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ORIGINAL RESEARCH

Impact of simple prostatectomy on erectile function and lower urinary tract symptoms

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Background: Lower urinary tract symptoms (LUTS) and erectile dysfunction (ED) in patients with benign prostatic enlargement (BPE) are common conditions in ageing men. Although the positive impact of surgical management of symptomatic BPE has been established, its impact on erectile function is controversial. This study aimed to determine the impact of open simple prostatectomy on erectile function (EF) and LUTS in patients with BPE.

Methods: This prospective observational study was carried out at our hospital over a period of one year. Consenting patients with clinical, ultrasonic and laboratory features suggesting benign prostate enlargement and who were scheduled for open simple retropubic (Millin's) prostatectomy were recruited for this study. Patients with elevated serum prostate-specific antigen (PSA) or findings suspicious of prostate cancer on digital rectal examination had prostate biopsies to exclude prostate cancer. The patients were requested to complete the International Prostate Symptoms Score (IPSS) and Sexual Health Inventory for Men (SHIM) questionnaires before the open simple prostatectomy as well as six months after the procedure. The preoperative IPSS and SHIM were compared to postoperative IPSS and SHIM by using the Wilcoxon signed-rank test.

Results: A total of 53 patients took part in the study. Their ages ranged from 44–80 years with a mean of 64 ± 9. The median value of the preoperative IPSS was 29, while the median postoperative value was 2 ($p < 0.001$). The median value of the preoperative SHIM was 16, while the median postoperative value was 18 ($p = 0.6$).

Conclusion: There was a significant positive relationship with improvement of LUTS following the simple prostatectomy. There was also slight improvement in erectile function, although it was not statistically significant.

Keywords: erectile function, lower urinary tract symptoms, benign prostatic enlargement, erectile dysfunction, prostatectomy

Introduction

Lower urinary tract symptoms (LUTS) due to benign prostatic enlargement (BPE) and erectile dysfunction (ED) are highly prevalent in men over the age of 50 years.[1] Both LUTS and ED have a negative impact on sexual functioning and when these co-exist it could result in reduced quality of life.[2]

Studies in different geographical areas have provided strong evidence of an association between ED and LUTS independent of age and comorbidities.[3] This association is both epidemiological and pathophysiological. However, the pathophysiological link is largely unclear.[3] Treatments of LUTS due to BPE have led to remarkable improvements in both conditions as reported in some studies.[4,5]

Studies have tried to establish whether LUTS is a likely risk factor for ED. A study conducted in Nigeria reports a prevalence of ED of 71% among Nigerian men with LUTS due to BPH.[6] A study by Chahal et al. shows that there was significant improvement in erectile function (EF) and LUTS following transurethral resection of the prostate (TURP),[7] while similar studies conducted by Poulakis et al. report worsened EF following TURP with improvements in LUTS.[8,9] Li et al. evaluated nine different surgical approaches used in the treatment of LUTS due to BPE to determine the corresponding changes in EF. This study determined that all surgical interventions remarkably improve LUTS and did not worsen EF except photoselective vaporisation of the prostate.[10] Patients who underwent TURP, Holmium laser enucleation of the prostate, Thulium laser and open simple prostatectomy remarkably improved both their LUTS and their EF.[10] This finding contradicts a study by Jeong et al. who indicated serial improvements in LUTS at one, three, six and 12 months while there was slight reduction in the baseline EF up to six months.[11] This, however, returned to the baseline at 12 months following Holmium laser enucleation of the prostate. Jeong et al. suggested that EF appears to be transiently decreased during the early postoperative period following Holmium laser enucleation of the prostate.[11] Montesi et al. evaluated the effect of open simple prostatectomy for LUTS/BPE on EF and showed an increase in the Sexual Health Inventory for Men (SHIM) and decrease in International Prostate Symptoms Score (IPSS) which connote improvements.[12] Although the positive impact of surgical management of symptomatic BPE has been established, its impact on EF is controversial. To the best knowledge of the researcher, no study has looked at the impact of open simple prostatectomy on EF in our environment. This study, therefore, set out to investigate the impact of open simple prostatectomy on EF and LUTS.

Materials and methods

Study design and participants

This prospective, hospital-based, observational study was performed at a tertiary hospital between October 2020 and

September 2021 (a 1-year period) in Nigeria. The minimum sample size of 50 was calculated using the Cochran formula.

Consecutive consenting patients with clinical, ultrasonic and laboratory features suggestive of benign prostate enlargement and who had indications for open simple retropubic prostatectomy were recruited for this study. Patients with elevated serum prostate-specific antigens (PSA) or findings suspicious of prostate cancer on digital rectal examination had prostate needle biopsy to exclude prostate cancer.

All patients gave written informed consent and the study was approved by the local ethical committee of Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria (number: ERC2020/07/06).

The exclusion criteria were as follows:

1. Patients with established, or on treatment for, peripheral neuropathy
2. Men on treatment for ED
3. Patients on 5-alpha-reductase inhibitors therapy for BPE
4. Patients with diabetes mellitus
5. Patients with previous urethroplasty
6. Patients on anti-psychotic, anti-depressant and centrally acting anti-hypertensive medications
7. Patients with sickle cell disease or previous history of priapism
8. Patients with spinal cord injury

Sample size determination

The Cochran formula was used to determine the sample size for the study.[13]

$$N = \frac{Z_{1-\alpha/2}^2 p(1-p)}{d^2}$$

Where

N = minimum sample size

$Z_{1-\alpha/2}$ = standard normal variate (at 5% type I error) = 1.96

p = proportion of BPE patients who had open simple prostatectomy

The prevalence of open simple prostatectomy in our community, according to Salako et al.,[14] is 2.8%

P = 0.028

q = (1-p). 1-0.028 = 0.972

d = margin of error = 5%

$$\mathbf{n} = \frac{(1.96)^2 \text{x } 0.028 \text{ x } 0.972}{(0.05)^2} = \mathbf{41.8}$$

Allowing 15% attrition rate for the study, the minimum sample size was estimated at 50 patients.

The participants were requested to complete the IPSS and SHIM questionnaires both before the open simple retropubic prostatectomy and again six months after the procedure. Both questionnaires were either self-administered by English-speaking participants or thoroughly explained to non-English speakers in their native language by the research team led by the author.

Statistical analyses

Data were entered and analysed using Statistical Package for Social Sciences (SPSS), version 23 (IBM Corp., USA). Univariate analysis was used for the sociodemographic data of the participants using means and standard deviation. The Wilcoxon signed-rank test was used to determine changes in ED and LUTS after the prostatectomy. For all statistical tests, a p-value < 0.05 was considered statistically significant.

Results

In total, 59 patients were recruited to participate in the study and all of them had open simple retropubic (Millin's) prostatectomy. TURP is not readily available at our centre. Of these participants, six did not complete the study because they were lost to follow-up. Therefore, 53 participants concluded the study and were analysed.

The ages of the participants ranged from 44–80 years, with a mean of 64.6 ± 9.1 years and higher proportion in the 60–69 years group. The majority of the participants were skilled artisans (50.9%) (Table I).

Table I: Age and occupational distribution of the participants (n = 53)

Sociodemographics	Frequency (n)	Percentage (%)
Age in years		
< 50	2	3.8
50–59	13	24.5
60–69	20	37.7
70 and above	18	34
Mean age (44–80)	64.6 ± 9.1	
Occupation		
Skilled	27	50.9
Semi-skilled	8	15.1
Unskilled	18	34

Occupations under skilled include teacher, accountant; occupations under semi-skilled include taxi driver, guard; occupations under unskilled include farmer.

The preoperative IPSS ranged from 10–35, with a median value of 29. Most of the participants had severe symptoms (86.8%) and reported their clinical status as terrible (77.3%) (Figure 1). The preoperative SHIM ranged from 6–24, with a median value of 16. The majority of the participants had ED (69.8%) – mild to moderate ED (28.3%), moderate ED (22.6%), mild ED (15.1%), severe ED (3.8%) and no ED (30.2%) (Figure 2). The most common indication for surgery within the study group was recurrent acute urinary retention (33.9%) (Table II). All of the participants had mild symptoms (100%) and ranged from 0–4 with a median value of 2 six months postoperatively (Figure 1). The majority of the participants were delighted concerning their quality of life (79.2%) (Figure 2). The postoperative SHIM ranged from 8–25 with a median value of 18. Most of the participants reported ED six months after surgery (79.5%) while none of them reported severe ED (Figure 3).

Table II: Indications for surgery in participants (n = 53)

Factors	Frequency (n)	Percentage (%)
Recurrent acute urinary retention alone	18	33.9
Acute urinary retention + failed medical therapy	8	15.09
Recurrent acute urinary retention + urinary tract infection	7	13.2
Acute urinary retention + renal insufficiency	6	11.3
Acute urinary retention + recurrent haematuria	3	5.6
Acute urinary retention + urinary tract infection + haematuria	3	5.6
Recurrent haematuria alone	2	3.77
Urinary tract infection + renal insufficiency	1	1.88
Urinary tract infection + haematuria + renal insufficiency	1	1.88
Failed medical therapy alone	1	1.88
Bladder stone alone	1	1.88
Acute urinary retention + bladder stones	1	1.88
Renal insufficiency alone	1	1.88

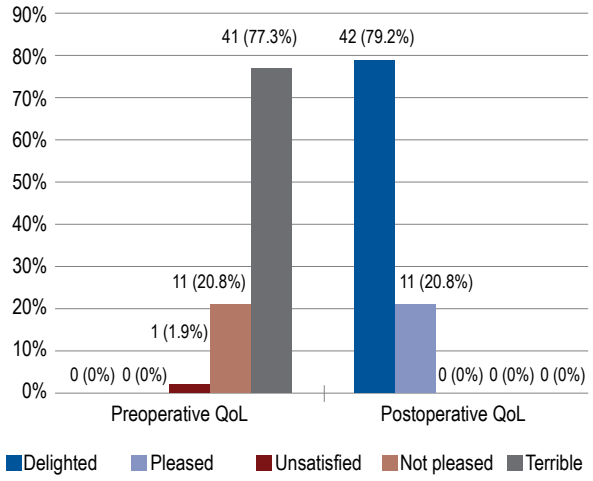

Figure 1: Pre- and postoperative IPSS of participants (n = 53, p < 0.001)

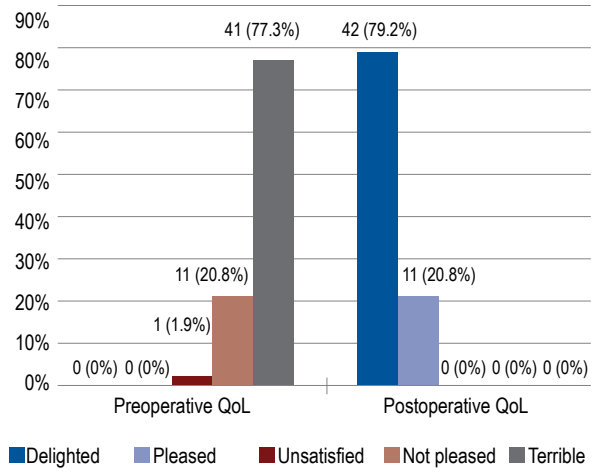

Figure 2: Pre- and postoperative quality of life index of participants (n = 53, p < 0.001)

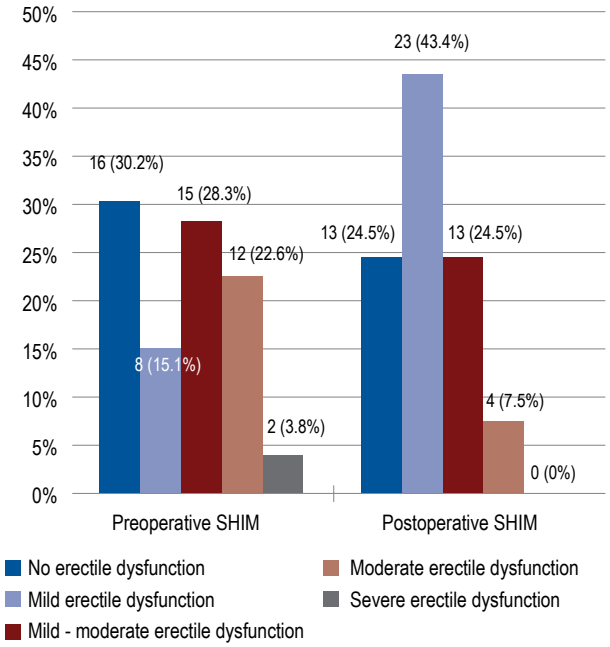

Figure 3: Pre- and postoperative SHIM of participants (n = 53, p-value = 0.6)

Discussion

BPE is a significant cause of LUTS in ageing men.[15] LUTS due to BPE has been said to be an independent risk factor for the development of ED. This study evaluated the impact of open simple prostatectomy on EF and LUTS. Our findings indicate that there is a statistically significant relationship between the improvement of EF and LUTS and open simple prostatectomy. While this study did not aim to determine the association between ED and LUTS in patients with BPE, it did, however, note that the majority of participants with LUTS also reported ED before surgery. This indicates a possible association between BPE, LUTS and ED which corroborates the outcome of another similar study.[16]

BPE is reported as a disease of ageing men.[17] Findings from this study also confirmed a higher proportion of participants in the 60–69 years age range. BPE is rare before the age of 40; although there have been cases of patients with BPE between the ages of 20 and 30 years.[18]

The majority of the participants reported severe symptoms and described their clinical status as terrible before surgery. This may indicate selection bias as only patients with complications

necessitating surgical intervention were recruited for the study. This finding, however, is similar to what has been reported in other studies with respect to surgical intervention for BPE.[14] It also depicts the burden of the disease as significant LUTS negatively impacts the quality of life of patients. Preoperative occurrence of ED in 69.8% of participants is similar to findings by other studies.[6] The establishment of ED in the majority of the participants with BPE/LUTS reflects an association between ED and LUTS in patients with BPE. Other studies[14] have also reported BPE/LUTS as an independent risk factor for the development of ED, thus constituting an additional burden of the disease.

This study demonstrated that the most common indication for simple prostatectomy in our immediate community is recurrent acute urinary retention. This is in contrast with findings from other studies which revealed failed medical therapy as the most common indication for surgical intervention.[14,19] This may be a reflection of the different socioeconomic climates of various communities where some may readily afford the cost of medical therapy. It is also known that many people have an aversion to surgery.

Further, selection bias against patients on 5-alpha-reductase inhibitors, which can affect baseline erectile functions, could also have reduced the number of patients on medical therapy recruited for this study. The commonly used medication for symptomatic BPE at this centre is alpha-adrenergic blockers, such as tamsulosin, and 5-alpha-reductase inhibitors, such as dutasteride.

This study indicated that there was a significant improvement of LUTS following open simple prostatectomy ($p < 0.001$). The median preoperative IPSS value was 29, while the postoperative value was 2, and all of the participants were pleased with the treatment. This finding is consistent with findings from other studies. The study also indicated the efficacy of open prostatectomy in ameliorating the burden of bladder outlet obstruction due to BPE in our environment. This, however, is in contrast to the situation in the developed communities where minimally invasive approaches such as transurethral resection of the prostate and Holmium laser enucleation of the prostate have become the treatments of choice with less morbidity. Following simple prostatectomy, participants experienced an improvement of EFs (p-value = 0.6). SHIM also increased from the median preoperative value of 16 to the median postoperative value of 18. Although this was not statistically significant, this observation may be connected to the reported suspected aetiologic link between BPE/LUTS and ED.[20] Some other studies have also reported significant positive impact of simple prostatectomy for LUTS on EF.[12] The non-establishment of significant impact of simple prostatectomy for LUTS on ED in this study, even though it indicated slight improvement, may be due to the small sample size. Although some of the patients still observed ED postoperatively, the majority, however, reported an improvement from the preoperative EF baseline. It is also noted that a few participants reported decline in their EF from the baseline. This may possibly be due to the attendant retrograde ejaculation which some patients may mistake for ED even after thorough explanation during the administration of the questionnaires.

Conclusion

This study confirmed a significant relationship between the improvement of LUTS following simple prostatectomy and a positive impact on the patients' quality of life. There was slight improvement of EF from the baseline, although this was not statistically significant. The study further corroborated an association between ED and LUTS. Concomitant evaluation of EF with LUTS is recommended as this will impact positively on the quality of life of patients. Some patients with LUTS and co-existing ED due to BPE may benefit from a monotherapy approach for both conditions.

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Conflict of interest

The authors declare no conflict of interest.

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Ethical approval

Ethical approval was obtained from the Ethics and Research Committee of the Obafemi Awolowo University Teaching Hospitals Complex (Ref: IRB/IEC/0004553).

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