 36–48 h and the urethral catheter removed by 96 h following operation. The patients are kept in the hospital until stitch removal, usually 1-week after operation, at the initial phase of this modification but as we gained confidence overtime the patients were discharged home with phone contact number in case there are issues. They were seen at one week postoperation to remove their stitches, then one month, three months and then six monthly schedules in the clinic. All the patients are schedule for uroflowmetry at one month postoperation.

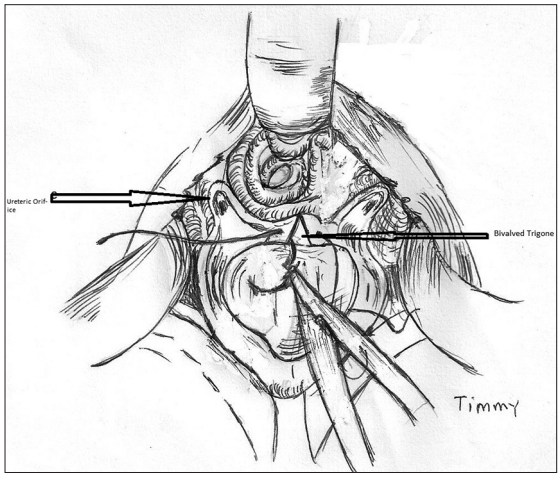

Figure 1: Schematic diagram of the trigone-bladder neck complex management. Bivalve trigone-bladder neck (right arrow) with needle taking the left leave separately

RESULTS

A total of 91 patients had retropubic prostatectomy, using our technique, for the duration of the study period; but only 87 patients' case note were found and formed the basis of further analysis. The mean age (±standard deviation) of patients at presentation was 65.14 (±10.55) years with a minimum of 50 years and the maximum of 88 years.

The mode of presentation was uncomplicated LUTS in about a quarter of the patients (25%) while the remaining patients presented with one form of complication or the other [Table 1]. Premorbid state was found in 14% of the patients, one-third

Table 1: The patient's and surgical demographics of the study population

	Number of subjects	Mean (±SD)	Range
Age (years)	*n*=87 (%)	65.14 (±10.55)	50–88
50-59	24 (27.6)		
60-69	31 (35.6)		
70-79	21 (24.2)		
80-89	11 (12.6)		
Modes of presentation	*n*=87 (%)		
LUTS	22 (25.3)		
AUR	50 (57.5)		
CUR	12 (13.8)		
Bleeding prostate	03 (3.4)		
Perioperation blood transfusion	*n*=87 (%)		
Nil	57 (65.6)		
1	23 (26-4)		
2	05 (5.7)		
4	01 (1.1)		
6	01 (1.1)		
Preoperative Qmax (ml/s)	*n*=20	12.05 (±2.44)	6.0-16.0
Postoperative Qmax (ml/s)	*n*=54	25.59 (±5.18)	15.0-38.0
Preoperative PCV (%)	*n*=87	34.56 (±3.63)	26-45
Postoperative PCV (%)	*n*=87	32.25 (±2.49)	28-40
Prostate volume on USS (ml/s)	*n*=87	87.86 (±40.10)	40-280
Weight of enucleated adenoma (g)	*n*=59	82.64 (±36.63)	30-200
Duration of catheterization (days)	*n*=87	4.38 (±0.69)	4-7
4	61 (70.1)		
5	22 (25.4)		
6	01 (1.1)		
7	03 (3.4)		
Hospital stay (days)	*n*=87	6.52 (±2.14)	5-16

LUTS: Lower urinary tract symptoms, AUR: Acute urinary retention, CUR: Chronic urinary retention, USS: Ultrasound, PCV: Packed cell volume, SD: Standard deviation

of them had diabetes and the remaining two-third were hypertensive. Uroflowmetry was performed preoperatively on 20 patients (23%) with a mean maximum flow rate (Qmax) of 12.05 ml/s. The mean estimated weight of the prostate on ultrasound was 87.86 g; those with prostate weight of 60 g or less were 32%. About two-third of the patients (68%) had the enucleated adenoma weight recorded with a mean weight of 82.64 g; those with weight 60 g or less were 42% [Table 2].

The mean preoperative PCV value was 34.56% (±3.63) (range = 26–45%). The mean change in the PCV among those patients that were not transfused peri-operatively was 3.32% (±1.95). Blood was transfused in 35% of the patients; of those that had blood transfusion 77% of them had only one pint of blood transfused [Table 1]. Additional procedures, essentially bladder stone removal and inguinal hernia repair, were carried out in 14% of the patients. Bladder irrigation was done in 14% of the subjects. Majority of the patients (70%) had their urethral catheter removed on the 4th day of operation while another one quarter (25%) had it removed on the 5th day of surgery; only about 5% had the urethral catheter for more than 5 days.

The mean duration of hospital stay was 6.52 days (±2.14) (range = 5–16 days). One tenth of our patients stay more than a week in the hospital. The mean follow-up period was 16.39 months (±4.40) (range = 12–24); the mean Qmax at follow-up, among the 54 patients that had uroflowmetry, was 25.59 ml/s (±5.18) (range = 15–38). Two patients developed LUTS that was secondary to urethral stricture; no patient developed BNS.

DISCUSSION

Historically, OP has been considered the standard of care for men with symptomatic and extremely large prostates.[19] TURP and OP remains the gold standard for surgical treatment of benign prostatic obstruction; OP provides a high degree of de-obstruction, symptomatic relief, and sustained improvement.[20] OP remains a cornerstone in the management of symptomatic BPH. Emerging new techniques are still lacking broad application due to the long learning curve, costs, lack of expertise and endoscopic equipment.[11]

In the current study, the mean age of 65.14 years is comparable with findings from other studies.[1-4] Preoperative acute retention was present in 58% of the patients, in addition 14% of the patients presented in chronic retention of urine [Table 1]; this represent the common finding in most other reports.[1-4,10-13] Uroflowmetry was done preoperatively in 20 patients with a mean Qmax of 12.05 ml/s; this was because majority of patients presented in retention of urine and the unavailability of uroflowmeter in one of the study centres. The mean enucleated tissue weight was 82.64 g and it compared favourably with the mean prostate weight of 87.86 g on ultrasound; even though there are some discrepancies, between individual patient's measurement on ultrasound and the enucleated prostate, these can be accounted for by the fact that such measurements were routinely taken using the abdominal route as against the transrectal route which have been reported to give a better representation.[21] In addition, the measurements in this study represent the whole gland as against the adenomatous zone that was enucleated during prostatectomy. It is pertinent to note that the mean weight of the prostate gland was similar to finding in another report;[11] this was greater than the advocated prostate gland weight for minimally invasive options for treatment of benign prostatic enlargement.[5] Only about one-third (32%) of the patients had their prostate weight 60 g and below on ultrasound and thus are the proportion that are theoretically amenable to minimally invasive technique [Table 2].

The mean preoperation PCV was 34.56% among all patients. The mean preoperation PCV, among those that were transfused blood and those that do not have blood transfusion, was 31.93 (±2.79) and 35.95 (±3.25), respectively. Among those that received no blood transfusion, however, the mean pre- and post-operation PCV were 35.95% (±3.25) (range = 32–45%) and 32.63% (±2.51) (range = 28–40%) respectively. This corresponded to a mean change in PCV, from preoperation to postoperation period, of 3.32% (±1.95); equivalent to a mean

Table 2: Proportion of the prostate weight by ultrasound and enucleated tissue

Parameters	Weight of prostate (g)	Estimation by USS (%)	Enucleated tissue (%)
Number of patients		87	59
Small	≤60	28 (32.2)	25 (42.4)
Medium	61–100	45 (51.7)	27 (45.8)
Large	>100	14 (16.1)	07 (11.8)
Mean		87.86 (±40.10)	82.64 (±36.63)
Range		40–280	30–200

USS: Ultrasound

Table 3: The mean PCV among patient group

Parameters	All patients	Transfused patients (%)		Not transfused patients (%)	
		Preoperative	Postoperative	Preoperative	Postoperative
Number of patients	87	30		57	
Mean (±SD)	34.56 (±3.63)	31.93 (±2.79)	31.53 (±2.32)	35.95 (±3.25)	32.63 (±2.51)
Range	26–45	26–40	28–40	32–45	28–40
Mean change in PCV	-	0.40 (±0.47)		3.32 (±0.74)	

PCV: Packed cell volume, SD: Standard deviation

blood loss of 1.11 pints of blood (±0.65). The blood transfusion rate in the present study was 35% which was significantly greater than previous studies.[7,12,22] About two-third of those that were transfused got one pint of blood leaving only 8% being transfused two or more pints of blood. The justification for such one unit of blood transfusion may not be possible in this retrospective analysis. Inferring from the mean blood loss of 1.11 pints from the present study therefore, majority of patients with allowable blood loss of about 600 ml or less can be safely left without transfusion [Table 3].

The urine was clear in majority of our patients before leaving the operation theatre. Only 14% of the patients required bladder irrigation. The mean urethral catheterization days was 4.38 (±0.69) with no incidence of re-catheterization after removal of the urethral catheter. The mean duration of hospital stay was 6.52 days (±2.14) (range = 5–16 days); many of those that stayed beyond a week were inadvertently left on bed or developed varying degree of wound infection. At the initial period, the patients were kept in the hospital after the urethral catheter was removed until the stitches were removed; usually on the 8th day of operation. As we gained confidence the patients were discharged a day after the urethral catheter was removed with contact details of who to contact, if there is any issue, and they had to come for removal of stitches later as outpatient.

We routinely follow-up our patients at one month, three month, and then six monthly postoperatively. The mean follow-up period was 16.39 months (±4.40) (range = 12–24); the mean Qmax at follow-up was 25.59 ml/s. Two patients (2.3%) later presented with LUTS that were evaluated and found to be due to membranous urethral stricture, they both did well after internal urethrotomy with serial dilatation with bougie; this is in keeping with findings in other reports.[14] There was no case of BNS at 2-year of follow-up in the present study; this is in contrast to a range of 1.7% to 5% rate that has been reported in the literature.[7,14]

CONCLUSION

Although a prospective randomized control study shall be required to ascertain the benefit of this modification as it affects the long-term outcome; it is our belief that this technical modification of trigone-bladder neck complex management can be added to the surgical armamentarium of open simple prostatectomy as we awaits the result of a longer period of follow-up.

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