

Evaluating the Influence of the Prostate Weight on the Morbidity and Mortality of Transvesical Open Prostatectomy: Prospective Analysis of 108 Cases in the Urology-Andrology Department of the Ignace Deen National Hospital in Conakry

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Abstract

Introduction: Open transvesical prostatectomy remains today one of the most effective approaches for the management of benign prostatic hyperplasia despite the fact that, this method is associated with multiple complications. The objective of this study was to evaluate the influence of prostate weight on the morbidity and mortality of transvesical prostatectomy for adenoma in the urology-andrology department of the Ignace Deen National Hospital. **Materials and Methods:** This was a prospective, longitudinal and analytical study lasting 6 months, from March 1, 2022 to August 31, 2022 including patients admitted and operated on by open transvesical prostatectomy by assessing the influence of prostate weight on the morbidity and mortality of transvesical adenomectomies. **Results:** 108 patients were included in our study, the average age of our patients was 70 ± 7.7 years, cultivators were the most represented profession with 38.89%, and hypertension was the most represented comorbidity with 75%. 33.06% of cases became complicated and surgical wound infection was the main complication with a frequency of 17.40%. Statistical analysis did not conclude that, the prostate weight does not have a statistically significant influence on the morbidity and mortality of transvesical open prostatectomy for benign prostatic hyperplasia. **Conclu-**

sion: Prostate weight has no influence on the morbidity and mortality of transvesical prostate adenoma.

Keywords

Benign Prostatic Hyperplasia (BPH), Adenectomy, Prostate Weight, Complication

1. Introduction

Open prostatectomy (OP) for benign prostatic hyperplasia (BPH) is the surgical removal of the prostate adenoma transvesically. It remains one of the most effective approaches for the surgical management of large volume benign prostatic hyperplasia (BPH) [1] [2]. The European Association of Urology defines high-volume BPH as an adenoma with a volume greater than 80 cm³ [3]. BPH is the most common benign tumor in men, increasing in prevalence with age from 25% in men between 40 and 49 years of age to 80% in men between 70 and 79 years of age [3] [4]. Transurethral resection of the prostate (TURP) remains the gold standard in the surgical management of BPH. However, in many developing countries, open surgery is still a common practice, as prostate resection equipment is not available in all urological centers. In addition, open surgery is justified by the need for a concomitant endovesical procedure during the surgery adenoma in case of chronic complications of obstruction such as bladder stones or bladder diverticulum [1] [5]. OP is a safe and well-evaluated technique. Enucleating a large prostate can be much faster than removing it transurethrally. In addition, excellent hemostasis can be achieved with proper hemostatic suture positioning and inflating the catheter balloon in the prostatic fossa [6]. However, despite the rigor of its execution, complications can occur during the perioperative period, including hemorrhage and surgical wound infections [7] [8]. In prostate cancer surgery, Kim MS *et al.* [9] reported that the mean duration of surgery and blood loss increased significantly with prostate weight. The objective of this study was to evaluate the influence of the prostate weight on the morbidity and mortality of Open prostatectomy (OP) for benign prostatic hyperplasia (BPH).

2. Materials and Method

The urology-andrology department of the Ignace Deen National Hospital (Conakry) served as the framework for this study. This was a prospective, longitudinal and analytic study with a duration of 6 months from March 1 to August 31, 2022. For selection criteria, Were included in the study, patients who underwent open prostatectomy using the Fuller-Freyer-Hryntschak technique during the study period. We excluded from the study patients operated on in emergency departments for benign prostatic hyperplasia (BPH complicated by hematuria), those whose histopathological examination was not performed and those whose

anatomical pathology revealed associated prostate cancer.

We did an exhaustive recruitment by systematic inclusion of patients who met our inclusion criteria. The study variables were sociodemographic and focused on the frequency of Hryntschak adenomectomy, as determined by the number of patients operated on this technique for other surgically treated conditions in the service during the study period. The age, occupation, and residence of patients were studied. Patients were classified according to the residence, either rural or urban areas. Paraclinical variables included prostate-specific antigen PSA levels in irregular interval slices (<4 ng/mL, 4 - 10 ng/mL and >10 ng/mL) and we determined mean PSA and extremes. Hemoglobin level and bacteriological examination of urine were determined. The volume of the prostate was assessed by suprapubic ultrasound and patients were divided into two groups: the first group, those with a prostate volume less than or equal to 80 ml and the second, those with a volume greater than 80 ml. For the operative variables, we studied the mode of anaesthesia, assessed blood loss. It was estimated by subtracting from the total amount of fluid aspirated, the amount of fluid supplied to the patient, and the amount of urine sucked from the bladder. We divided it into slices with a regular amplitude of 250 ml (minor loss < 250 ml, moderate loss 250 - 500 ml, major loss > 500 ml). The average quantity was calculated and the extremes specified. Patients who required a blood transfusion were allocated according to the amount of blood administered: 500 mL; 1000 ml; 1500 ml and >1500 ml. The prostatic adenoma enucleated during the procedure was weighed using an electronic scale and expressed in grams (g). Patients were divided into two groups: ≤80 g and >80 g and mean weight and extremes were calculated. A survey sheet created and incorporated into the Kobo collect application was the data collection medium. Our data were analyzed by the SPSS software version 21.0 and the software of the Office Pack 2016 was used for the entry of documents and the design of tables. First, we described our sample with the mean and standard deviation for quantitative variables (DVs) that follow a normal distribution. In a second step, by a univariate analysis, we investigated the influence of prostatic weight on: postoperative periods, blood loss; how long the urethral tube has been worn; length of hospitalization. We used the Chi2 test for the comparison of proportions in the qualitative variables and the student test for the comparison of means in the quantitative variables. The P-value was calculated with $\alpha = 0.05$ and the significance relationship was established only for P-value < α .

Ethical considerations: The research protocol was previously submitted to the approval of the Chair of Urology-Andrology and the principle of confidentiality and anonymity after consent of the patients and was used only for scientific reasons.

3. Results

During the study period, 324 surgeries were performed, including 108 cases of Open prostatectomy (OP) using the Hryntschak technique, which accounted for

33.3% of the procedures performed. The mean age of patients was 70 ± 7.7 years with ranges of 56 years and 90 years. The 60 - 75 age group accounted for 61.1%. The most affected occupations are farmers, manual workers and civil servants with 38.9%, 26.9% and 20.4% respectively. More than half of our patients were from the interior of the country, 56.5% ($n = 61$). Among the 108 patients, 60.2% ($n = 65$) patients had no comorbidities, 39.8% (43) had associated conditions including hypertension and diabetes in 27.8% ($n = 30$) and 7.4% ($n = 8$) respectively.

The mean preoperative hemoglobin level was 12.09 g/dL with extremes 7 and 17. The mean total PSA level was 17 ng/ml with extremes of 1 and 256 ng/ml. Preoperative ECRU was positive in 68.5% ($n = 74$). *E. coli* and *S. aureus* were the main germs found with 54.1% ($n = 40$) and 24.3% ($n = 18$) respectively. The mean prostate volume assessed on ultrasound was 108 ml and extremes were 47 ml and 430 ml. It should be noted that 23.1% ($n = 25$) of patients had a prostate volume less than or equal to 80 ml compared to 76.9% ($n = 83$) who had a prostate volume greater than 80 ml. The type of anesthesia used was mainly regional anesthesia (spinal anesthesia) in 96.3% compared to 3.7% ($n = 4$) for general anesthesia. The mean intraoperative blood loss was 324 ± 45 mL and extremes were 100 ml and 650 ml. Blood transfusion was required in 22 patients. **Table 1** shows the distribution of patients by amount of blood transfused.

The mean weight of the enucleated prostate was 75 g with extremes of 19 g and 250 g. In addition, only 32.4% (35) of patients had a prostate weight greater than 80 g. In the postoperative post-operative period, the mean duration of bladder catheterization was 11 days with extremes of 6 and 33 days. Postoperative complications are listed in **Table 2**.

It should be noted that some patients have had more than one complication. In univariate analysis, prostate weight did not influence length of hospital stay, blood loss, length of urethral catheter wear, or blood loss (**Table 3**). Also in univariate analysis, the weight of the prostate did not influence the occurrence of any of these complications, namely: hemorrhage, epididymitis, surgical wound infection and vesicocutaneous fistula (**Table 4**). The mean length of hospital stay for patients was 13 ± 6 with extremes of 7 and 35 days.

Table 1. Distribution of patients by perioperative transfusion ($n = 22$).

Quantity of blood transfused (ml)	Number	Percent
500	6	27.3
1000	10	45.5
1500	3	13.6
>1500	3	13.6
Total	22	100

Table 2. Distribution of patients by operative complications.

Parameters	Frequency (n = 108)	%
Post operatives courses		
Simple	75	69.4
Complicated	33	30.6
Complications		
Surgical wound infection	17	15.7
Vesico-cutaneous Fistula	13	12
Hemorrhage	6	5.6
Epididymitis	6	5.6
Urine retention upon removal of the bladder catheter	1	0.01
Death	1	0.01

Table 3. Univariate analysis of complications according to the parameters.

Parameters	Prostate weight (g)		p value
	≤80	>80	
Hospitalization length (day)			
≤10	38	17	0.735
>10	35	18	
Blood loss (ml)			
≤250	29	11	0.403
>250	44	24	
Operation duration (mn)			
≤59	39	15	0.304
>59	34	20	
Urethral catheter wearing duration (day)			
≤9	48	20	0.386
>9	25	15	
Aftermath of surgery			
Simples	53	22	0.303
Complicated	20	13	

4. Discussion

We conducted a prospective, longitudinal and analytic study of 6 months (March 1 to August 31, 2022) to evaluate the influence of prostate weight on the morbidity and mortality of open prostatectomy (OP) according to Hryntschak. The small sample size was the main limitation of our study. Indeed, a larger study population would have given more power to our statistical tests.

Table 4. Univariate analysis of complications according to prostate weight.

Complications	Prostate weight (g)		p value
	≤80	>80	
Hemorrhage			
Yes	3	3	0.387
No	70	32	
Epididymitis			
Yes	4	2	1.000
No	69	33	
Surgical Wound infection			
Yes	9	8	0.160
No	64	27	
Acute urine retention after catheter removal			
Yes	1	0	1,000
No	72	35	
Vesico-cutaneous fistula			
Yes	6	7	0.113
No	67	28	

In our study, OP for benign hyperplasia using the Hryntschak technique accounted for 33.3% (108/324) of the surgeries performed. OP according to Hryntschak remains a widely used surgical method in the surgical management of BPH in sub-Saharan Africa. Luhiriri *et al.* in Congo in 2016 [10] had found a frequency of 57.7%. The mean age of our patients was 70 ± 7.7 years with extremes of 56 and 90 years. This result is superimposed on the data of Bagayogo NA *et al.* [11] and shows that we are increasingly facing an ageing African population. High blood pressure was the top comorbidity in this study, followed by diabetes. Ugwumba *et al.* [12] showed that high blood pressure was the most common comorbidity with a frequency of 39%. Hypertension is explained by advanced age and the fact that it is the most common chronic disease in the world [13].

While nearly 60% of patients in this series had a total PSA less than 10 ng/ml, the average total PSA level; 17 ng/ml is high compared to an earlier study by Bah I *et al.* [1] in the same department, which reported a mean PSA level of 2.1 ng/ml with extremes of 0.23 - 6 ng/ml. It should be remembered however that, all of our patients had a negative anatomical pathology results of the surgical specimens, ruling out any malignancy. Several factors can cause elevated PSA levels outside of any malignancy, including following an infection, a bladder urinary retention with indwelling bladder catheterization, but also large adenomas. Kyei M *et al.* [14] reported a similar PSA level. In one observation, An-

glickis M [15] showed that volume influenced the total PSA. Indeed, reporting the history of a patient with giant prostatic hyperplasia, the PSA went from 77.5 ng/ml for a prostate volume of 371 ml to more than 100 ng/ml when the prostate volume reached 800 ml in a context of chronic urinary retention. This patient had negative biopsies and magnetic resonance imaging. The mean prostate volume assessed on suprapubic ultrasound was 108 ml (47 and 430 ml). These prostate volumes warrant open surgery for prostate adenoma; with an enucleated adenoma weight of 75 g (19 and 250 g). Ultrasound is still used in the case of prostate adenoma to assess the prostate volume in order to make a decision about the surgical technique to be used. It is an accessible, non-irradiating and inexpensive imaging technique. Similar observations are reported in the study by Botcho G *et al.* [16]. These authors report an average volume of 104.7 ml (ranging from 35 - 285 ml) and justify large prostate volumes by open surgery for adenoma; even if they emphasize the importance of moving quickly towards the new emerging techniques of prostate surgery.

In our series, spinal anesthesia was the mode of anesthesia used in almost all of our patients; 96.3%. Spinal anesthesia is interesting in urological practice, because prostate surgery is accessible to this type of anesthesia, but also because of its good hemodynamic tolerance. In addition, maintaining the patient's consciousness ensures that the patient has "self-control" intraoperatively [17]. The preference for spinal anesthesia is reported by some authors [18]. We currently have in the department of monopolar endoscopic surgery among the possibilities offered for the surgical treatment of BPH. The choice between endoscopic resection and open surgery depends on the estimated volume of the prostate gland [19]. Transurethral resection of the prostate remains the gold standard of endoscopic treatment for BPH. However, monopolar TURP is not suitable for large volume adenoma, particularly those larger than 80 ml [20]. Upper adenectomy is an old technique and is an option when the prostate volume is greater than 80 ml. Its long-term results are satisfactory despite a greater number of complications compared to minimally invasive surgery. In addition, the transvesical approach has other advantages in the case of concomitant intravesical procedure, such as diverticulum treatment or giant bladder stones [20] [21]. AUA and EAU guidelines suggest that open prostatectomy should be the treatment of choice in patients with a prostate volume of 80 - 100 ml [22].

The average blood loss was 324 ± 45 milliliters (100 - 650 ml). Our results were different from those of Kpatcha TM. [23] in Togo in 2016 had found an average loss of 425.92 ± 38.2 ml (100 - 800 ml). Hemostasis of the adenectomy compartment is an essential phase of the procedure. The quality and speed of its execution make it possible to minimize blood loss. The mean length of hospital stay was 13 ± 6 days (7 - 35 days). Similar results are reported in a previous study [5]. Post-operative complications are an element that lengthens the post-operative time. Like any surgery, prostate adenectomy can be fraught complications. The most common complication was surgical wound infection, followed by vesicocutaneous fistula. These results are similar to those of other pre-

vious studies in Africa [16] [24] that reported surgical wound infections and vesicocutaneous fistulas as postoperative complications. For Idowu N [25], infections occupy the 2nd position after blood transfusions.

The aim of this study was to assess the possible association between prostate weight and the morbidity and mortality of transvesical adenomectomy. Regarding bleeding complications, patients were evenly distributed between the two prostate weight groups. Epididymitis and surgical wound infections were more prevalent in patients with a prostate weight of less than 80 g. On the other hand, vesicocutaneous fistula was predominant in patients with a prostate weight greater than 80 g. Despite all these findings, we did not find a statistically significant association between prostate weight and morbidity and mortality of transvesical open prostatectomy. The lack of a link could be explained by the small size of our sample, indeed a larger study population would have given more power to our statistical tests and more than two-thirds (67.6%) of our patients had a prostate weight less than or equal to 80 ml (and therefore only less than a third of our patients had a prostate weight greater than 80 ml).

5. Conclusion

Open prostatectomy is a technique that is still widely used in our department as a treatment for benign prostatic hyperplasia. Intraoperative incidents are rare; it is a safe technique in the long term. However, it is fraught with complications, particularly infectious ones, and vesicocutaneous fistulas. Statistical analysis did not find a statistically significant association between prostate weight and morbidity or mortality of transvesical open simple prostatectomy. However, there is a need to continue this study with a larger sample size and long-term follow-up.

Conflict of Interest

The authors declare that there is no conflict of interest with any financial organization or corporation or individual that can inappropriately influence this work.

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