

Comparing the incidence of Bladder Neck Stenosis post monopolar Transurethral Resection of the Prostate; small prostates versus larger prostates in the black African population

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Abstract

Monopolar Transurethral Resection of the Prostate (TURP) is the commonly done procedure for surgical removal of the prostate after open prostatectomy in our subregion. It is still a novel procedure in our subregion, as very few centers offer this procedure. It is generally believed that the size of the prostate may influence the development of complications of bladder neck stenosis. This is a dreaded complication, which requires further surgical procedure to correct in a resource-poor environment. We decided to compare the

incidence of Bladder Neck Stenosis (BNS) in small vs larger prostates following monopolar TURP in our black African subregion. We prospectively studied 194 patients who underwent TURP in our facility from 2015 to 2022 that satisfied the inclusion criteria. Eighty-five participants (43.81%) had a small prostate (Transrectal Ultrasound, TRUS, weight <30 g), and 109 participants (56.19%) had a large prostate (TRUS weight >30 g). Overall, ten participants (5.15%) had postoperative BNS. Participants with smaller prostates had more incidence of bladder neck contracture than those with larger prostates, although this did not reach statistical significance, Fisher's Exact test $p=0.338$. Multifactorial reasons and not prostate size alone may be responsible for BNS. There may be a need for larger-scale standardized studies on prostate size effect on BNS.

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Introduction

Transurethral Resection of the Prostate (TURP) is the gold standard for surgical treatment of severe Lower Urinary Tract Symptoms (LUTS) due to Benign Prostate Hyperplasia (BPH).^{1,2} Monopolar TURP is more commonly used than bipolar TURP in our subregion because the equipment is cheaper to procure. One of the late complications arising from TURP is Bladder Neck Stenosis/Contracture (BNS/BNC). It could result in devastating psychological and financial burden to the patient because repeated surgical procedures to correct it could be necessary. Although the underlying mechanisms of BNS are not well understood,³⁻⁵ many factors have been studied as possible risk factors for BNS post-TURP. These include prostate size, prolonged resection time, postoperative urinary tract infection, persisting chronic prostatitis, etc.⁶⁻⁸ However, prostate size is the commonest identified risk factor in many studies.^{7,9-11}

Many of the studies comparing small prostate size to larger prostates with respect to BNS as a complication post-TURP are retrospective studies without standardized protocol for prostate sizes. Some studies used 40 g as a small prostate, while some used 30 g. This led to conflicting results from these studies, until the American Urology Association (AUA) Part II Guidelines, published in 2021, came up with a standard protocol for prostate size, in which <30 g was regarded as small prostate; 30-80 g as moderate-sized; 80-150 g as large prostate.^{12,13}

In this study, we attempted to prospectively study the incidence of post-TURP BNS in small prostates vs larger prostates using the standard protocol of <30 g for small prostates and >30 g for larger prostates in a black African population living in sub-Saharan Africa. It is believed that small prostates causing severe LUTS have more fibrous than glandular components, and healing processes may increase the likelihood of stenosis, more in a black population believed to mount more fibrosis during wound healing.

Materials and Methods

This was a prospective study done in the 82nd Division Military Hospital from 2015 to 2022. Ethical clearance was obtained from the ethics committee of the hospital. Informed consent was obtained from participants prior to the commencement of the study. A total of 196 patients were enrolled in the study, but 194 patients completed the study. Using the European Urology Association (EUA) and American Urology Association guidelines, small prostates were regarded as patients with prostate <30 g and larger prostates >30 g to 80 g. All patients met the indications for TURP. Preoperative evaluation was done using the International Prostate Symptom Score (IPSS). A Transrectal Ultrasound (TRUS) of the prostate was done using a Toshiba model SSA- 590A ultrasound machine with a transrectal probe, model PVM-620ST, and the prostate volume/weight was documented. The ultrasonography was performed by a single radiologist to avoid interobserver differences. Urinalysis/culture was done to rule out urinary tract infection. Monopolar TURP was done for all patients using a size 26F continuous flow resectoscope (Karl-Storz; Tuttlingen, Germany). Initial gentle dilatation of the urethra was done with size 28/32 Clutton metallic bougie and 50 mL of K-Y lubricant jelly instilled into the urethra before inserting the resectoscope. Cutting and coagulation energies were set at 120 w and 80 w, respectively. Five percent dextrose water was used as irrigation fluid. TURP was carried out by a single urologist with over five years of experience at TURP. Resection time lasted between 40 and 75 minutes under spinal anesthesia. Postoperatively, a size 22, 3-way urethral silicone catheter is passed for irrigation of the bladder with normal saline. The catheter is usually removed after 72 hours when effluent is clear. Prophylactic antibiotic with parenteral ceftazidime continues for 48 hours. Patients are discharged on oral quinolones for two weeks. IPSS was done to monitor the patients' postoperative LUTS. Patients were followed up for 2 years, and patients with worsening voiding symptoms subjectively or through IPSS scores were subjected to cystoscopy to confirm BNS. Patients with urethral strictures established as narrowing of the anterior urethra or adenomatous regrowth of the prostate on urethroscopy were excluded from the study. These patients present with dwindling urine stream and worsening IPSS, just like patients with BNS thus requiring urethrocystoscopy for definitive diagnosis.¹⁴ Patients whose histology report returned as prostate cancers were excluded from the study. Patients with keloids were also excluded from the study. Eighty-five patients with small prostates and 109 patients with larger prostates were followed up for 2 years.

Results

One hundred and ninety-four patients completed the study. The mean age of the participants was 66.28 years (Standard Deviation, SD=8.19). The modal age group was the sixth decade, and most of the participants were retired civil servants. Table 1 summarizes the sociodemographic characteristics of the participants. Only 7.4% of

patients had previous prostate surgeries, as illustrated in Figure 1, of which 2.06% had an open prostatectomy and 1.55% had TURP. All the patients had a preoperative TRUS of the prostate. The participants' average prostate gland weight as determined by TRUS was 44.41 g (SD=18.52). Table 2 shows the weight categories of the prostate as determined by TRUS. Eighty-five participants (43.81%) had a small prostate (TRUS weight <30 g), and 109 participants (56.19%) had a large prostate (TRUS weight >30 g). The average prostate size in the former group was 25.87 g (SD=4.13), while the mean prostate size was 58.87 g (SD=10.86) in the latter group. This weight difference of 33 g was statistically significant, $t=26.54$, $p<0.001$, 95% Confidence Interval (CI) (30.54-5.45). Overall, 10 participants (5.15%) had postoperative BNC. The median time to developing BNC in this study was 7.50 months,

Had Previous Prostate surgeries?

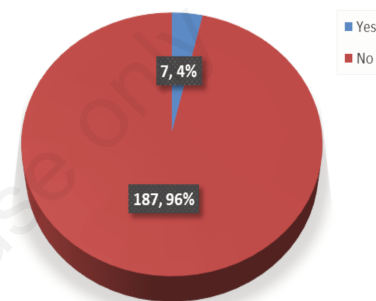


Figure 1. The proportion of patients that had previous prostate surgeries.

Table 1. The sociodemographic characteristics of the participants.

Age category (years)		
40-50	2	1.03
50-60	38	19.59
60-70	82	42.27
70-80	62	31.96
80-90	8	4.12
90-100	2	1.03

Table 2. The different weight categories of the participants' prostate as estimated by Transrectal Ultrasound (TRUS).

TRUS estimated weight of prostate (g)	N	%
10-30	65	33.51
30-50	50	25.77
50-70	55	28.35
70-90	24	12.37
Grand total	194	100.00

Table 3. The relationship between prostate size and bladder neck contracture.

	Bladder-Neck Contracture present	Bladder-Neck Contracture absent	Total	Chi-square Fisher's exact p
Small prostate (<30 g)	6 (7.1%)	79 (92.9%)	85 (100%)	1.122 (0.338)
Large prostate (>30 g)	4 (3.7%)	105 (96.3%)	109 (100%)	
Total	10 (5.2%)	184 (94.8%)		

with a minimum of 2 and a maximum of 24 months, respectively.

Participants with smaller prostates had a higher incidence of BNC than those with larger prostates, although this did not reach statistical significance (Fisher's Exact test p -value=0.338). Table 3 shows the incidences of BNC in participants with small and large prostate glands.

Discussion

TURP remains the gold standard for simple prostatectomy in patients with BPH. BNC is one of the possible long-term complications. The underlying mechanism and pathophysiology of BNS are currently poorly understood.^{3-5,15} In literature, the most common risk factor for BNS is small prostate volume.^{7,9,10} Other risk factors implicated are prolonged surgical duration, higher IPSS storage scores, preoperative uncontrolled infection, unsuitable resectoscope, large resection loop, extensive resection of the bladder neck, long surgical time and recatheterization after surgery, the diameter of the instrument, presence of chronic prostatitis in anamnesis, increased volume of the prostate, and repeated drainage of the bladder using the urethral catheter.^{6,10} We decided to embark on a prospective study to compare the incidence of BNS in small prostates versus larger prostates in a black African population. One hundred ninety-four (194) patients completed this study. The mean age was 66.28 years. This is in keeping with the age incidence of BPH found in other studies.^{7,10}

The overall incidence of BNS in this study was 5.15%. This was in keeping with the incidence of BNS in medical literature, which ranges from 2.2 to 9.8%.¹⁶ In a meta-analysis by Ahya *et al.*, the incidence of BNS was 2%.⁴ The median time to occurrence of BNS post-TURP in this study was 7.5 months (range 2-24 months). BNC is a common postoperative complication that typically occurs early within the first 2 years post-operation.¹⁷ A follow-up of 2 years, as was the case in this study, is usually adequate to detect patients that will develop BNS.

BNC was seen more in small prostates than larger ones in this study, but the difference was not significant statistically, unlike many studies that noted the significant preponderance of BNC in small prostates.^{7,9-11} The finding in this study could be related to the standard protocol used in this study, where small glands are accepted as less or equal to 30 g, while bigger prostates were those more than 30 g. There was no standardized protocol for prostate size until the panel for AUA Guidelines Part II in 2021 came up with size categorization. Some studies used values above 30 g as their cut-off for small prostates. Chen *et al.*,¹⁰ Chen ML *et al.*¹⁴ and Tao *et al.*⁷ regarded up to 40 g as small prostate, thereby recording statistically significant higher incidence for BNS in small prostates. Al-Singary *et al.*¹⁸ did not state the categorization used for small prostates vs larger prostates. It is possible that a larger sample size may have given a statistically significant difference in this study. However, it is important to point out that a few studies noted a higher incidence of BNS in larger prostates compared to small prostates.⁶

This suggests that size alone may not be responsible for the occurrence of BNS post-TURP. The etiology may, therefore, be multifactorial, and more standardized, large-scale randomized studies may be needed to establish this concern. It is also noteworthy that the black African population in this study played no role, as the incidence of BNS of 5.15% in this study was within the recorded incidence from literature in other climes.

The incidence of BNS in small prostates can be significantly

reduced by prophylactic incision of the bladder neck immediately after TURP^{7,19} or performing only Transurethral Incision of the Prostate (TUIP), as stated in the EAU guideline.¹³

Conclusions

Post-TURP BNS was recorded more for small prostates than for larger prostates, but the difference was not statistically significant. This points to multifactorial reasons for BNS or the need for a larger-scale standardized studies for prostate size effect on BNS.

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