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Comparative Study of Transvesical and Retropubic Prostatic Adenomectomies in the Urology-Andrology Department of Ignace Deen University Hospital Center

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Abstract

Objective: To compare the results of transvesical and retropubic prostatic adenomectomies at the Urology-Andrology Department of Conakry University Hospital. **Methodology:** This was a prospective multi-operator analytical study lasting 6 months. It included 70 patients operated on for benign prostatic hypertrophy (BPH), divided into 2 groups of 35 according to the retropubic or transvesical technique. The data was collected using a questionnaire and entered into the Epi info application. The analysis was initially descriptive and then univariate. To identify confounding factors, a multivariate analysis was performed. The application conditions of each test were checked before their application. A p-value < 0.05 was considered statistically significant. **Results:** Upper adenomectomies represented 53.6% of surgeries performed for BPH. The average age was 73.2 years. The mean prostate volume was 117 ± 51.6 cc and the mean total PSA was 9.2 ± 11.4 ng/ml. The majority of patients had an ASA1 (60%) and ASA2 (37.1%) score. Spinal anesthesia, a double-current silicone probe with hinged hinge 22, and drainage of the prevesical space were carried out in all patients, *i.e.* 100%. The average overall blood loss was 229 ± 98.2 ml. It was lower in the group of patients operated via the retropubic route (187 ± 60.4 ml). The same was true for the duration of intervention (49.1 ± 7.17 vs 55.4 ± 7.9 min), the catheter wearing time (5.14 ± 0.97 vs 9.29 ± 2 .9 days) and the length of hospitalization (=6.26 ± 1.15 vs 12.1 ±

5.74 days). **Conclusion:** The retropubic technique has advantages over the transvesical one. These advantages are translated by a gain in the duration of the intervention, blood loss, catheter wearing time and length of hospitalization.

Keywords

Upper Adenomectomies, BPH, Retropubic Approach, Transvesical Approach, Conakry

1. Introduction

Benign prostatic hypertrophy (BPH) is one of the most common conditions affecting aging men. It affects 50% to 75% of men over 50 [1] [2].

It is defined anatomically by an increase in the volume of the prostate, and histologically by hyperplasia of its transitional zone. When it becomes symptomatic, it can lead to so-called irritative or filling and/or obstructive or emptying symptoms [3].

The management of BPH has evolved significantly [4]. Although drug treatment has shown effectiveness in recent years, ultimately the treatment of BPH remains essentially surgical [1] [4].

BPH surgery began in the late 19th century. The work of Peter Freyer and Eugène Fuller reported in 1884 the first upper adenomectomy [5] [6].

From then on, several techniques relating to open surgery, including those transvesical, described by Hrynstchak, and retropubic described by Terrans Millin, multiplied before the hegemonic advent of transurethral resection of the prostate (TURP). This technique is historically considered the gold standard for patients with a prostate volume between 30 mL and 60 - 80 mL [7].

For a long time therefore, surgical treatments for subbladder obstruction linked to benign prostatic hyperplasia remained limited to upper adenomectomy and endoscopic resection, before the emergence of several other minimally invasive techniques over the last 15 years [8] [9].

The advent of these new techniques brought out the idea that we could possibly do without upper adenomectomy. This is all the more so since some of them make it possible to operate on large prostates, traditionally the domain of upper adenomectomy, which tends to call into question more and more the place of this intervention which dates back more than 150 years, with an indication reserved for prostates weighing more than 80 grams.

Faced with the proven effectiveness of these new minimally invasive techniques, at the cost of low morbidity, the need to align with technological progress seems imperative. But on the other hand, the relatively high cost of consumable materials given the socio-economic context of developing countries makes upper prostatic adenomectomy the most accessible and least expensive surgical technique [10].

In our department, although in recent years TURP has significantly reduced the volume of its activity, upper adenomectomy remains one of the most performed surgeries. It represents approximately 50% of the surgical activity for BPH and is mostly performed transvesically. Given such a volume of practice, mastery of this surgery through several techniques would be likely to further refine the indications depending on the patient.

The objective of our work was to compare the operative variants of prostatic adenomectomy by transvesical (ATV) and retropubic (ARP) routes in order to provide us with conceptual scientific data which could further clarify the choice on one or the other of these techniques.

2. Methodology

We conducted a prospective analytical multi-operator study lasting 6 months, from June 1 to November 31, 2022. It focused on patients operated on by retropubic and transvesical prostatic adenomectomy techniques in the context of management of their benign prostatic hypertrophy. Were included, patients who underwent planned surgery, had a prostate volume greater than 60 cc with a total PSA level less than 4 ng/ml or a prostate biopsy confirming the diagnosis of BPH for all PSA values greater than 4 ng/ml, and a body mass index less than or equal to 29.9. We excluded from the study all patients who had a procedure associated with prostatic adenomectomy, all those for whom the histological result of the surgical specimen later revealed the malignant nature of the prostatic tumor and patients lost to follow-up after discharge from the hospital.

Recruitment was exhaustive by systematic inclusion on a case-by-case basis of patients who met our selection criteria with the objective of creating a cohort of at least 30 patients for each type of upper adenomectomy to respect the conditions of applicability of statistical tests. The selection of patients included in the study was carried out during weekly scheduling staff meetings. Once the indication for upper adenomectomy is given to the staff, we carry out a draw to determine the surgical technique to be assigned to each patient.

Data were collected using a non-validated questionnaire (see collection sheet in **Appendix 1**), which we produced ourselves. The questionnaire comprises 28 questions divided into three main categories:

- Pre-operative data: these included interview data (age, comorbidities, history of abdomino-pelvic surgery), clinical and paraclinical data (ASA score, wearing a urethral probe, total prostate volume on ultrasound, PSA level, etc.).
- Intraoperative data: these were intraoperative data collected by observation in the operating room. Surgical technique (transvesical or retropubic), operator qualification (Urologist, Urologist in training, other qualified surgeon), type of anesthesia (Spinal, epidural, general), duration of operation (minutes), volume of operative specimen (cm^3), operative incidents (peritoneal effraction, rupture of prostatic capsule, Santorini lesion, volume of blood lost…) and their management (repair, blood transfusion)…

- Post-operative data: These covered the entire period of the patient's hospitalization after the operating room, up to the first follow-up appointment, *i.e.* a minimum of one (1) month. it was about: Irrigation duration (day), drain removal duration (day), wearing probe duration (day), need to return to the operating room, micturition status after urethral probe removal, hospitalization duration (day), early complications (hemorrhage, fistula, etc.).

The data was collected using a questionnaire and entered into the Epi info application. The analysis was carried out using R software version 4.1.2 under the supervision of a biostatistician. It was descriptive initially, where we described our sample taking into account the type of variables. Secondly, a univariate analysis was carried out to compare the proportions and means of the study variables of the two techniques. Finally, we carried out a multivariate analysis to identify confounding factors.

The application conditions of each test were checked before their application. A p-value < 0.05 was considered statistically significant.

For the descriptive part, the quantitative data were described by the mean and the standard deviation for those which follow a normal distribution and by the median (25, 75th percentile) where applicable. Graphical representations and the Shapiro-Wilk test were used to check the normality of the distribution for each continuous quantitative variable. The qualitative variables were described with proportions, depending on the number of modalities, we presented either circular diagram (2 to 3 modalities) and bar diagrams (more than 3 modalities).

The univariate analysis concerned our variable of interest (the use of a surgical technique: retropubic/transvesical) and dependent variables (blood loss, operative incident, duration of the intervention, duration of irrigation, delay of removal of drains, duration of catheter wearing, post-operative complications, duration of hospitalization). For qualitative variables: the proportions were compared with Pearson's Chi-Square tests when all the theoretical numbers were greater than or equal to 5; the p-value of the Fisher exact test was chosen all the times where this condition had not been respected. The odds ratio was estimated to measure the strength of association.

For quantitative variables, a t test for independent samples was used for the comparison of the means of quantitative variables following a normal distribution and for which the variances of the groups compared were homogeneous (the equality of variances was tested with the test de levene), when these conditions were not respected the Welch or Mann-Whitney or K. Wallis test were chosen.

The multivariate analysis allowed us to go further in the analysis of the relationship between the dependent variables (blood loss, duration of the intervention, duration of irrigation, time to removal of drains, duration of wearing probe, duration of hospitalization) and the technique used, several linear regression models were used. The covariates were included in our model according to the explanatory approach based on our conceptual framework and on the results

of the univariate analysis. This multiple linear regression was step-by-step descending with entry probability p = 0.25. A final model was proposed for each dependent variable.

The agreement of the hospital ethics committee was obtained. Informed consent was obtained from selected patients prior to inclusion in the study, and patients were given the option of withdrawing from the study at any time; no patients withdrew. In order to respect patient confidentiality, patient data were anonymized with pre-coded numbers.

3. Results

BPH was the leading cause of hospitalization in our department. Open surgery and TURP were the two modalities of its surgical management. Upper adenomectomies represented 37.7% of hospitalizations during our study period. Compared to endoscopy, upper adenomectomy was the predominant indication in 53.6% of cases against 46.4% for TURP (Figure 1).

The average age of our patients was 73.2 years with extremes of 55 and 96 years. The age group of 71 to 80 years was predominant (50%). The majority of our patients (82.9%) had no history of abdominopelvic surgery. They were found only in 17.1% of cases and mainly dominated by inguinal surgery. Almost all (98.6%) of our patients had worn a transurethral bladder catheter before surgery. The average duration of catheter wearing was 24.6 days with extremes of 10 days and 168 days. More than half of the cases had the catheter worn within 2 weeks to one month (Table 1).

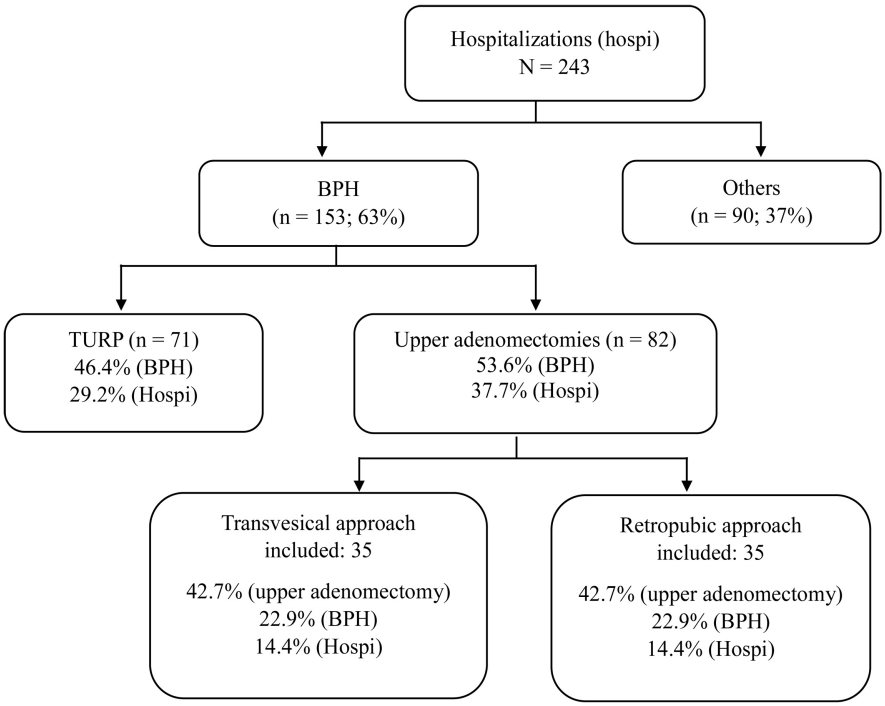

Figure 1. Flowchart of hospitalizations during the study period. BPH: Benign prostatic hyperplasia. TURP: Transurethral resection of the prostate. Hospi: Hospitalization.

On cytobacteriological examination of urine, the culture was sterile in 64.3% of our patients and non-sterile in 35.7% of them. In more than half of the cases (60%), *Escherichia coli* was the identified germ (Table 2).

The average prostate volume of our patients was estimated at 117 cc ± 51.6 with extremes of 63.3 cc and 240 cc. The mean total PSA level was 9.2 ng/ml ± 11.4 with extremes of 1.2 ng/ml and 76.8 ng/ml (Table 3).

Table 1. Patients and preoperative variables.

Variables	Effective	%
Age (middle age = 73.2 years; Extremes = 55 and 96 years)		
• Most represented segment (71 - 80 ans)	35	50
history of abdominopelvic surgery		
• Yes	12	17.1
• No	58	82.9
Dominant comorbidity (High Blood Pressure)	15	75
Probe wearing before the procedure*		
• Yes	69	98.6
• No	01	1.4

*Average duration of catheter wearing = 24.6 days; Extremes: 10 days and 168 days.

Table 2. Patients and results of Cyto-bacteriological testing of urine.

Cyto-bacteriological testing of urine	Effective	%
Sterile culture	**45**	**64.3**
Non-sterile culture	**25**	**35.7**
Escherichia coli	15	60
Enterobacter cloacae complex	1	4
Klebsiella pneumoniae	2	8
Proteus mirabilis	2	8
Pseudomonas luteola	1	1
Staphylococcus aureus	4	16
Total	**70**	**100**

Table 3. Patients and blood and ultrasound test results.

Testing	Mean ± SD	Minimum	Maximum
Total prostate volume (cm^3)	117 ± 51.6	63.3	240
Creatininemia (mg/dl)	1.4 ± 1	0.7	9.2
Hematocrit (%)	38 ± 4.09	29.7	47
Hemoglobin level (g/dl)	13 ± 1.32	10.7	16
Platelet rate (cell/mm^3)	234,600 ± 58,968	125,000	364,000
Total PSA rate (ng/ml)	9.2 ± 11.4	1.2	76.8

The operator was a urologist in charge of the service in all cases. The type of anesthesia and the type of probe were the same for all patients. This involved spinal anesthesia and a double-current silicone probe with hinged hinge 22. All patients benefited from drainage of the prevesical space. The mean overall blood loss was 229 ± 98.2 cc. It was lower in the group of patients operated via the retropubic route (187 ± 60.4 ml). The need for intraoperative transfusion was only observed in two (02) patients (Table 4). Overall, only two surgical incidents were noted (Table 5). The overall average duration of operation was 52.25 ± 7.5 min, it was also shorter in the group of patients operated via the retropubic route. The same was true for the catheter wearing time (5.14 ± 0.97 vs 9.29 ± 2.9 days) and the duration of hospitalization (6.26 ± 1.15 vs 12.1 ± 5 .74 days). The voiding stream upon removal of the catheter was good in all cases operated via the retropubic route. Two (02) cases of abnormal urination were recorded in the group of patients operated on via the transvesical route (Table 6). Complications (n = 9) were represented by parietal suppurations (n = 5) vesicocutaneous

Table 4. Patients and intraoperative variables.

Intraoperative Variables	Effective (N = 70)	%
Operator (urological surgeon)	70	100
Spinal anesthesia	70	100
Drainage of the pre-bladder space	70	100
3-way bent silicone probe	70	100
Intraoperative transfusion*	2	2.9

*01 blood bag of 500 ml per patient, a second bag for one of the patients postoperatively.

Table 5. Operative incidents and surgical technique.

Surgical technique	Operative incidents		
	Absent	present	Total
Transvesical approach (TVA)	33	2	35
Retropubic approach (RPA)	35	0	35
Total	68	2	70

Table 6. Quality of urination upon removal of the catheter according to the operating technique.

Quality of urination	Surgical technique	
	TVA (n = 35)	RPA (n = 35)
	Effective (%)	Effective (%)
Good urination stream	32 (91.4)	35 (100)
Hypogastric urine leak	1 (2.9)	0 (0)
Acute urine retention	2 (5.7)	0 (0)

TVA: Transvesical approach. RPA: Retropubic approach.

fistulas (n = 2) orchiepididymitis (n = 1) and hematoma (n = 1) (Table 7). They were all recorded in the group operated by retropubic approach. Comparison of operative variables between the two techniques using univariate analysis showed no statistical significance between the qualitative variables, *i.e.* intraoperative incidents, quality of micturition and occurrence of early complications. On the other hand, there was a statistically significant difference between the quantitative variables: duration of the procedure, blood loss, duration of drainage of the prevesical space, postoperative duration of catheterization, duration of irrigation and duration of hospitalization. For example, transvesical procedures lasted on average 6.314 min longer than retropubic procedures. The difference between all quantitative variables is summarized in Table 8. After adjustment for covariates

Table 7. Early complications depending on the surgical technique.

Early complications	Surgical technique	
	TVA (n = 35)	RPA (n = 35)
	Effective (%)	Effective (%)
None	26 (74.3)	35 (100)
Vesicocutaneous fistulas	2 (5.7)	0 (0)
Hematoma	1 (2.9)	0 (0)
Orchiepididymitis	1 (2.9)	0 (0)
Parietal suppuration	5 (14.3)	0 (0)

TVA: Transvesical approach. RPA: Retropubic approach.

Table 8. Univariate analysis of quantitative operating variables according to surgical technique.

	nT	nR	Mean. T	Mean. R	diff	St Err	t value	p value
Intervention duration (min)	35	35	55.400	49.086	6.314	1.802	3.5	**0.001**
Blood loss (ml)	35	35	271.057	186.986	84.072	25.093	3.35	**0.002**
Drainage duration (day)	35	35	2.257	1.8	0.457	0.189	2.45	**0.018**
Postoperative probe duration (day)	35	35	9.286	5.143	4.143	0.519	7.95	**<0.001**
Irrigation duration (day)	35	35	2.086	1.543	0.543	0.163	3.35	**0.002**
Hospitalization duration (day)	35	35	12.143	6.257	5.886	0.989	5.95	**<0.001**

nT: number of patients operated with the transvesical technique (TVA). nR: number of patients operated with the retropubic technique (RPA). Mean T: Mean for the transvesical technique (TVA) group. Mean R: Mean for the retropubic technique (RPA) group. Diff: Difference in average between the two techniques. St Err: erreur standard.

Table 9. Multi-varied analysis of factors likely to influence surgical results.

	Intervention duration (min)	Blood loss (ml)	Drainage duration (day)	Probe duration (day)	Irrigation duration (day)	Hospi duration (day)
TVA vs RPA	5.96**	74.61*	0.3	3.68***	0.47*	5.32***
	(2.11)	(29.58)	(0.23)	(0.54)	(0.2)	(1.15)
Age	0.13	−0.18	−0.01	0.07*	-	0.08
	(0.12)	(1.63)	(0.01)	(0.03)	(0.01)	(0.06)
Surgery' history	−3.58	84.97*	−0.08	−0.52	0.13	−1.9
	(2.76)	(38.56)	(0.3)	(0.7)	(0.26)	(1.5)
Postoperative Probe duration	−0.06	0.28	-	−0.01	-	−0.02
	(0.05)	(0.7)	(0.01)	(0.01)	-	(0.03)
Operating piece volume	−0.01	−0.27	-	−0.01	-	−0.01
	(0.02)	(0.23)	-	-	-	(0.01)
Urologist	−4.65	−11.02	−0.09	−2.8***	−0.13	−2.87
	(2.79)	(39.06)	(0.3)	(0.71)	(0.26)	(1.52)
ASA2 vs ASA1	0.18	−22.98	0.32	−1.09*	0.23	0.05
	(2.01)	(28.18)	(0.22)	(0.52)	(0.19)	(1.1)
constant	45.9***	225.99	2.32*	3.76	1.69*	4.75
	(8.9)	(124.51)	(0.96)	(2.28)	(0.83)	(4.85)
Observations	70	70	70	70	70	70
R-squared	0.25	0.23	0.14	0.64	0.19	0.43

Coefficient β (Standard error). ***p < 0.001, **p < 0.01, *p < 0.05.

(age, history of hernia, duration of catheterization prior to surgery, volume of surgical specimen, operator qualification and ASA score), multivariate analysis further refined the differences between variables found in univariate analysis, while confirming the advantage of the retropubic over the transvesical approach. These advantages are reflected in a 5.96 min reduction in procedure time, 74.6 ml less blood loss, 3.68 days less catheter insertion time and 5.32 days less hospital stay (Table 9).

4. Discussion

The study followed 70 patients divided into two groups of 35 depending on whether they were operated on for their prostate pathology using the transvesical or retropubic technique. The size of our sample was quite limited, although it made it possible to respect the conditions for applying statistical tests. A larger sample size would have increased the power of our tests.

We carried out a random drawing of patients for surgical techniques in order to achieve random distribution in the two groups, and to minimize selection bias. Likewise, obese patients were not included in the study in order to minimize

intra- and post-operative events linked to the difference in body weight. The multi-operator nature of the study means that conclusions can be drawn from all the hospital's urologists, and even extrapolate the results to the whole country, given that this is the only department that provides training.

BPH was the leading cause of hospitalization in our department. Compared to endoscopy, upper adenomectomy has been the predominant indication. Open surgery for prostate tumors has declined considerably in recent years in the department in favor of endoscopy. Between 2015 and 2017, it represented 91.11% of all hospitalizations [11]. In 2019, Bah I *et al*. reported that transvesical prostatic adenomectomy accounted for 73.89% of all surgical techniques used in the treatment of BPH [12]. Despite the growing development of endoscopic activity in our department, open surgery in the management of benign prostatic hypertrophy still retains first place.

The majority of our patients had no history of abdominopelvic surgery. The existence of previous surgery on the same sphere during a new surgery seems to induce in many cases operating difficulties linked to the presence of adhesions and post-operative fibrosis. It is established that a history of rectal or prostate surgery represents the primary risk factor for the occurrence of a rectal wound during radical prostatectomies [13]. With the aim of comparing the two techniques studied, the search for this parameter was necessary in order to evaluate its possible influence on the results.

Almost all of our patients had worn a transurethral bladder catheter before surgery. The need to wear a permanent catheter in our study reflects the reception of patients at stages of chronic bladder urine retention, where the ablation test no longer had its place, or where it had been carried out without success. The link between bladder catheterization and the risk of developing urinary infections is well known. It is now clearly established that infections linked to urinary catheters occupy the first place among nosocomial infections, the risk of developing them being closely linked to the duration of the catheterization [14]. A shorter duration of catheter wearing before the procedure would therefore help reduce the risk of urinary infections. But the prolonged in-person survey does not only have disadvantages. In patients with a muscular breakdown of the detrusor (ruptured bladder) it retains its place. Indeed, a wait of a few days to a few weeks would help the bladder to reacquire its contractile capacities in this type of patient [15].

Cytobacteriogical testing of urine was performed systematically in all our patients. The sample was taken either during the initial bladder catheterization or the day after the catheterization. The culture was sterile in more than half of our patients. *Escherichia coli* was the most identified germ. Bah I *et al*. had also reported the predominance of Escherichia coli [12]. These results are in line with the literature which indexes Escherichia coli as being the germ most incriminated in urinary infections [16].

The average prostate volume in our study shows that we were dealing with large prostates overall. An average prostate volume greater than 100 cc is re-

ported by several authors in the black African population [17] [18]. Which shows that the management of BPH in our context remains confronted with large prostates. It is true that currently, the notion of "large prostate" no longer seems to be consensual in the most equipped circles. It tends to be increasingly assigned to each surgeon based on the threshold beyond which it is impossible to resect. The advent of bipolar resectors allowing longer resections without the risk of Turp syndrome, and minimally invasive techniques performing the enucleation of prostates classically dedicated to open surgery, have contributed to this questioning. But in our working context, faced with such prostate volumes, open surgery still retains all its indications.

The majority of our patients had a total PSA level around 9.2 ng/ml. The mean total PSA was 18.22 ± 15.5 ng/ml in the study by Bagayogo N.A *et al*. who had also reported a total PSA level greater than 10 ng/ml in 61.1% of cases [19]. The values recorded for the PSA level in our study clearly confirm that it is a specific marker of the prostate gland and not of the Prostate cancer. Several factors are recognized as favoring its elevation: infection (prostatitis), urine retention, ejaculation, prostate biopsies, rectal examination, age, race. Despite the high total PSA level in certain patients, the results of the pathological examinations carried out on the prostate cores and the surgical specimens were consistent on the benignity of the tumor pathology.

The performance of procedures by urological surgeons with seniority greater than or equal to 7 years in our study is in favor of the low proportion of operative incidents recorded. This factor, associated with the retropubic approach in a group of patients, could justify the lower blood loss observed. Spinal anesthesia was the only type of anesthesia used in all our patients. In the series by Adakal O. *et al*. it was performed in 94.30% of cases [20]. Locoregional anesthesia offers more advantages than general anesthesia in the practice of small pelvic surgery. It helps reduce blood loss. It is effective for controlling post-operative pain, and facilitates the rapid resumption of intestinal transit. The choice of systematic drainage of the prevesical space had been made. It responded more to the habits of the service than to a necessarily rational option. In the majority of cases, the drains were removed after the 24th hour when bladder irrigation stopped.

Despite an overall average blood loss of less than 250 cc, we resorted to two (02) cases of intraoperative blood transfusion. The patients received a bag of packed red blood cells of 500 ml each to compensate for the massive blood loss recorded during the intervention. One of the cases had been operated on by the retropubic technique and the other by the transvesical one. This confirms that despite the little hemorrhagic nature recognized at the retropubic approach, it can in certain cases prove very hemorrhagic depending on the experience and dexterity of the surgeon. Kpatcha TM *et al*. reported a mean blood loss of 425.92 ± 38.2 ml [18].

The observation of postoperative variables on a descriptive level made it possible to note that the results obtained with the retropubic technique seem superior to those obtained with the transvesical technique. The averages for the

duration of irrigation, the time to remove the drains, the use of the probe and the duration of hospitalization were lower in the group of patients operated by retropubic approach. In both groups, there were no cases of repeat surgery despite the nine cases of complications recorded with the transvesical approach.

In univariate analysis, apart from the drainage of the prevesical space, operative incidents and the quality of the voiding stream after removal of the catheter, all other operative variables presented a statistically significant relationship with the operative techniques. These were: the duration of the intervention ($p < 0.001$), the blood loss ($p < 0.001$), the postoperative duration of catheter wearing ($p < 0.001$), the duration of irrigation. ($p = 0.002$), the duration of hospitalization ($p < 0.001$) and the occurrence of early complications ($p = 0.002$).

In multivariate analysis, after adjustment for covariates (age, history of surgery, duration of catheter wear before surgery, volume of the surgical part, operator qualification and ASA score) at the search for confounding factors, the statistical links of the univariate analysis remained. Comparison of the means revealed the following differences between the two techniques:

- 5.96 minutes in terms of intervention duration;
- 74.6 ml in terms of blood loss;
- 3.68 days in terms of duration of catheter wearing after the intervention;
- 0.47 days in terms of irrigation duration;
- And 5.32 days in terms of length of hospitalization.

These differences are statistically greater than 0 at alpha risk, in favor of the retropubic approach. In other words, the retropubic technique compared to the transvesical one saves almost 6 minutes of intervention time, avoids blood loss of almost 75 ml, removes the probe almost 4 days before, and release the patient 5 days early.

Despite the results obtained, the interest of the present study is open to debate in this era of convergence of all surgical specialties towards minimally invasive surgery. This is due to the advantages it offers in terms of overall morbidity and mortality reduction, with the possibility of outpatient management [21] [22]. Better still, the possibility offered by minimally invasive surgery of operating inside body cavities without incision or the need to make large incisions in the skin, helps to minimize the aesthetic damage so feared by patients. So why are we still talking about high-track adenomectomies at this very moment? Quite apart from the theoretical risk of conversion, which is very real, and the need to continue to perform this surgery in our context, where conventional surgery is still dominant, certain data on techniques currently in vogue tend to support the existence of a place for high-track adenomectomy in urological practice [10]. Functional results are similar to laser enucleation [23]. The need for re-intervention with TURP is in the order of 12% to 15% [24]. Upper denomectomies enables complete excision to be performed more rapidly, without exposing the patient to the risk of lavage fluid resorption syndrome, which is more likely to occur after TURP lasting more than 75 minutes [25]. Finally, some studies have suggested a lower risk of mortality from myocardial infarction or prostate cancer in the long term

in patients whose prostate adenoma was treated by high-level surgery, compared with those treated by endoscopic resection [26]. A more protective effect against prostate cancer in the long term may be observed after high-level surgery, although the explanation for this is unclear [27].

5. Conclusions

Upper prostate adenomectomies occupy the first rank of surgeries for benign prostatic hypertrophy. However, activity remains in clear decline due to the development and promotion of endoscopic surgery in recent years.

The majority of operated patients are between the 7th and 8th decade of life, with a permanent catheter with a prostate volume greater than 100 cc and a total PSA value less than 10 ng/ml.

The operating variables remained dependent on each surgical technique. The comparison of the two techniques studied allows us to conclude that the retropubic approach has advantages over the transvesical one. These advantages translate into a reduction in the duration of the intervention, blood loss, catheter wearing time and length of hospitalization.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix 1

SURVEY FORM N°: ……

PREOPERATIVE DATA

1) Age: …… ans

2) History of abdomino-pelvic surgery:

Yes ☐ No ☐

If yes, please specify ……..

3) Comorbidity: Hypertension ☐ Diabetes ☐ Retrovirose ☐

Asthma ☐ Sickle cell disease ☐ Other, please specify ……

4) Wearing a probe before surgery: Yes ☐ No ☐

If yes (specify duration)…… Weeks

5) Total prostate volume on ultrasound ……(in cm^3)

6) Creatinine levels ……mg/dl

7) Cytobacteriological examination of urine

Sterile urine ☐ Isolated germ ……..

8) Blood count

Hematocrit (Day-1 or Day-0)……. %

Hemoglobin level (Day-1 or Day-0)……. g/dl

Platelet count …… (cell/mm^3)

9) Total PSA ……..ng/ml

10) ASA Score: ASA1 ☐ ASA2 ☐ ASA3 ☐ ASA4 ☐

PEROPERATIVE DATA

11) Surgical technique: Retropubic ☐ Transvesical ☐

12) Operator qualification: Physicians in specialization ☐ Urologist ☐

13) Type of anesthesia

Rachi anesthesia ☐ epidural ☐ General anesthesia ☐

14) Duration of intervention:…… min

15) Drainage of the prevesical space: Yes ☐ No ☐

If yes, please specify ……(min)

16) Surgical piece volume …….. (in cm^3)

17) Intraoperative incident

Peritoneal Effraction ☐ Rupture of prostatic capsule ☐

Santorini lesion ☐ Other (please specify) ……

18) Control blood count

Hematocrit (Day-5) …….. Hemoglobin level (Day-5)……..

Volume of blood lost:……..ml

19) Type of probe used:

Silicone probe ☐ Latex probe ☐

20) Intraoperative blood transfusion: Yes ☐ No ☐

POSTOPERATIVE DATA

21) Irrigation duration: Day 1 ☐ Day 2 ☐ Day 3 ☐ Greater than Day 3 ☐

22) Time to remove drains: Day 1 ☐ Day 2 ☐ Day 3 ☐ Greater than Day 3 ☐

23) Postoperative transfusions: Yes ☐ No ☐

24) Probe wearing duration:..... Days

25) Back to the block: Yes ☐ No ☐

26) Quality of micturition after catheter removal:

Good stream of urine ☐ Dysuria ☐

Urinary leakage through the hypogastrium ☐ Acute urine retention ☐

27) Hospitalization duration: ..... Days

28) Early complications

Hemorrhages ☐ Vesico-cutaneous fistulas ☐ Wound disunion ☐

Parietal suppurations ☐ Retard de cicatrisation ☐ Orchiepididymitis ☐

Kidney failure ☐ Death ☐ Other (please specify).....