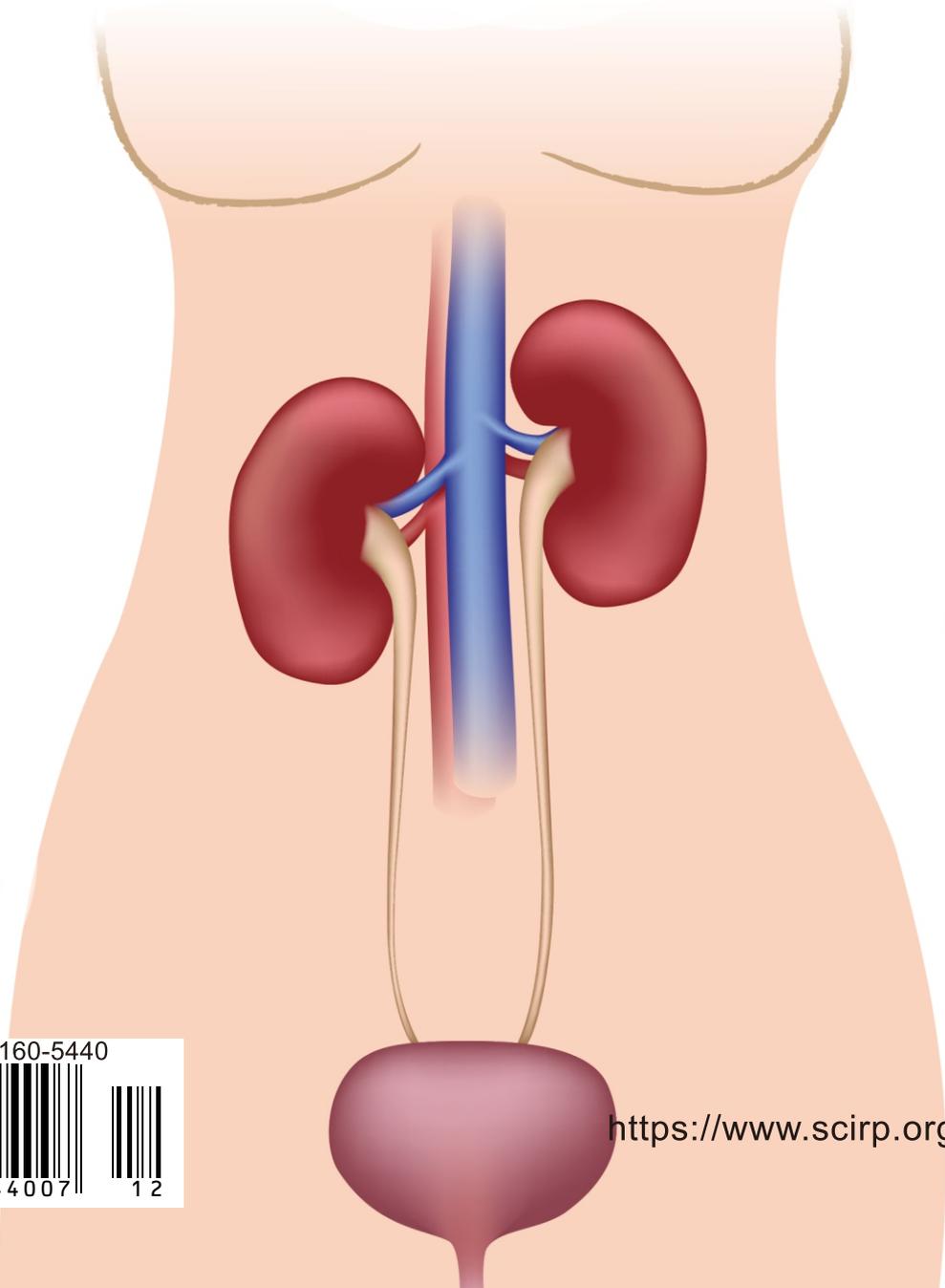


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# Results of Adults Laparoscopic Varicocelelectomy in a Limited Setting: A Study in Yaoundé (Cameroon)

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## Abstract

**Background:** Varicocele is an abnormal dilation and tortuosity of the internal spermatic veins within the pampiniform plexus veins draining the testicle. The principle of varicocele treatment is to block the reflux in the internal spermatic vein while preserving the internal spermatic artery, lymphatics and *vas deferens*. Treatment can be performed through percutaneous venous embolization or surgical correction, either open or laparoscopic approach. The purpose of the study was to review our experience in the management of laparoscopic varicocele repair and to assess the outcomes after operation. **Methods:** We retrospectively reviewed files of patients who underwent laparoscopic varicocelelectomy from January 2010 to December 2009 in three health center of Yaoundé (Cameroon). Clinical and diagnosis features of varicocele, indication for surgery, operative procedure and outcomes, as well as long-term follow-up of were analyzed. **Results:** A total of 74 file of patients were collected. The average age of patients was 36.93 years old. Among them, 43 (58.11%) had varicocele grade 1, 21 (28.38%) grade 2, and 2 (2.70%) grade 3. Fifty-four (72.97%) cases had bilateral varicocele, 17 (22.97%) and 3 (4.05%) patients had left and right varicocele respectively. 42(56.7%) patients complained for fertility problem. Scrotal pain was found in 26 (35.13%) cases. The pneumoperitoneum was achieved in all cases through a supra-umbilical open coelioscopy with the insertion of a 10 mm-optic port. Two 5 mm working ports were used in all cases. Dilated veins were clipped without section simple in 56 cases (75.68%). the mean operative time was 31.9 min ± 8.6 min. With a mean follow-up period of 27 months, we recorded 4.05% of recur-

rence and hydrocele in 1 case (1.35%), symptoms' regression in 87% of cases and pregnancy in 65.9% of cases of infertility. **Conclusion:** Laparoscopic varicocelectomy is feasible and safe in our setting, with good results. We emphasize this approach in even in low setting like our own.

## Keywords

Varicocele, Laparoscopy, Fertility, Pain

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## 1. Introduction

Varicocele is an abnormal dilation and tortuosity of the internal spermatic veins within the pampiniform plexus veins draining the testicle. It can result in testicular discomfort, atrophy, infertility, and possibly hypogonadism [1]. Varicocele represents the most common surgically treatable cause of male infertility worldwide and is found in approximately 15% of all adult males and 40% of males presenting for infertility evaluation [2]. The clinical grading system defines varicoceles as *grade 0* (subclinical): nonpalpable and visualized only by color doppler ultrasound; *grade 1*: palpable only with Valsalva maneuver; *grade 2*: easily palpable but not visible; and *grade 3*: easily visible. There is abundant evidence that a varicocele may alter testicular growth, spermatogenesis, and fertility potential. The cause of testicular injury is presumed to be related to increased scrotal temperature, but the pathogenesis remains poorly understood. Observation remains the approach of choice for the majority of adolescents with varicocele until a surgical indication is present. Despite the aforementioned limitations regarding testicular hypotrophy, the main indications for surgical intervention remain significant left ( $\geq 20\%$ ) or bilateral testicular hypotrophy, pain, or abnormal semen analysis findings [1]. Several approaches exist to correct the varicocele: inguinal or subinguinal, laparoscopic or retroperitoneal, or venographic. The laparoscopic varicocele, introduced by Sanchez-de-Badajoz *et al.* in 1990 utilises a transperitoneal intra-abdominal approach, which offers several advantages including increased efficiency for bilateral surgery and relatively short operating times [3]. However, this approach is an intra-abdominal procedure and carries a small added risk for complications, e.g. visceral injury from trocar placement [3]. Laparoscopic varicocelectomy is an uncommon procedure in low setting where open approaches are still commonly practice. We present our experience and outcomes of laparoscopic varicocelectomy in three health structures in Yaoundé, Cameroon.

## 2. Methodology

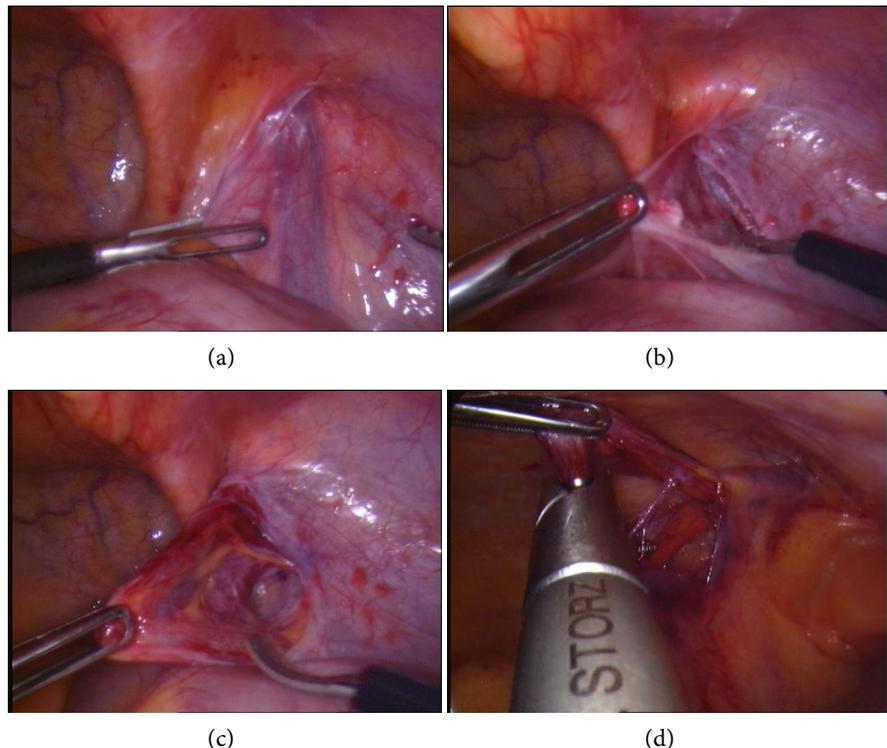
### 2.1. Study Design and Participants

A retrospective review was performed in the files of patients who underwent laparoscopic varicocelectomy, from January 1<sup>st</sup> 2010 to November 30<sup>th</sup> 2019, in the

Department of Surgery of three Hospital of Yaoundé (the capital city of Cameroon, a central African country): The National Insurance Fund Health Center of Essos, Bethesda Hospital and Marie Wyss Hospital. Were included all patients who have had a laparoscopic varicocelectomy for symptomatic varicocele and whom we have been able to contact again. Symptomatic varicocele was identified as patients presented with scrotal pain and/or testicular atrophy and/or infertility. The Varicocele staging was done according to the classification of Dubin and Amelar. The outcome of each patient had to be known at least one year after the surgery

## 2.2. Surgical Technique

Procedures were performed by a senior surgeon. The patient, in supine position and under general anesthesia with oro-tracheal intubation, we inserted a 10 mm optic port in supra-umbilical by “open-coelioscopy” and the pneumoperitoneum was achieved through this access. A 0° endoscope was used and two working ports were then inserted, respectively in the iliac fossa (in the opposite site of the varicocele) and the supra-pubic region. The supra-pubic working port was of 5 mm diameter in all cases. The iliac fossa working port was either of 5 mm or 10 mm, depending of the diameter of the endoclip used. In cases of bilateral varicocele, one working port was inserted in both flank; one of 5 mm diameter and another one or either 5 or 10 mm. The internal inguinal ring was identified and the posterior peritoneum was incised 1 to 2 cm above. Dilated veins were identified, dissected and clipped. The internal spermatic artery was carefully spared (**Figure 1**).





(e)

**Figure 1.** Laparoscopic view of varicocelelectomy (a) dilated veins, (b) opening of posterior peritoneum, (c) dissection and isolation of veins, (d) endoclip, (e) clips on the veins, artery spared.

### 2.3. Statistical Analysis

For each patient, we recorded data, on demographics, clinical symptoms, ultrasound findings, operative duration, length of hospital stay, postoperative complications and outcome after surgery (in terms of recurrence, symptoms improvement and spontaneous pregnancy obtained). Data collection was done through a pre-established questionnaire by consulting patient records, operative protocol and patient registration records, by viewing videos of operating procedures. Data were analysed by using EPI Info 7.0. Means and Standard Deviations were calculated for parametric data and categorical variables were reported as counts and percentages.

## 3. Results

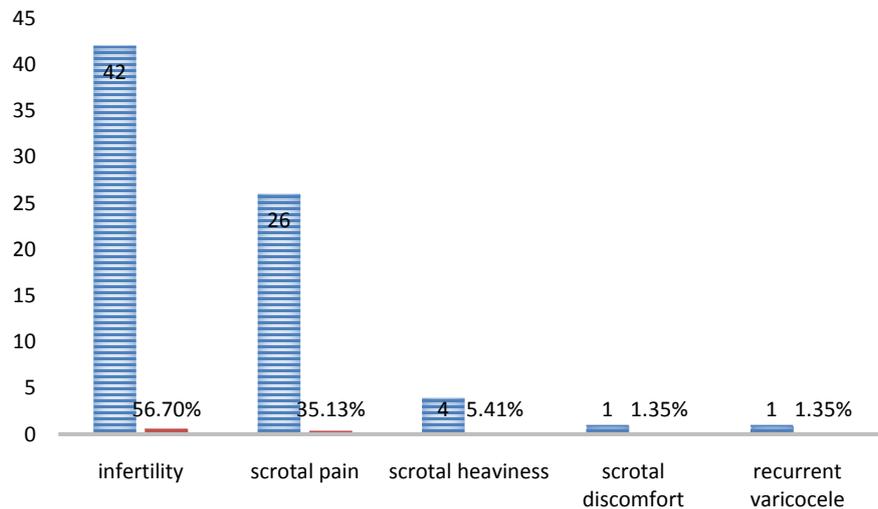
A total of 74 file of patients were collected.

### 3.1. Socio-Demographic Characteristics

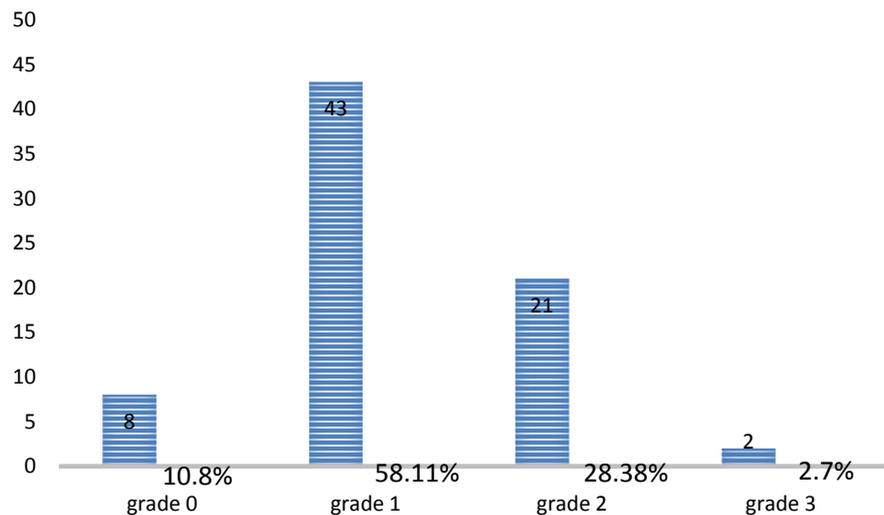
The mean age was  $36.93 \pm 9.65$  years old (range, 16 - 69 years). Students are the most affected by this pathology at a frequency of 12.16% followed by traders in 8.11% of cases. Other occupations were estimated at less than 5% for each.

### 3.2. Clinical Features

Varicocele was mainly diagnosed in a context of infertility for 42 patients (56.7%) and scrotal pain in 26 patients (35.13%) (**Figure 2**). Others symptoms included scrotal discomfort ( $n = 4$ , 5.41%) and scrotal heaviness ( $n = 1$ , 35%) The infertility was primary and secondary for 28 (63.63%) and 16 (36.37%) patients, respectively. The average consultation time was  $28.16 \pm 33.58$  months (range, 1 - 120 months). 43 (58.11%) patients had varicocele grade 1, 21 (28.38%) had varicocele grade 2, and only 2 (2.70%) patients had varicocele grade 3. Our 74 patients have a total of 138 varicocelelectomy procedures: 54 (72.97%) cases were bilateral, and 20 unilateral (27.03%). In unilateral cases, the left site was predominant in 17 (85%) (**Figure 3**).



**Figure 2.** Indications of varicocelectomy.



**Figure 3.** Grade of varicocele.

### 3.3. Operative Results

Dilated veins were simply clipped in 75.68% of cases. In the other cases (24.32%), dilated veins were sectioned after clipping. No intraoperative complications were recorded. The mean operative time was  $31.9 \pm 8.6$  minutes (range, 16 - 60 min). All patients were discharged first day post-operative.

### 3.4. Outcomes

With a mean follow-up period of 27 months (range, 13 - 108 months). Five (5.4%) cases of postoperative complications were recorded: one case of hydrocele (1.35%), 3 cases of recurrence (4.05%). One reintervention (1.35%) was performed for recurrence. There was no testicular atrophy. There was 87% percentage rate of symptom regression. 29 cases out of 44 patients (65.9%) complaining of infertility reported spontaneous pregnancies with their partner.

## 4. Discussion

The mean age of our patients was  $36.93 \pm 9.65$ . This result is comparable to that of Diao *et al.* in Senegal, which had an average age of 36.5 years [4]. It is a pathology that is rare before the age of 10 and therefore the incidence increases after this age [5]. On the other hand, in Morocco Benazzouz *et al.* [6] found a lower average age of 29.71 years. Students and traders were the most affected profession in our study. A study has shown that occupations that require prolonged standing may be risk factors for the occurrence of varicocele [7].

Our study found that infertility and scrotal discomfort were the most frequent complaints. These data do not correspond to those found by Diallo *et al.* [8] in Conakry. They showed that 80.7% of cases presented with infertility problem. Scrotal pain and mass followed with 10.9% and 8.4% respectively. Indeed, the prevalence of varicocele in men presenting for infertility is in the range of 25% - 35%, and in that subset of men with secondary infertility it is 50% - 80% [9]. This could be related to the mentalities and habits of the populations of sub-Saharan Africa who consult only when they have a symptomatic health problem and are very little adept at the systematic health check. Moreover, it is estimated that the prevalence of pain with varicocele is around 2% - 10% although, the association between varicocele and pain is not clearly established [10]. The average consultation time in our patients was  $28.16 \pm 33.58$  months. This confirms the fact that most people in sub-Saharan Africa consult late. Thus, the longer the consultation time, the more the disease is diagnosed at an advanced stage. Out of 74 patients, bilateral and grade 3 varicocele were prevalent. These results are in total contradiction with the literature which finds the left side as the one that is most affected in 85% to 90% of cases. It is also reported that a right palpable varicocele is normally found in cases of bilateral varicocele [11]. Concerning the severity of varicocele, Diallo *et al.* [11] in their study revealed the following figures: on the right, grade 0 (50%), grade 1 (27.8%), grade 2 (22.4%); on the left, grade 3 (49.6%), grade 2 (33.61%), grade 0 (1.7%). On the other hand, a systematic review including 1299 men reported 32.1% of patients with varicocele grade 1, 67.9% with grade 2 and 3 [12]. This showed that varicocele is diagnosed at a more or less advanced. The delay in the consultation of patients could be an explanation for this situation in our study.

## Surgical Technique

The main operative indication was infertility in 59.5% of cases. The common indications of varicocelectomy are infertility, testicular hypotrophy and pain [13]. This is supported by other studies [10] [14] this fact shows that the couple's infertility could be considered as a common health problem with varicocele as the main correctable cause. Concerning the operative technique, we have not found any particular recommendations in the literature with regard to the diameter of the operator trocars. On the other hand, two trocar operators in iliac fossa and supra pubic or iliac fossa were enough to perform this surgery. Despite the ad-

vent of single port laparoscopy, Esposito *et al.* said that three trocars is absolutely safer, technically faster, and has a lower complication rate [15]. Simple venous clipping was more performed compared to venous section after clipping. Depending on surgeon, there can be mass ligation of veins with artery, sparing artery varicoectomy in which the spermatic veins are separated from the artery and only the veins ligated, clips, bipolar coagulation. Although, we did not find any difference in outcomes during literature review on laparoscopic varicocele repair. However, a study by Mendéz-Gallart *et al.* showed that the use of LigaSure® in laparoscopic varicoectomy reduced operating time. They concluded that compared to staplers, this sealing system allows better tailoring of spermatic vessel margins, thus potentially saving lymphatic tissue [16]. The average time of the intervention was 31.9 minutes. This result is closed to the study of Esposito *et al.* [15] who showed that varicoectomy by mass ligation was faster than artery sparing varicoectomy. It varied from 14 and 45 minutes with average time of 17 minutes for the first technique. On the other hand the mean operative time was 26 minutes with range from 18 to 50 minutes for the artery sparing procedure. Then, the operating time depends on many factors including the number of trocars used, the type of varicoectomy (artery sparing or not) and the experience of the surgical team [15] [17].

Our morbidity was of 5.4%. Recurrence and hydroceles rate in our study were 4% and 1.3% respectively. These findings are comparable to those of the literature who found post-operative recurrence rates varying from 3% to 6% and hydrocele rates ranging from 7% to 43% [18]. We found a symptom regression rate of 87%. This is similar to the 86% of success reported by Peterson *et al.* [19] however one study by Altunoluk *et al.* [20] showed that the regression of symptoms was function of the duration of the pain. The longer the symptoms last the pain regress after varicoectomy. We noticed 29 (65.9%) pregnancies achieved. The spontaneous pregnancy rate after laparoscopic varicoectomy varies from 13% to 40% [21].

Limitations of our study include its retrospective nature, subject to selection bias and missing data.

## 5. Conclusion

Laparoscopic varicoectomy is feasible, safe and reproducible even in a low setting income like our own. Results are good with high rate of symptoms' regression, high rate of pregnancy recorded, low rate of recurrence and postoperative hydrocele. We emphasize the use of this approach in the surgical management of patients with varicocele.

## Ethical Clearance

Study was approved by institutional ethics committee.

## Conflicts of Interest

The authors declare no competing financial or personal interests.

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# Endoscopic Internal Urethrotomy Outcomes in the Management of Male Urethral Strictures

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## Abstract

**Background:** The aim of this study was to evaluate the outcomes of stricture treatment using endoscopic internal urethrotomy in the male urethra. **Patients and Methods:** We conducted a retrospective study from 2012 to 2017 at the Urology and Andrology Department of the University Hospital in Brazzaville, Congo. Medical records of 30 patients who underwent endoscopic internal urethrotomy for urethral stricture were analyzed. We studied the following variables: frequency of urethral stricture, age of patient, onset, cause and location of urethral stricture, duration of bladder catheterization, duration of hospitalization, and postoperative complications. The treatment outcome was assessed after a follow-up of 2.6 years (extreme: 2 and 4 years). Outcomes were considered successful or good when the patients had a normal urine flow and an unobstructed urethra at the Retrograde Urethrogram (RUG). **Results:** The mean age was  $47.5 \pm 9.7$  years (range: 17 to 83 years). Dysuria was the most common symptom reported. We found that urethral stricture was mostly caused by infectious diseases (20 patients). The urethral stricture was located at the membranous urethra in 4 patients, the bulbar urethra in 25 patients, and the penile urethra in 1 patient. The mean duration of the bladder catheterization was 2.3 days. Hospitalization duration was 36 hours. We observed the following complications: urethrorrhagia in 3 patients, acute orchiepididymitis. We achieved good results in 23 patients. **Conclusion:** In our context where the practice of endoscopic internal urethrotomy is recent, it provides satisfactory results for the treatment of short urethral male stricture.

## Keywords

Stricture, Male Urethra, Endoscopic Internal Urethrotomy

## 1. Introduction

Urethral stricture is an intrinsic and permanent decrease in the caliber of the urethra, which leads to an obstruction in the flow of urine. Sexually transmitted infection and urethra trauma are the main causes reported in the literature. Diverse treatments options for male urethral stricture exist, which include endoscopic internal urethrotomy (EIU), urethroplasty and bougienage [1].

Urethroplasty is an invasive method of treatment for urethral stricture, which carries the risk of male sexual dysfunction and deformation of the penis. Bougienage technique is not used in our context because of lack of equipment. EIU technique involves a high rate of recurrences, especially when the stricture is greater than 1 cm. However, in our context, EIU remains the most practical and accessible option for the treatment of urethral stricture [2]. Since EIU is carried out, no study has been able to evaluate its results. This is how we proposed to carry out this study with the aim to evaluate the outcomes of EIU treatment for male stricture.

## 2. Patients and Methods

We conducted a retrospective study from 2012 to 2017 at the Urology and Andrology Department of the University Hospital in Brazzaville-Congo. We focused on the medical records of patients who were hospitalized for urethral stricture and underwent EIU. The inclusion criteria for this study were: availability of medical observation, RUG results, operative report and postoperative follow-up data. In addition, we considered patients with a unique stricture < 1 cm length and no presence of spongiofibrosis. On the basis of these criteria, 30 medical records were selected. A Cytobacteriological Exam of Urine (ECBU) was performed preoperatively to ensure the absence of urinary tract infection. The urethrotomy was performed using a Woolf brand urethrotomy fitted with a 0° optical urethrotomy. The stricture was catheterized by a guidewire, and the incision was made at the 12 o'clock position. The procedure ended with the insertion of an indwelling urethral catheter. We studied the following variables: frequency of urethral stricture; age of patients; onset; cause and location of urethral stricture; procedure duration, bladder catheterization duration; hospitalization duration; and post-operative complications. The treatment outcome was assessed after a follow-up of 2.6 years (with extremes of 2 and 4 years). Outcomes were considered successful or good when the patients had a normal urine flow and an unobstructed urethra at the RUG. Conversely, it was considered unsuccessful or poor when patients had dysuria and a RUG showing a narrowed urethra.

Data entry and processing were carried out using Epi-info software version 7.2.2.6 The various tables and graphs were generated using the Microsoft Office Excel 2016 software. For quantitative variables, we calculated means and standard deviations.

## 3. Results

During the study period, 2610 patients were admitted into the Urology-Andrology

department, of which 80 patients were treated for urethral stricture. Among these patients, 30 underwent an internal endoscopic urethrotomy. The mean age was  $47.5 \pm 9.7$  years (extremes 17 and 83 years). The most common symptoms reported were dysuria (19 patients), followed by urinary retention (7 patients) and pollakiuria (4 patients). We found that male urethral strictures were mostly caused by infections (20 patients). The other causes were urethral trauma (7 patients) and iatrogenic lesions due to bladder catheterization (3 patients).

Among these patients who had post-traumatic urethral strictures, 3 were the consequence of a pelvic trauma due to car accident, which involved membranous urethra, and 4 were due to perineal trauma, which involved bulbar urethra (perineal).

RUG results showed that all patients had a unique stricture with a length less than 1 cm in our study. Urethral strictures were located in 3 different areas: bulbar urethra (25 patients), membranous urethra (4 patients), and penile urethra (1 patient).

Twenty-six patients had anterior urethral strictures and 4 patients had posterior urethral strictures.

The mean duration of the procedure was 16.7 minutes (extremes 6 and 25 minutes). The mean duration of the bladder catheterization was 2.3 days (extremes of 1 and 5 days). Hospitalization duration was 36 hours (extremes 24 and 72 hours). We observed the following complications: urethrorrhagia in 3 patients, acute orchiepididymitis in 1 patient, successfully treated with fluoroquinolone.

Outcomes were considered successful or good in 23 patients and poor in 7 patients. Among those successfully treated, 22 had an anterior urethral stricture (**Table 1**).

#### 4. Discussion

Male urethral stricture is a common condition. The treatment depends on the location, the cause, the length of the stricture, and the availability of the technical equipment. Treatment methods include minimally invasive techniques (dilation, EIU) and surgical reconstructions using a flap or graft [3] [4]. EIU is indicated for the treatment of a short stricture less than 1 cm in length, and it is performed using a urethrotome [2] [5] [6]. Following the procedure, a catheter is inserted for 8 to 24 hours. The duration of the bladder catheterization is controversial; some authors like Chiari [7] are in favor of prolonged bladder catheterization,

**Table 1.** Distribution of UIE results according to the sites of urethral stricture.

	Good results	Bad results
Bulbar urethra	71%	13%
Membranous urethra	3%	10%
Penile urethra	3%	0

while other authors, like Johnston [8], are in favor of a short catheterization. In our practice, our preference is a short catheterization period.

EIU Stricture treatment was successful in 23 patients, which represents 77%. Similar trends have been reported by Benjelloun in Morocco [9], Guirassy in Guinea [10], and Dje in the Ivory Coast [11]. The hospitalization duration was 36 hours, which is shorter than other studies that reported duration of 6.8 and 6 days respectively [11] [12].

In our study, 10% of our patients experienced complications related to the procedure. Urethrorrhagia was the main complication in our study; however, it didn't require a transfusion. Other authors reported higher bleeding rates, and it was due to the existence of other per operative complications [11] [12].

We found one infectious complication in our study, which was an orchiepididymitis. Dje *et al.* [11] reported that 83% of postoperative complications were infectious, and orchiepididymitis represented 1% of the cases.

We obtained successful outcomes in 23 patients. Our results were similar to those reported by Mhiri [13]. However, other studies found a higher failure rate [11]. A successful outcome of an EIU depends on the cause, location, and length of the stricture. For Dubey [14], traumatic strictures have a higher rate of failure than sclero-inflammatory strictures, which is consistent with what we reported in our study. Failures were observed 43% in traumatic strictures and 20% in infectious strictures. Mhiri [13] reported contrasting results.

Regarding the location of the stricture, outcomes were better when the stricture was at the proximal urethra [15]. In our study, we reported better results for anterior urethral strictures in 22 cases.

In order to achieve successful results, we believe that the length of the stricture should be considered when planning EIU procedure. Normally, EIU should be limited to urethral stricture of less than 1 cm. Isen *et al.* [16], who performed EIU in that indication, obtained 86.8% of good results in the 3 months, and only 14.2% of patients required a second urethrotomy. In our study, the majority of patients had urethral stenosis small size, a good indication for EIU while in Yameogo *et al.* [17], stenosis of the urethra was very extensive which is why open surgery was the only indication. Our study reported a 77% success rate and a 23% failure rate in the first EIU cases. Of these, 17% required a second EIU and 7% required dilation with Van Buren Sounds.

The study is carried out retrospectively, with a limited number of patients related to the conditions of selection, excluding certain files due to lack of information, and on the basis of exploitation of the records of a single department. It is therefore not representative of all patients operated in Congo by EIU for urethral stricture. Its cross-sectional nature and small sample size limit the scope of its conclusions.

## 5. Conclusion

Endoscopic internal urethrotomy is a simple treatment method for male urethral

stricture. It is associated with few complications. In our context where the practice of endoscopic internal urethrotomy is recent, it provides satisfactory results for the treatment of short urethral male stricture and should be recommended as first-line treatment for these types of lesions.

### Conflicts of Interest

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

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# Ischemic Priapism Management at the University Hospital, Brazzaville

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## Abstract

**Background:** Priapism is defined as a prolonged and painful erection that persists beyond or is unrelated to sexual stimulation. Its frequency is high in sickle cell patients in our regions. Despite being a urological emergency, many patients are diagnosed at a late stage, increasing their risk of sequelae. In this article, we assessed the management of priapism in our department, with the aim of improving our daily clinical practices. **Patients and Methods:** We conducted a monocentric retrospective descriptive study from January 2005 to December 2020. All patients admitted and treated for priapism in our emergency department during the study period were included. The following variables were considered: age, sex, etiology, consultation delay, treatment type and outcomes. A follow-up visit was scheduled once at 1, 6 and 12 months post-treatment and the erectile function was evaluated during this visit. **Results:** In total 97 patients were treated during the study period. Priapism represented the 4<sup>th</sup> urological emergency after urinary retention, renal colic and hematuria. The mean age was  $23.63 \pm 11.5$  years old. Sickle cell disease was observed in 59.8% of patients. Sixteen patients (16.50%) who consulted within 12 hours of priapism onset were successfully treated by oral or injectable etilefrine. Forty-three patients (44.33%) who consulted between 12 and 36 hours were successfully treated using distal spongio-cavernous fistula. After treatment, detumescence was obtained in 86 patients (88.66%). Eleven patients (11.34%), who consulted after the 36th hour, developed cavernous fibrosis with subsequent erectile dysfunction. **Conclusion:** Priapism represents the 4<sup>th</sup> cause of admission at our emergency department. Sickle cell disease was the main cause of ischemic priapism in our context. One patient in 2 consulted after 36 hours following the onset of symptoms. Medical treatment was effective in patients who consulted before 12 hours, while surgical treatment resulted in good outcomes in most of the patients who consulted after 36 hours.

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## Keywords

Priapism, Urological Emergency, Sickle Cell, Caverno-Spongy Shunt

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### 1. Introduction

Priapism is defined as a persistent and painful erection for more than 4 hours, occurring without sexual stimulation [1]. Priapism is one of the most common emergencies managed by urologists [2] [3]. Pathophysiological mechanism distinguishes 2 types of priapism: ischemic and non-ischemic priapism [1] [4]. Non-ischemic priapism is rare and mainly associated with perineal trauma. Ischemic priapism, commonly considered as low flow priapism, is the most frequent, often idiopathic, but usually related to sickle cell disease [1]. Ischemic priapism requires urgent treatment to prevent the occurrence of fibrosis and subsequent erectile dysfunction [5]. However, patients with sickle cell disease have shown limited knowledge of this urological emergency, often leading to delayed consultation [6]. In this article, we assessed the management of priapism in our department, with the aim of improving our daily clinical practices.

### 2. Patients and Methods

We conducted a monocentric retrospective descriptive study, at the urology-andrology department of the University Teaching Hospital of Brazzaville over a period of fifteen years (January 2005 to December 2020). All patients admitted for priapism management during this period were included. Data were extracted from patient's medical records. Study variables were age, etiological factors, circumstances of occurrence, consultation delay, type of treatment and outcomes. Patients were seen once at 1, 6 and 12 months after treatment. An assessment of the quality of erectile function was carried out during consultations. To assess the erectile function, we verified during the clinical interview the presence of morning/night erections in pediatric patients and the existence of erections allowing satisfactory sexual intercourse in adults. Patients who reported erectile dysfunction underwent objective complementary exams (pharmacologically-induced erection test by intracavernous injection of alprostadil or penile pharmacoechodoppler). The data were entered and processed in the Epi info software version 7.1.3. We used Microsoft Excel for the design of tables and figures. Quantitative variables were expressed as mean ( $\pm$ standard deviation) and qualitative variables as number or percentage.

### 3. Results

In total, 97 patients were admitted to the urology-andrology emergency department for priapism. Priapism prevalence was 1.41%. Priapism was the fourth urological emergency after acute urinary retention, renal colic and hematuria. The mean age was  $23.63 \pm 11.5$  years. **Table 1** displays distribution by age group.

**Table 1.** Distribution of patients according to age groups.

	n	%
<10	8	8.25
[10 - 19]	29	29.9
[20 - 29]	24	24.74
[30 - 39]	25	25.77
[40 - 49]	6	6.19
>49	5	5.15
<b>Total</b>	<b>97</b>	<b>100</b>

Thirty-five patients (36.08%) had a history of priapism. Among them, 24 patients (24.74%) had at least two past episodes of priapism. Twenty-one patients had previously been hospitalized and 14 patients had intermittent priapism episodes. Medical comorbidities such as hypertension and diabetes were found in 3 and 4 patients respectively. The circumstances of priapism occurrence are reported in **Figure 1**. Sixteen patients (16.50%) came to our emergency department within 12 hours from the onset of symptoms, 43 patients (44.33%) between 12 and 36 hours, and 38 patients (39.17%) after 36 hours.

**Table 2** shows the main causes of priapism in our study. Fifty-one patients (52.58%) had homozygous SS sickle cell disease and 7.22% had heterozygous AS sickle cell disease. Among these patients, 32 (33%) had severe anemia that required blood transfusion.

**Table 3** presents the different treatment modalities. **Figure 2** shows the delay of the occurrence of detumescence after treatment. After treatment, detumescence was obtained in 86 patients (88.66%). Medical treatment had been effective in patients admitted before the 12<sup>th</sup> hour. Between 12 and 36 hours, surgical treatment was performed, and it was effective in all patients. However, in patients admitted after 36 hours, surgery was effective in 71.05% of cases (n = 27) only. Eleven patients (11.34%) developed cavernosal fibrosis with subsequent erectile dysfunction.

#### 4. Discussion

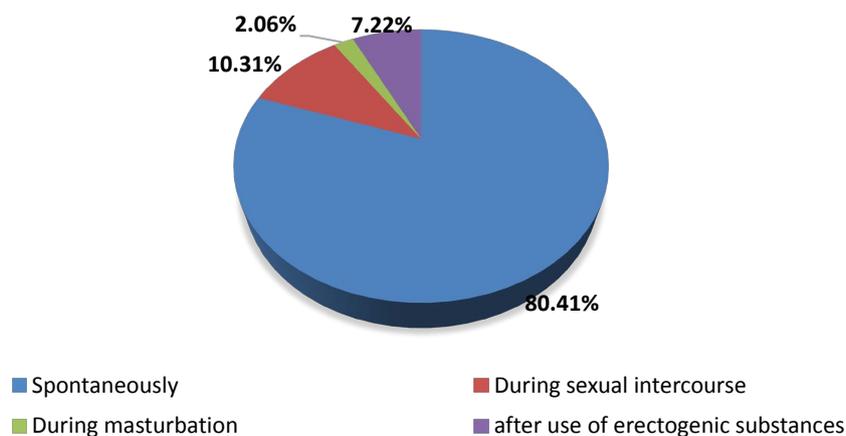
Priapism prevalence remains difficult to assess in our countries. In this study, priapism prevalence was estimated at 1.41% (97 patients in total). An earlier study conducted at our department reported discordant results. In fact, Bouya *et al.* found 32 cases of priapism due to sickle cell disease, over a period of 11 years, with an average of 3 cases per year [7]. Similarly, fall in Senegal [8] reported 63 cases in 20 years (3.15 cases per year). In 2017, a referral center for sickle disease management was implemented at the university hospital center of Brazzaville. The referral center did not exist when Bouya *et al.* conducted their study. This could explain the increased number of patients seen in our urology emergency department during our study period.

**Table 2.** Distribution of patients according to etiological factors.

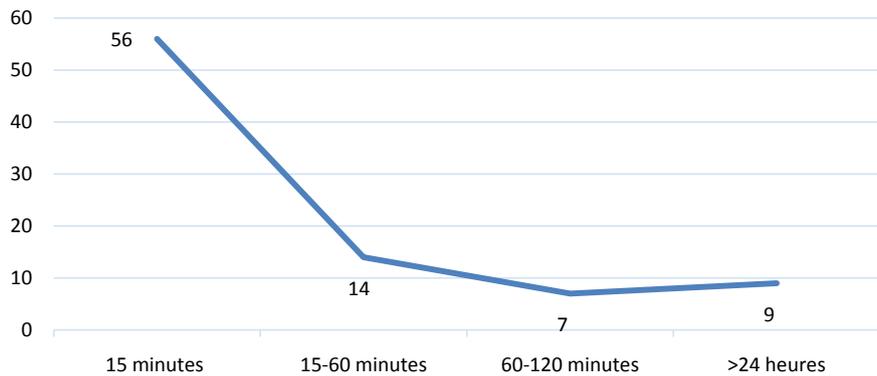
	<b>n</b>	<b>%</b>
Sickle cell anemia	58	59.80
Intra Cavernous Injection of Erectogenic Drugs	4	4.12
Oral aphrodisiacs	2	2.06
Leukemia	1	1.03
Polycythemia	2	2.06
Idiopathic causes	30	30.93
<b>Total</b>	<b>97</b>	<b>100</b>

**Table 3.** Presentation by type of treatment.

Surgical treatment	Medical treatment		<b>Total</b>
	Puncture of the penis corpus cavernosum and Etilefrine	None	
Proximal cavernosa-spongiosum shunt (1)	0	0	<b>0</b>
Distal cavernosa-spongiosum shunt (2)	25	41	<b>66</b>
1 + 2	12	01	<b>13</b>
None	18	0	<b>18</b>
<b>Total</b>	<b>55</b>	<b>42</b>	<b>97</b>

**Figure 1.** installation mode priapism.

Ischemic priapism mostly affects young patients in countries where sickle cell disease is endemic [7] [8] [9] [10] [11]. The first episode usually occurs at the age of 10 years old [12] [13] [14]. Despite the acute pain which characterizes ischemic priapism, many patients still present themselves many hours following the beginning of symptoms. While it is well established that early diagnosis and management is associated with reduction of erectile dysfunction sequelae and better prognosis, the reluctance in consultation in our context could be explained



**Figure 2.** Detumescence time after treatment.

by many reasons such as ignorance of existing therapeutic modalities, taboos surrounding sexuality, low socioeconomic status, lack of healthcare facilities or insufficient trained urologists [7] [8].

Priapism occurs in two forms:

- The acute form is the best known. It gives spontaneously a persistent and painful erection that can lead to erectile dysfunction.
- And the chronic form, commonly called chronic intermittent priapism (PIC) or stuttering priapism is characterized by repeated episodes of nocturnal short term that may extend over several months or years despite treatment. Very few described in the literature, the PIC seems nevertheless more common than acute priapism [15].

Both forms are in fact only forms of low flow or ischemic priapism.

Priapism most often occurs spontaneously and during sleep. Nowadays, the use of erectogenic drugs contributes significantly to the occurrence of priapism [7].

Several studies reported high rates of sickle cell disease patients in the group of patients with priapism. These are mainly the results of studies carried out in areas where sickle cell disease is endemic [7] [8] [16]. Sickle cell disease plays a central role in the mechanisms by which priapism occurs. While anatomic factors and a low-flow state contribute to making erectile tissue prone to sickle cell-induced pain and ischemia, abnormal regulation of the nitric oxide pathway and its downstream signaling may be particularly key in the development of priapism and other vascular complications in sickle cell disease [17].

In our study, medication intake was the 3<sup>rd</sup> cause of ischemic priapism, after idiopathic causes. These medications were dominated by intracavernous injections of erectogenic drugs. Our findings are in contrast with studies conducted in developed countries, in which erectogenic medication intake represented the main cause of priapism [16] [18] [19] [20]. As it is reported in the literature, ischemic priapism is also due to others causes such as antipsychotics, neuroleptic or pulmonary infections [8] [21] [22] [23]. We did not find such causes in our study.

Treatment modalities depend on 2 factors: the incriminated pathophysiologi-

cal mechanism (ischemic versus non ischemic priapism) and the time delay between onset of symptoms and management [24] [25] [26] [27]. In fact, priapism is an urological emergency that requires a prompt consultation, and its treatment must be done early (in the first hours) in order to obtain successful results. However, ischemic priapism due to sickle cell disease usually has a good prognosis even when treated later, as reported by Bouya *et al.* [7] in his study. There is no standard medical procedure for ischemic priapism treatment. In our study, medical treatment was used as a first line treatment in young sickle cell patients for up to 24 hours. Medical treatment consisted of corporal aspiration and/or injection of sympathomimetics. Detumescence was achieved in 18 patients treated medically, while 43 patients had unsuccessful results with the medical treatment. These patients were successfully treated with surgical procedure [28].

Our study reports satisfactory results in patients who had consulted before the 12<sup>th</sup> hour. Surgical treatment was used successfully in all patients who consulted between 12 and 36 hours. Of the 38 patients who consulted after the 36th hour, 27 patients or 71.05% had reported good results. Distal cavernosa-spongiosum shunt was the first-line surgical treatment technique. This technique gave 68% of satisfactory results. Proximal cavernosa-spongiosum was the second-line technique used when the first one failed. Despite a relatively long delay of consultation prior to priapism treatment, 88.66% of patients consider having a satisfactory erection.

Our study has several limitations. First, this was a snapshot of priapism management based on hospital data. It is well known that some patients don't come to the hospital, especially when it concerns the male genital organ. Therefore, the priapism prevalence reported in this study may have been underestimated. Second, erectile function was difficult to assess during consultation. In fact, male genital organ diseases are still taboo in our context, and patients may seem reluctant to answer questions on their sexual function. Thus, it is not excluded that many patients provided inaccurate responses regarding their erections during sexual intercourse, leading to a possible information bias. Similarly, evaluating the quality of erections in pediatric patients by interviewing their parents was made difficult because of the same taboo mentioned previously. Third, IIEF5 questionnaires were not routinely used for many reasons: questionnaires being too long according to patients, items difficult to understand especially in patients with low education level.

## 5. Conclusion

Priapism is a rare emergency in urology. In our countries, sickle cell disease represents the main cause, followed by idiopathic causes. Many patients are still admitted in urology after the 36th hour. Surgical treatment provides good results especially when patients are seen earlier.

## Conflicts of Interest

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

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# Renal Anastomosing Hemangioma Simulating Angiosarcoma as a Second Primary in a Patient with Breast Cancer

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## Abstract

Anastomosing hemangioma is a type of tumor lesion of benign behavior scarcely documented, it has been observed in renal parenchyma, testicles, ovaries and adrenal glands, it is usually prone to perirenal and renal medullary adipose tissue. In this case report, we present an anastomosed hemangioma in the right kidney of a 33-year-old woman, with previous coexistence of breast cancer, in which an unusual behavior was detected, with characteristics of vascular lesion, in this case we report: The classic conditions, its heterogeneous nature and the vascular alterations that presents in different imaging modalities.

## Keywords

Anastomosing Hemangioma, Kidney, Tumor Lesion, Breast Cancer

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## 1. Introduction

Hemangiomas are common mesenchymal tumors, which manifest mainly on the skin, soft tissues, and viscera. The existence of reports about renal vascular tumors is scarce, the literature of angiosarcomas and hemangiomas are limited to some series of reports and clinical cases, even when renal vascularity is considerable, receiving 20% of cardiac output [1].

Anastomosing hemangioma is a tumor-like lesion of vascular etiology and benign behavior [2]. It was first described in 2009 by Montgomery and Epstein as a vascular lesion that involves the renal parenchyma and mimics angiosarcoma. The composition of this type of hemangioma is characterized by irregularly anastomosed sinusoidal vascular spaces, surrounded by endothelial cells with mi-

nimal atypia. Generally described with a tack morphology, with minimal marginal invasion and a stroma, formed of spindle cells that express the immunohistochemical marker CD34.

Different clinical studies have been described in: testicles, gastrointestinal tract, ovaries and adrenal glands. Anastomosing hemangioma has a propensity for perirenal adipose tissue and renal medulla [3] [4]. Renal hemangiomas are commonly unilateral and isolated, however in 12% of clinical researches, they can show multiple hemangiomas [5]. It mainly affects the young population, with no specific predilection for gender. The usual characteristic symptoms are hematuria and renal colic, however incidental findings are common in asymptomatic patients [6].

## 2. Image Assessment

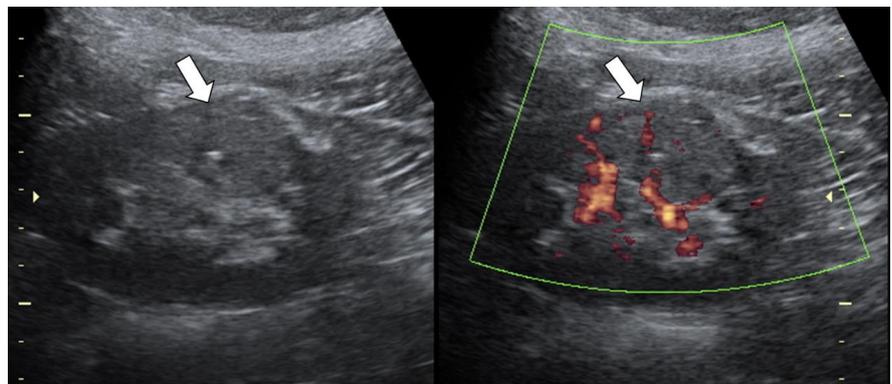
The diagnostic through ultrasonography has a limited literature, because anastomosing hemangioma is a variable type of tumor lesion, and ultrasound examination usually shows different echogenicity ranges [7]. In our case report, a tumor-type lesion is documented with a slight increase in echogenicity, compared to the renal parenchyma, associated with calcifications and peripheral vascularity (**Figure 1**).

By means of computed tomography, hemangiomas are described as neoplasms with a circular appearance, with a low heterogeneous density of soft tissues, in the arterial phase they usually manifest a septal enhancement that persists during the venous phase [8].

Considering the characteristics detected by renal magnetic resonance imaging, anastomosing hemangioma is described as a lesion with a rounded, well-defined morphology [9], hypointense in T1 sequence and hyperintense in T2 sequence, and with substantial enhancement to the contrast medium [8].

## 3. Case Report

33-year-old woman with a three-year history of breast cancer; the patient received



**Figure 1.** Gray scale ultrasound of the right kidney, longitudinal section showing a well-defined lesion (white arrows), slightly hyperechoic with internal calcification, peripheral vascularization was scrutinized via color Doppler.

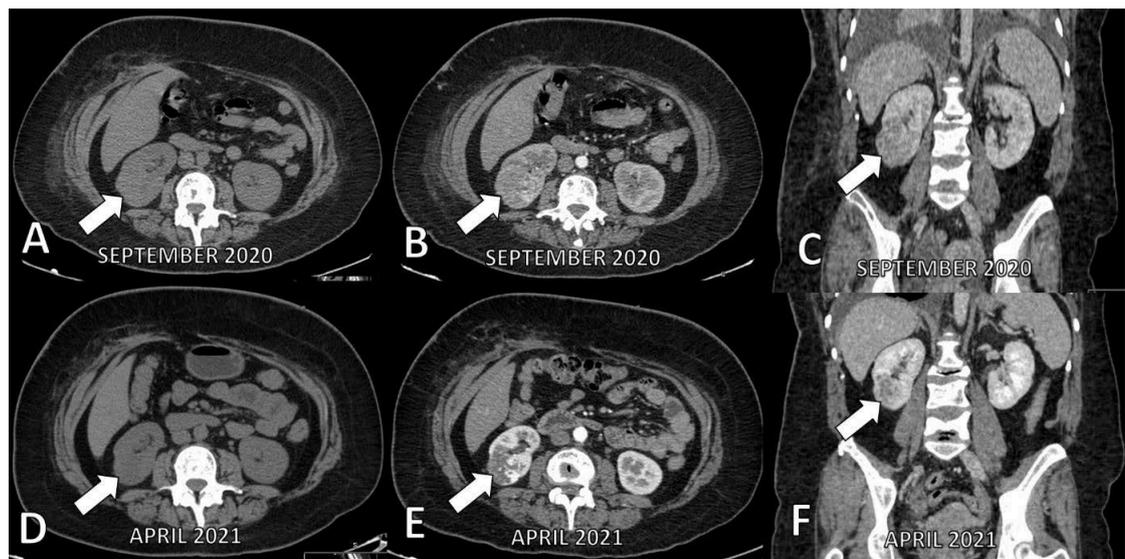
an initial treatment of four cycles of chemotherapy (epirubicin); subsequently, on December 2<sup>nd</sup> of 2017, a radical mastectomy with axillary dissection was performed. Afterwards, a histopathological diagnosis of infiltrating ductal carcinoma was carried out, indicating a positive molecular subtype for estrogen and progesterone receptors.

In September of 2020, after 37 sessions of radiotherapy, she was monitored in order to provide follow-up; by means of thoracoabdominal computed tomography, with simple and contrasted phases; some characteristics of metastasis, local and generalized lymphadenopathy were found, as well as lesions suggestive of secondary deposits in the abdominal wall; as a discovery, a tumor lesion with soft tissue density was found in the lower pole of the right kidney, which has an appreciable enhancement to contrast in arterial phase, therefore, by means of the known diagnostic methods it was conjectured in mammary metastasis to the kidney, with a second primary lesion (angiosarcoma) (**Figure 2**).

Consequently, and due to the suspicion of a neoplastic process, the case was considered as a secondary deposit of a known primary by the oncology service.

In April of 2021, we optimized the acquisition method and computed tomography protocol, in this case report, we found that the renal lesion has a vascular compartment to the intravenous contrast, without changes in size and morphology, so it is considered indicative of benignity (**Figure 2**).

In complementation, an MRI was also performed, revealing an image with a



**Figure 2.** CT, performed in September of 2020, with the objective of screening the therapeutic response to breast cancer. (A) Simple phase axial view reveals the presence of a hypodense tumor-like lesion with soft tissue density, located in the lower pole of the right kidney. (B) After the administration of medium contrast in arterial phase, a heterogeneous enhancement with peripheral predominance is observed. (C) Coronal section reveals the persistence of heterogeneous enhancement throughout the venous phase. Because of the characteristics of the lesion shown in the radiological report, it is surmised as a second primary tumor, a renal cell carcinoma versus an angiosarcoma. A second monitoring was performed in April of 2021. (D) and (E) show the presence of a neoplastic lesion with considerable peripheral enhancement. (F) Coronal section with a central filling of contrast medium in venous phase.

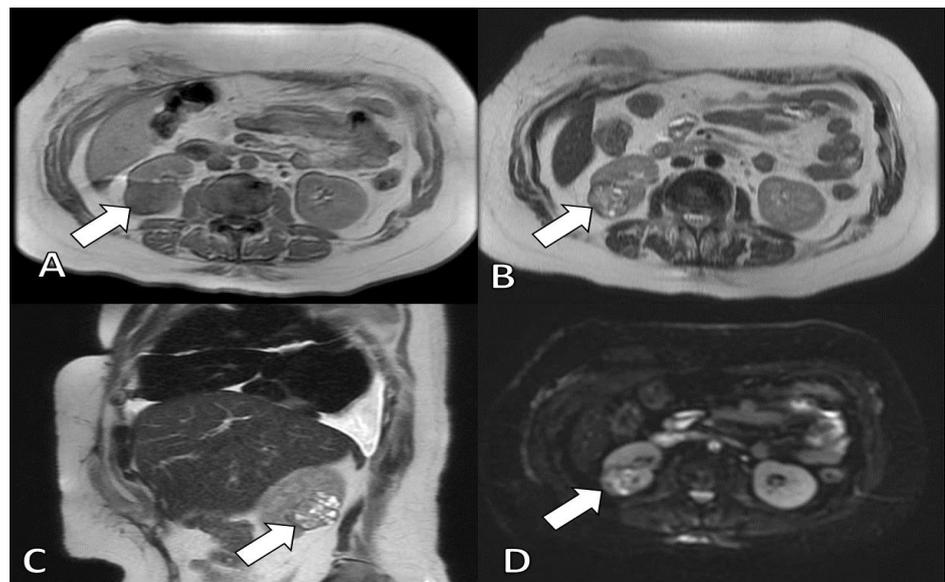
mixed pattern in intensity, showing hyperintense areas in T2 sequence and hypointense in T1 sequence, as well as dotted/stippled areas located in the lower pole of the right kidney (**Figure 3**).

As a backup, an ultrasonography was performed in order to closely monitor patient's kidneys, revealing a rounded image in the lower pole of the right kidney, slightly hyperechoic in relation to the adjacent renal parenchyma, and with the presence of peripheral and central vascularity when using color Doppler (**Figure 1**).

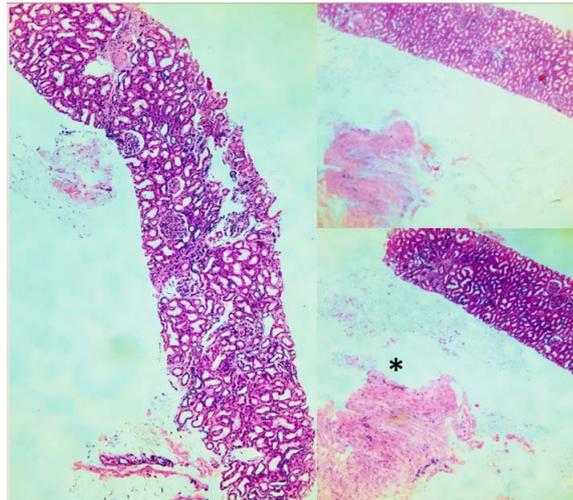
The method selected consisted a percutaneous biopsy guided by ultrasonography, employing a coaxial device and a semi-automatic tru-cut biopsy gun of 14 g. Obtaining a total of 4 sections, the analysis of the pathology department specified the following findings: probable subcapsular tissue damage, tubular atrophy and mild interstitial fibrosis, mild to moderate atherosclerosis with 25% vascular lumen compromised in some arteries; unfortunately, an optimal result was not achieved, however the diagnosis by biopsy revealed no evidence of malignancy (**Figure 4**).

It was decided to employ a percutaneous biopsy, in comparison with the majority of the reported cases in which a partial nephrectomy was opted for; however, the complexity of this method was confirmed, due to the prioritization of renal integrity over puncture the vascular component.

Subsequently, once there was no evidence of malignancy, the patient's protocol continued, with regular visits to the oncology department and control scans every 6 months, in which no signs of growth or indication of malignancy have been detected.



**Figure 3.** MRI, April of 2021, shows evidence of a mixed intensity pattern; (A) and (B) predominantly hypointense in T1 with hyperintense areas in T2; (C) also obtained dotted images that revealed absence of signal during vascular sequences, located in the lower pole of the right kidney; (D) T2 with fat saturation, with central hyperintensity.



**Figure 4.** Hematoxylin and eosin (10× magnification) renal section with permeable proximal tubules and without glomerular abnormalities—Renal capsule (\*).

#### 4. Discussion

Renal tumors of vascular origin are unusual, the most frequent subgroup consisting of benign hemangiomas.

Renal hemangiomas are usually detected in incidental circumstances and asymptomatic patients. In the symptomatic patient, the regular symptoms are hematuria and abdominal pain [10].

In the global knowledge, it is estimated that 200 cases are reported, but with limited radiological findings [1], consequently, we have a limited information about the radiological characteristics of the condition; although there are cases reported with erroneous diagnoses of renal cell carcinomas or angiosarcomas, a renal hemangioma appearing to be a metastasis deposit or a second primary tumor has not been specified in a patient with breast cancer [2].

According to the literature, renal hemangiomas generally have the presence of small or large injuries, with an average size of 2.1 centimeters, and a range of 1 to 6 centimeters [7] [11].

In this report, through ultrasonography, a well-defined tumor-like lesion with presence of peripheral vascularity was observed, which was achieved with the help of color Doppler (Figure 1). By means of computed tomography, a predominantly hypodense heterogeneous lesion with internal calcifications and with a substantial heterogeneous enhancement with vascular features (Figure 2). With the help of magnetic resonance imaging, a mixed intensity pattern with hyperintense areas in T2 and hypointense in T1 areas were detected in the lower pole of the right kidney (Figure 3). The imaging findings correspond to those reported in the literature [2] [4].

The differential diagnoses between benign and malignant vascular tumors is realized by histopathology [4], in this case, the possibility of an angiosarcoma or metastasis of the known primary was ruled out, by virtue of a later tomography performed to evaluate the therapeutic response, an improvement in the contrast

phases was obtained, which allowed us an optimal identification of the lesion, in which a vascular behavior without important changes in size and morphology, features suggestive of benignity were found. On the other hand, vascular tumors of malignant origin such as angiosarcoma usually have an aggressive behavior with metastasis to the liver, lungs and bone at the time of diagnosis.

Regardless of the fact that anastomosing hemangioma is uncommon, its identification and separation from other malignant entities is essential, because a meticulous diagnosis offers the opportunity to provide a conservative treatment using selective embolization, in comparison to the use of a radical nephrectomy, which is often chosen as treatment [2].

Histopathological analysis reveals in this kind of tumor lesions, the presence of intravascular growth of the hemangioma, multilayers of cellular endothelium, and an absence of cellular atypia. It was determined to obtain biopsy by percutaneous needle puncture, taking into consideration the vascular pattern, the risk was reduced with the help of color Doppler, however, the result was not the convenient one, and only the increase of the level of vascular hyperplasia from mild to moderate with a compromise of 20% of the vascular lumen of the arterioles close to the glomerular hilum was documented (Figure 4).

## 5. Conclusions

Due to the fact that hemangioma is a barely reported disease, all the documentation of the general and radiological features detected by ultrasound, computed tomography and magnetic resonance imaging are very helpful. In addition, the prior coexistence of stage IV metastatic breast cancer is a consideration when relating and clarifying the diagnosis with histopathologic analysis. Although most reports are obtained through surgical procedures via partial or total nephrectomy, in this case report, it was determined to use an ultrasound-guided needle biopsy, which proved to be a convenient alternative, considering that in addition to being an affordable medical treatment, it offers results in less time, since it reduces a medical care process that for various circumstances can be delayed, finally, we consider this alternative less invasive, also leaves little or no scarring, and does not require exposure to ionizing radiation.

To our knowledge, this is one of the first reports in which ultrasonography, computed tomography and magnetic resonance imaging are documented in the same patient. We hope that this information will be useful in the clinical and radiological field, helping in the identification of subsequent renal hemangiomas.

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## Conflicts of Interest

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

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# Evaluation of Extracorporeal Shockwave Lithotripsy in the Management of Renal and Ureteral Calculi

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## Abstract

**Aim:** To evaluate the efficacy of extracorporeal lithotripsy in the management of renal and ureteric calculi in a urology center in Douala, Cameroon. **Materials and Methods:** This is a retrospective study carried out over six years, between January 2014 and December 2020. All the patients were treated using a Direx Integra lithotripter, with the number of shockwaves ranging from 1200 to 3500, without anaesthesia and were discharged a few hours after the procedure on the same day. In a majority (63.75%) of the cases, the calculi were incidental findings. A Double-J stent was indicated in two patients and preceded extracorporeal lithotripsy because of renal colic and signs of urinary tract infection. **Results:** We recruited a total of 122 patients with a mean age of  $42.19 \pm 13.08$ . We had 65 (53.3%) males and all patients had at least one calculus confirmed by CT scan with a mean size of  $13.84 \pm 4.17$  mm, 85 (69.7%) patients became completely stone-free after a maximum of four sessions of extracorporeal lithotripsy (ESWL). 21 (17.2%) patients had intermediate results, being asymptomatic and/or having less than three residual fragments that measured less than 4 mm. The failure rate was 13.9%, with 17 patients still having more than three fragments measuring more than 4 mm after 4 ESWL sessions. 1 (0.8%) had septic shock as a post ESWL complication while 6 (4.9%) benefitted from a complimentary medical and/or surgical treatment (double J stent placement). **Conclusion:** The management of renal and ureteral calculi through extracorporeal lithotripsy in adults seems to be particularly effective for renal calculi measuring less than 20 mm and ureteral calculi measuring less than 15 mm. Extracorporeal lithotripsy, which can be

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performed on an outpatient basis (and without anaesthesia) is associated with minimal complications, and remains the option of choice for most upper urinary tract calculi.

## Keywords

Renal and Ureteric Calculi, Extracorporeal Lithotripsy, Double-J Stent

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## 1. Introduction

The use of Extracorporeal shockwave lithotripsy (ESWL) for the management of renal and upper urinary tract calculi started as far back as the 1980's [1].

ESWL is a very important and highly effective method in the treatment of calculi of the upper urinary tract and upper ureter. It effectively fragments these calculi, which in turn pass completely by the end of 3 months in 77.4% of the patients with single stones according to a report by Drach *et al.* in 1986 [2]. Over the years, ESWL has gained rapid acceptance worldwide because of its ease of use, noninvasive nature, high efficacy in treating kidney and ureteral stones, and wide availability of lithotriptors [3]. ESWL is effective in fragmenting kidney stones because of some inherent properties of the shock waves. The most important of these properties are the ability to generate mechanical stress in brittle material, the potential to be transmitted freely and propagated through the body without energy loss and without causing damage when passing through, the ability to be focused, and the ease and reliability of reproducibility for clinical use [1]. The overall goal in the management of kidney and ureteric calculi is to bring the patients to a completely stone-free status while minimizing morbidity and mortality. Other non-invasive methods are also employed in the management of calculi of the upper urinary tract and upper ureter. These include percutaneous nephrolithotomy (PCNL), ureteroscopy (URS), laparoscopy and robotic surgery [4]. In the absence of these non-invasive or minimally invasive methods, or where they fail, other more invasive procedures can be used including open surgery [4]. As treatment modality for adult patients with ureteral stones, the American Urological Association (AUA) recommends watchful waiting for patients with uncomplicated ureteral stones  $\leq 10$  mm, URS for patients with mid or distal ureteral stones who require intervention and for patients with suspected cystine or uric acid ureteral stones who fail medical expulsive therapy (MET) [4]. In the case of adult patients with renal stones, the AUA recommends SWL or URS for symptomatic patients with a total non-lower pole renal stone burden  $< 20$  mm, PCNL for symptomatic patients with a total renal stone burden  $> 20$  mm [4]. However, because of limited resources in our setting and coupled with the expensive nature of PCNL in terms of equipment and expertise, ESWL is still being performed on patients with renal stone size above 20 mm.

ESWL has been proven to be an ideal modality for the management of kidney

stones. The advantages of this method include the fact that it is non-invasive, has a greater success rate in the management of proximal ureteral calculi, the reduced need for secondary calculi-clearing procedures, a significantly low hospitalization rate, and significantly short hospitalization [5] [6] [7].

## 2. Methods and Materials

We carried out a retrospective study over a period of six years, from January 2014 to December 2020 at the Centre medico-chirurgicale d'urologie, which is located in Bali, Douala. This is a medical center that specializes in minimally-invasive surgery and surgical management of urological pathologies using innovative techniques. We consulted the clinical records of patients who had calculi in the kidneys, at the junction between the renal pelvis and the ureter, and at the lumbar segment of the ureter. The calculi were managed using a Direx Integra lithotripter in all study participants. The image of the lithotripter is presented in **Figure 1**. The number of shockwaves ranged from 1500 to 3500, 2500 to 3200, 2500 to 3000, and 1200 to 3000 during the first, second, third, and fourth sessions, respectively. All the interventions were carried out by the same surgeon, assisted by a nurse. General anaesthesia was not used in any patient, but all patients had an intravenous line prior to the ESWL sessions that permitted the administration of analgesics in case of pains. All patients were treated on an outpatient basis. Drainage using a Double-J stent preceded extracorporeal lithotripsy in some patients. We consulted a total of 122 records of patients from January 2014 to December 2020 at the Centre medico-chirurgicale d'urologie. The data we collected from the patients' clinical records included patients' age, gender, clinical profile, relevant medical history, size of the calculi, localization of the calculi as confirmed by imaging, and outcome of lithotripsy. All the study participants had at least one kidney or ureteric stone. The imaging method used for confirmation of the stones before ESWL in all patients was the CT scan and X-rays were performed following the procedure to confirm stone clearance. Patients were considered stone-free if no stone was visible on imaging fifteen days after their last ESWL session. Residual fragments were defined as the presence of at least three residual fragments of at most 4 mm following ESWL.



**Figure 1.** Image of the Direx Integra lithotripter used in the treatment of the patients.

Continuous variables were presented as mean values and standard deviations (for normally distributed data) and medians with interquartile ranges (for skewed data). On the other hand, categorical variables were presented as frequencies and percentages.

### 3. Results

#### 3.1. Patients' Profile

Of the 122 files we included for analysis, 67 files belonged to men and 55 belonged to women. The mean age of these patients was 42.19 (13.08) years. Although all the patients underwent extracorporeal lithotripsy, drainage using a Double-J stent preceded extracorporeal lithotripsy in two patients because they had renal colic with urinary tract infection as a complication on presentation.

The mean size of the stones was 13.84 (4.17) mm. As for the localisation of these stones, 84 (68.9%) were found in the renal pelvis (30 in the upper pole, 31 in the middle pole and 23 in the inferior pole), 21 (17.2%) were found at the junction between the renal pelvis and the ureter, while 17 (13.9%) were found in the lumbar ureter. As concerns the laterality of the stones, 65 (53.3%) of them were located on the right side of the body, while 56 (46.7%) of them were located on the left side. As for the number of shockwave sessions, there was one session in 34 (27.9%) cases, two sessions in 62 (50.8%) cases, three sessions in 20 (16.4%) cases, and four sessions in 6 (4.9%) cases. Twenty-four patients (19.7%) had double-J stents pre-op, while three patients (2.5%) had double-J stents post-op.

Concerning the outcomes of calculi following ESWL, 84 (68.9%) patients were stone-free, 21 (17.2%) had residual fragments, while 17 (13.9%) experienced therapeutic failure. Four (3.3%) patients received medical treatment as complementary therapy, while 2 patients (1.6%) received surgical treatment as complementary therapy. A total of 121 (99.2%) patients experienced no complications after ESWL, while 1 patient (0.8%) experienced septic shock as a complication.

Although all the patients underwent extracorporeal lithotripsy, 4 (3.3%) patients received medical treatment as complementary therapy, while 2 (1.6%) were treated with double-J stent placement as complimentary surgical therapy. The profiles of the 122 patients involved in this study are presented in **Table 1**.

#### 3.2. Success Rate Following ESWL in the General Population

In general, 32 (26.2%) patients were stone-free after the first session of ESWL. After four sessions, the percentage of participants with stone-free kidneys increased to 68.9% (84 patients) (**Table 2**) (**Figure 2**).

#### 3.3. Success Rate According to Stone Location

Nineteen kidney stones were successfully removed from the junction between the pelvis and the ureter, 5 from the inferior pole of the kidney, 21 from the middle pole of the kidney, 23 from the superior pole of the kidney, and 16 from the lumbar portion of the ureter (**Table 3**).

**Table 1.** Patient profile.

VARIABLE	MALE (n = 67) N° (%)	FEMALE (n = 55) N° (%)	TOTAL (n = 122) N° (%)
Mean age (SD)	40.85 (13.19)	43.72 (12.91)	42.19 (13.08)
Initial presentation			
No symptom	41 (63.1)	39 (68.4)	80 (65.6)
Acute nephritic colic	22 (33.8)	16 (28.1)	38 (31.1)
Acute nephritic colic plus sepsis	2 (3.1)	0 (0.0)	2 (1.6)
Sepsis only	0 (0.0)	2 (3.5)	2 (1.6)
Mean size of stone (SD)	13.88 (3.83)	13.79 (4.56)	13.84 (4.17)
Localization of stone			
JPU	12 (18.5)	9 (15.8)	21 (17.2)
PI	10 (15.4)	13 (22.8)	23 (18.9)
PM	18 (27.7)	12 (21.1)	31 (25.4)
PS	15 (23.1)	16 (28.1)	30 (24.6)
UL	10 (15.4)	7 (12.3)	17 (13.9)
Laterality of the affected kidney n			
Right	31 (47.7)	34 (59.6)	65 (53.3)
Left	34 (52.3)	23 (40.4)	56 (46.7)
Number of shockwave sessions			
One shockwave session only	17 (26.2)	17 (29.8)	34 (27.9)
Two shockwave sessions only	35 (53.8)	27 (47.4)	62 (50.8)
Three shockwave sessions only	10 (15.4)	10 (17.5)	20 (16.4)
Four shockwave sessions only	3 (4.6)	3 (5.3)	6 (4.9)
Number of clients with JJ stents pre-op	13 (20.0)	11 (19.3)	24 (19.7)
Number of clients with JJ stents post-op	2 (3.1)	1 (1.8)	3 (2.5)
Outcome of Calculi following ESWL			
Stone-free	42 (64.6)	42 (73.7)	84 (68.9)
Residual fragments	11 (16.9)	10 (17.5)	21 (17.2)
Failure	12 (18.5)	5 (8.8)	17 (13.9)
Complementary treatment n (%)			
Medical treatment	2 (3.1)	2 (3.5)	4 (3.3)
Surgical treatment	1 (1.5)	1 (1.8)	2 (1.6)
Post-ESWL complication n (%)			
No complication	61 (93.8)	54 (94.7)	115 (94.3)
CNA	3 (4.6)	3 (5.3)	6 (4.9)
Septic shock	1 (1.5)	0 (0.0)	1 (0.8)

**Table 2.** Success rate following ESWL in the general population.

	Male n (%)	Female n (%)	Total n (%)
<b>After one session</b>	16 (24.6)	16 (28.1)	32 (26.2)
<b>After two sessions</b>	37 (56.9)	36 (63.2)	73 (59.8)
<b>After three sessions</b>	41 (63.1)	42 (73.7)	83 (68.0)
<b>After four sessions</b>	42 (64.6)	42 (73.7)	84 (68.9)

**Table 3.** Success rate according to stone location.

	First session n (%)	Second session n (%)	Third session n (%)	Fourth session n (%)	Total n (%)
<b>JPU (n = 21)</b>	7 (33.3)	8 (38.1)	4 (19.0)	0 (0.0)	19 (90.5)
<b>PI (n = 23)</b>	3 (13.0)	2 (8.7)	0 (0.0)	0 (0.0)	5 (21.7)
<b>PM (n = 31)</b>	9 (29.0)	7 (22.5)	4 (12.9)	1 (3.2)	21 (67.7)
<b>PS (n = 30)</b>	8 (26.7.0)	14 (46.7)	1 (3.3)	0 (0.0)	23 (76.7)
<b>UL (n = 17)</b>	5 (29.4)	10 (58.8)	1 (5.9)	(0.0)	16 (94.1)
<b>TOTAL (n = 122)</b>	32 (26.2)	41 (33.6)	10 (8.2)	1 (0.8)	84 (68.9)



(a)



(b)



(c)

**Figure 2.** (a) Left non obstructive renal stone before ESWL sessions; (b) After first session of ESWL; (c) After second session of ESWL.

### 3.4. Success Rate According to Stone Size

Of the 32 stones measuring 5 - 10 mm, 24 (75.0%) were removed during the first session of ESWL and 1 was removed after the second session, giving a stone-free success rate of 78.1% after two sessions. Of the 57 stones measuring 11 - 15 mm, 8 (14.0%) were removed during the first session, 32 during the second session, and 2 during the third session of ESWL, giving an overall stone-free success rate of 73.7%. Of the 23 stones measuring 16 - 20 mm, none was removed during the first session, 8 were removed during the second session, 5 during the third session, and 1 during the fourth session with an overall stone-free success rate of 60.9%. Of the 10 stones measuring 21 - 25 mm, 3 (30.0%) were removed only after the third ESWL session and none removed after the fourth session were removed during the third session of ESWL (**Table 4**).

### 3.5. Success Rate According to Initial Presenting Symptoms

Of the 80 patients that had no symptom at initial presentation, 20 (25.0%) had their stones removed during the first session of ESWL, 23 had their stones removed during the second session, 5 during the third session, and 1 during the fourth session, giving a stone-free success rate of 61.3%.

Of the 38 patients that had acute nephritic colic as initial symptom, 12 (31.6%) had their stones removed during the first session of ESWL, 16 had their stones removed during the second session, and 4 during the third session, with an overall stone-free success rate of 84.2%. Only 1 (50%) of the 2 patients who presented with acute nephritic colic and sepsis had the stone removed and this was during the second session of ESWL. The 2 patients who presented with sepsis were completely stone free after the second session for one and after the third session for the other, with an ESWL success rate of 100% (**Table 5**).

**Table 4.** Success rate according to stone size.

	After one session n (%)	After two sessions n (%)	After three sessions n (%)	After four sessions n (%)
5 - 10 (n = 32)	24 (75.0)	25 (78.1)	25 (78.1)	25 (78.1)
11 - 15 (n = 57)	8 (14.0)	40 (70.2)	42 (73.7)	42 (73.7)
16 - 20 (n = 23)	0 (0.0)	8 (34.8)	13 (56.5)	14 (60.9)
21 - 25 (n = 10)	0 (0.0)	0 (0.0)	3 (30.0)	3 (30.0)

**Table 5.** Success rate based on initial presenting symptoms.

	After one Session n (%)	After two sessions n (%)	After three sessions n (%)	After four Sessions n (%)
No symptom (n = 80)	20 (25.0)	43 (53.8)	48 (60.0)	49 (61.3)
CAN (n = 38)	12 (31.6)	28 (73.7)	32 (84.2)	32 (84.2)
CAN + Sepsis (n = 2)	0 (0.0)	1 (50.0)	1 (50.0)	1 (50.0)
Sepsis (n = 2)	0 (0.0)	1 (50.0)	2 (100.0)	2 (100.0)

### 3.6. Success Rate Based on Initial Presenting Symptoms and Stone Size

Of the 49 patients who had no symptoms initially and were completely stone-free following ESWL, 28 had stones that measured 5 - 10 mm, 25 had stones that measured 11 - 15 mm, 5 had stones that measured 16 - 20 mm, while 1 had stones that measured 21 - 25 mm.

Of the 32 patients that had acute nephritic colic and treated successfully with ESWL, 7 had stones that measured 5 - 10 mm, 16 had stones that measured 11 - 15 mm, 7 had stones that measured 16 - 20 mm, while 2 had stones that measured 21 - 25 mm. The 1 patient who initially presented with acute nephritic colic and sepsis and became stone free after ESWL had stones measuring 11 - 15 mm. The two patients that initially presented with sepsis had stones measuring 16 - 20 mm (**Table 6**).

## 4. Discussion

We used 122 patients to compare the percentage of patients with kidney and ureteric stones who achieved a complete stone-free state after ESWL. We compared the success rate based on the number of shockwave sessions required, stone location, stone size and initial presentation at diagnosis. We obtained a general success rate (patients who became stone-free) of 68.9% in the general population and 64.6% and 73.7% respectively in males and females. This was higher than the 55.2% gotten by Ze Ondo *et al.* [8]. This could be explained by the fact that in our study, most of the patients (89) had calculi less than or equal to 15 mm. It has been shown that ESWL is more effective in removing stones of smaller sizes.

**Table 6.** Success rate based on initial presenting symptoms and stone size.

	5 - 10 (n = 32)	11 - 15 (n = 57)	16 - 20 (n = 23)	21 - 25 (n = 10)	Total n (%)
<b>No symptoms</b>	18	25	5	1	49 (61.3)
<b>CAN</b>	7	16	7	2	32 (84.2)
<b>CAN + Sepsis</b>	0	1	0	0	1 (50.0)
<b>Sepsis</b>	0	0	2	0	2 (100.0)

We noticed that after the first ESWL session, just 26.2% of the patients were stone-free and 52 (42.6%) required multiple ESWL sessions. After four sessions, therefore, the percentage of patients who were stone-free increased to 68.9%. This is similar to the results published by Al-Abadi *et al.* (43% after first ESWL and 61% requiring repeat ESWL) and Al-Ansari *et al.* (78% after first ESWL and 53.1% requiring repeat ESWL) [9] [10].

In our study, 77.5% of patients with a calculus of less than 20 mm who were symptomatic at presentation were stone-free following ESWL. This is higher than the 64.8% for stones less than 10 mm and 30% for those between 10 and 20 mm reported by Ze Ondo *et al.* but similar to 82.0% and 64.5% for less than 10 mm and between 10 - 20 mm respectively reported by De Marco [8] [11]. The high percentage observed in our study compared to that reported by Ze Ondo could be explained by the fact that the AUA recommends ESWL, based on strong evidence, in the treatment of symptomatic patients with a total non-lower pole renal stone burden < 20 mm [4]. Also, Ze Ondo *et al.* did not take the size of the calculi when estimating the success rate of ESWL.

In the present study, 94.1% and 90.5% of patients with calculi at the level of the UL and JPU respectively were stone-free after ESWL. A lower success rate was observed with stones located at the PI (21.7%). Juan *et al.* reported a stone clearance rate of 57.6% for inferior pole stones [12]. It has been shown from previous studies that the low success rate observed in inferior pole calculi, compared to calculi found in other locations within the kidney is related to the effects of gravity on the position of the stone and lower calyceal spatial anatomy, rather than of stone disintegration [13].

For stones of the PS and PM, 76.7% and 67.7% respectively resolved completely after ESWL sessions. This finding was similar to those obtained by Ze Ondo *et al.* (65.2% for PS and PM) [8]. The high success rate experienced with stone of the superior and middle poles of the kidney is due to the significant effect of gravity which makes it easier for fragments to be eliminated following ESWL.

However, the rate of success we had with stones of the PS and PM were lower than the 89.2% and 90.5% respectively reported by Coz *et al.* [14].

ESWL has several advantages mainly owing to its non-invasive nature and its high success rate. In spite of these benefits, several studies have reported acute nephritic colic, renal hematoma, sepsis and septic shock as major complications

of ESWL [3] [8] [15]. In the present study, the overall rate of complication following ESWL was 5.7%, with acute colicky pain contributing 4.9% and septic shock accounting for 0.8%. Out of the 6 patients who had post ESWL colicky pain, 66.7% were treated medically with analgesics and antispasmodics, while 33.3% underwent surgical treatment with double J stent placement. In general, complications after an ESWL are caused by the formation and passage of fragments; infections; the effects of shockwaves on renal and non-renal tissues or a combination of these [16]. It has been documented that the development of sepsis after bacteremia in patients who undergo ESWL is relatively low and occurs in less than 1% of patients, as was the case in our study (0.8%) [17]. The most common complication that occurs as a result of the direct effect of the shockwaves on the kidney is haematuria [16]. None of the patients, however, developed a haematoma.

## 5. Conclusion

ESWL has revolutionized the management of renal and ureteral calculi in adults and it is particularly effective for renal calculi measuring less than 20 mm and ureteral calculi measuring less than 15 mm. Extracorporeal lithotripsy, which can be performed on an outpatient basis (and without anaesthesia) is associated with minimal complications, and remains the option of choice for most upper urinary tract calculi. The overall success rate of the procedure in the present study was 68.9%, the re-treatment rate was 42.6% and the overall complication rate was 5.7%.

## Conflicts of Interest

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

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# Intraluminal Lithotripsy with Rigid Ureteroscopy for Proximal and Distal Ureteral Stones: Results of a Single Center in Cameroon

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## Abstract

**Aim:** To evaluate the efficacy and safety of intraluminal lithotripsy with a pneumatic lithotripter (EMS, Switzerland) and laser Holmium YAG in retrograde rigid ureteroscopy for proximal and distal ureteric calculi. **Materials and Methods:** This was a retrospective study carried out from January 2015 to December 2019 including 175 patients with ureteric calculi who presented with ureteric colic at a mini-invasive surgical urological center in Douala, Cameroon. All the patients underwent retrograde ureteroscopy with a 7F rigid ureteroscope, and fragmentation was done with either a pneumatic lithotripter or a laser holmium YAG. Six patients who had urinary tract infection benefited from double J stent placement before retrograde ureteroscopy. The study variables included age, clinical symptoms, size and location of the stone, the type of lithotripsy, operating time, and the results of lithotripsy. **Results:** We included a total of 175 patients with a mean age of  $40.95 \pm 12.50$  years. Seventy-six (43.43%) of our participants were females and all patients had at least one calculus confirmed by a CT scan. Stone sizes ranged from 5 - 26 mm (median of 12 mm). Fifteen (8.57%) stones were located in the upper ureter (pyeloureteric junction), 64 in the middle ureter, 20 in the iliac ureter, 43 in the pelvic ureter, and 33 at the vesico-ureteric orifice. The success rate was 100% for stones located in the iliac ureter, pelvic ureter and the ureteric orifice. For those in the middle and upper ureter, the success rate was 92.18% and 60%, respectively. **Conclusion:** Rigid ureteroscopy is an excellent treatment modality for ureteral calculi, especially those located at the distal part of

the ureter. The procedure is associated with a shorter operation time and a shorter post-operative hospitalization period, in addition to its safety and effectiveness compared to open surgery.

## Keywords

Calculi, Rigid Ureteroscopy, Pneumatic Lithoclast, Laser Holmium, Double J Stent

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## 1. Introduction

Although ureteroscopy (URS) was developed as an extension of cystoscopy, it has rapidly evolved and found application in the diagnosis and treatment of disorders of the upper urinary tract [1]. Its use dates as far back as the 1970s when Lyon *et al.* used it to diagnose and manage ureteral tumours, calculi, and obstructions [2]. Ureteroscopes could be rigid or flexible, and both can be used complementarily to gain access to the entire upper urinary tract [3]. Rigid ureteroscopes are easier to use, provide excellent image transmission, allow excellent control of working instruments, provide larger working channels, and are best suited for the lower ureter, particularly the part below the level of the iliac vessels [4]. Although flexible ureteroscopes are better suited for use in the upper ureter and intrarenal collecting system, they are more difficult to use in the lower ureter because of their tendency to buckle into the bladder [4].

The most common indication for URS continues to be the treatment of urinary calculi [4] [5]. Other indications include the diagnosis and treatment of filling defects observed in excretory computer tomographic urography, lateralizing essential hematuria, foreign bodies, and upper urinary tract neoplasms and fistulas [6]. An active urinary tract infection is the commonest contraindication to URS, and this diagnosis usually leads to the deferral of URS until after the infection has been fully treated (by placing a double J ureteral stent to establish urinary drainage on the affected side and administering the appropriate antibiotics) and its resolution confirmed [5].

Apart from URS, there exist other non-invasive techniques used in treating patients with renal and ureteric calculi such as extracorporeal shockwave lithotripsy (ESWL), percutaneous nephrolithotomy (PCNL), laparoscopy, and robotic surgery [3]. Where non-invasive or minimally invasive methods are either unavailable or fail, invasive procedures (including open surgery) can be employed. The American Urological Association (AUA) recommends watchful waiting for patients with uncomplicated ureteral stones  $\leq 10$  mm, URS for patients with stones in the middle or distal parts of the ureter who require intervention and for patients with suspected cystine or uric acid ureteral stones in whom medical expulsive therapy (MET) as a treatment modality for adult patients with ureteral stones fails [3]. In the case of adult patients with renal stones, the AUA recommends ESWL or URS for symptomatic patients with a total

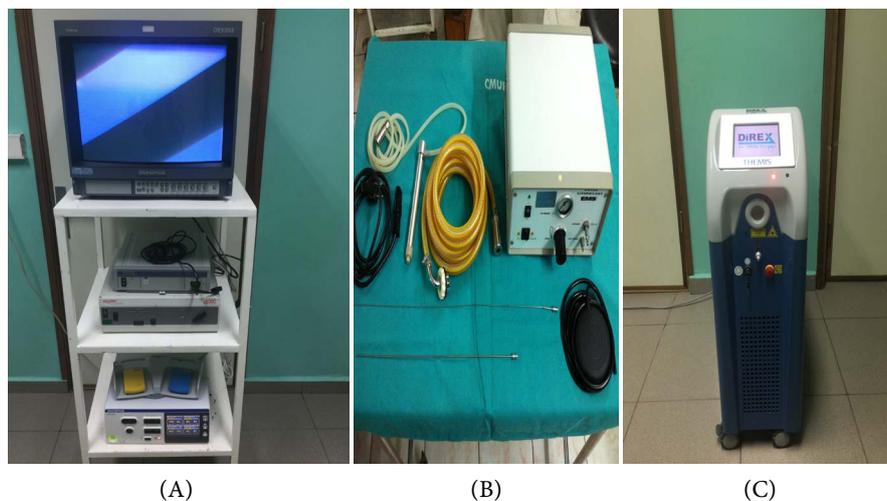
non-lower pole renal stone burden < 20 mm, PCNL for symptomatic patients with a total renal stone burden > 20 mm [3].

Ureteroscopy is generally a safe procedure with minimal complications. The complications of URS range from minor complications like mild urinary tract infection, hematuria, double J stent discomfort, and temporal elevation of creatinine level to more severe complications such as severe urosepsis, submucosal or extra-ureteral stone migration, ureteral perforation, ureteral stricture, and ureteral avulsion [7] [8]. The overall stone-free success rates for URS in the treatment of ureteral calculi ranges from 91% - 93%.

## 2. Methods and Materials

We conducted a retrospective study over a period of five years (from January 2015 to December 2019) at the Centre medico-chirurgical d'urologie, which is located in Bali, Douala. This is a medical center that specializes in minimally-invasive surgery and the surgical management of urological pathologies using innovative techniques. The study included 175 patients with ureteric calculi who all presented with ureteric colic. The calculi were located at the upper ureter, middle ureter, iliac ureter, pelvic ureter, and the vesico-ureteric orifice. Ureteroscopy was performed using a rigid ureteroscope (7F) under loco-regional anesthesia. Two types of lithotripsy were used to fragment the stones; these were the pneumatic lithoclast (EMS, Switzerland) used in 32 patients and the laser holmium YAG, with a power of 30 W, used in 132 patients. The calculi could not be reached in 11 patients because of the migration of the stone to the renal pelvis or the narrowness of the ureter. Urine analysis and urine culture were carried out in all patients prior to the procedure to exclude any urinary tract infection. Thereafter, a second generation cephalosporin was administered to all of them as a prophylactic antibiotic (Figure 1).

The procedure involved placing patients in the lithotomy position and advancing



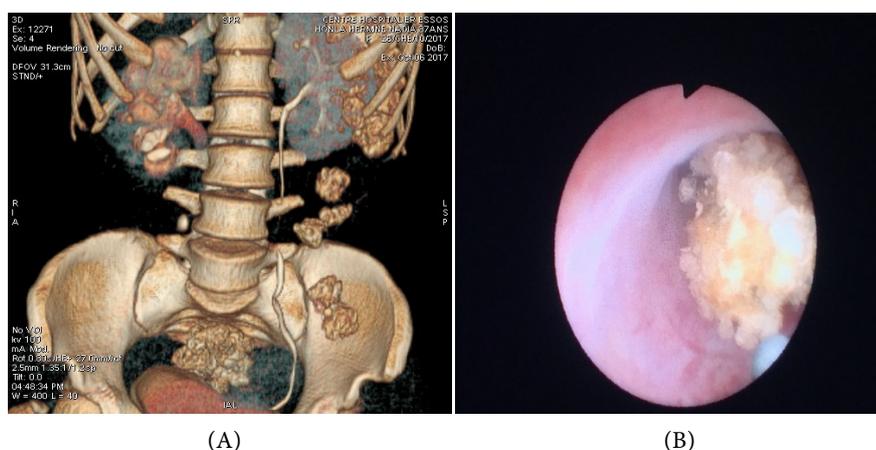
**Figure 1.** Endoscopy (Ureteroscopy) unit (A), Pneumatic lithoclast (B), and Laser holmium YAG (C) used to manage the patients.

a guidewire (Guidewire 0.035) controlled by an image intensifier through a 19F cystoscope that was previously inserted up to the level of the ureteric orifice. The guidewire was advanced to the level of the stone, then carefully beyond the stone into the kidney cavity. The ureteroscope was then introduced beside the wire until it reached the stone. A pneumatic lithotripter or laser holmium YAG was used to fragment the stone and a basket was used to extract the fragmented calculi.

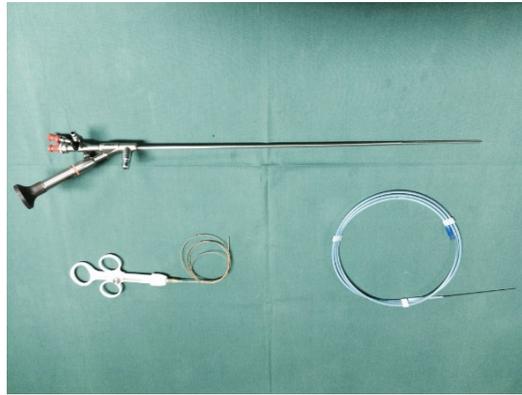
After ureteroscopic manipulation, the double J stent that was placed in some patients before retrograde ureteroscopy was left in place for 10 days to prevent edematous inflammation of the ureteral mucosa. Most of the patients had a double J stent placed following the procedure, which was left in place for 10 - 60 days depending on the presence or absence of ureteral trauma. The decision to place or not to place the double J stent depended on the location of the stone (the more distal the stone, the less likely it was to place a stent), and the state of the ureteral mucosa following fragmentation (difficult fragmentation with associated ureteral inflammation favors stent placement).

We collected data on patients' ages, genders, clinical profiles, relevant medical history, sizes of the calculi, localization of the calculi as confirmed by imaging, and outcome of lithotripsy. All the study participants had at least one ureteric stone. The imaging method used for confirmation of the stones before URS in all patients was the CT scan, and X-rays were also performed following the procedure to confirm stone clearance. Patients were considered stone-free if no stone was visible on imaging following URS. Failure was defined as inability to remove the identified calculi due to either the migration of the calculi towards the kidney or the narrowness of the ureter (**Figure 2, Figure 3**).

Continuous data were collected and presented as mean values and standard deviations (for normally distributed data) and medians with interquartile ranges (for skewed data). On the other hand, categorical data were presented as frequencies and percentages.



**Figure 2.** CT Scan imaging of a right ureteric stone (A) and an endoscopic view of a ureteric calculi (B).



**Figure 3.** Ureteroscopy set with rigid ureteroscope, basket and guidewire.

### 3. Results

Of the 175 patients treated, 99 (56.57%) were males and 76 (43.43%) were females. The mean age of these patients was  $40.95 \pm 12.50$  years. Of the 175 patients, 164 (93.72%) underwent intraluminal lithotripsy with a pneumatic lithotripter (32 patients) and a laser holmium (132 patients). The stone could not be reached by URS in 11 (6.29%) patients. Drainage using a Double J stent preceded URS in 6 patients because they had renal colic with urinary tract infection at presentation as confirmed by urine culture.

The stone sizes ranged 5 - 26 mm, with a mean size of  $12.11 \pm 4.38$ . Concerning the exact locations of the stones, 20 (11.43%) were located in the iliac ureter, 64 (36.57%) were located in the lumbar ureter, 43 (24.57%) were located in the pelvic ureter, 15 (8.57%) were located in the Pyeloureteric junction, and 33 (18.86%) were located at the vesico-ureteric orifice. As concerns the laterality of the stones, they were located on the right side of the body in 85 (48.57%) patients and on the left side of the body in 90 (51.43%) patients. The patients were hospitalized for 1 - 7 days, with a mean duration of  $1.18 \pm 0.67$  days. A total of 156 (89.14%) of the 175 patients were hospitalized for one day, 14 (8.00%) were hospitalized for two days, 2 (1.14%) were hospitalized for three days, 1 (0.57%) patient was hospitalized for four days, 1 (0.57%) patient was hospitalized for five days 0 (0%) patient was hospitalized for six days, and 1 (0.57%) patient was hospitalized for seven days. The duration of the surgery ranged from 20 - 130 minutes, with a mean duration of  $58.64 \pm 22.57$  minutes. Of the 175 patients, double J stents were placed in 132 (75.43%) post-operatively and in 6 (3.43%) preoperatively. The time lapse till the removal of the double J stent ranged from 0 - 60 days, with a median time lapse of 10 (IQR: 0 - 13) days.

A dormia basket was used for stone extraction in 45 (25.71%) of the 175 patients while these forceps were not used in 130 (74.29%) patients. A total of 6 (3.43%) of the 175 patients experienced complications. Out of these 6, 2 (33.33%) experienced septic shock, 2 (33.33%) experienced fever, and 2 (33.33%) experienced perforation at some point in the urinary tract.

The profiles of the 175 patients involved in this study are presented in **Table 1**.

**Table 1.** Patients' profiles.

VARIABLE	MALE, 99 (56.57%) N° (%)	FEMALE, 76 (43.43%) N° (%)	TOTAL, 175 N° (%)
Mean age (SD)	41.59 (12.99)	40.12 (11.86)	40.95 (12.50)
<b>Initial presentation</b>			
Colic only	84 (84.85)	61 (80.26)	145 (82.86)
Colic + haematuria	13 (13.13)	7 (9.21)	20 (11.43)
Colic + sepsis	1 (1.01)	5 (6.58)	6 (3.43)
Colic + LUTS	1 (1.01)	3 (3.95)	4 (2.29)
Median size of stone (range), mm	12 (5 - 26)	10.5 (5 - 24)	12 (5 - 26)
<b>Localization of stone</b>			
upper ureter (pyeloureteric junction)	10 (10.10)	5 (6.58)	15 (8.57)
lumbar ureter,	39 (39.39)	25 (32.89)	64 (36.57)
iliac ureter,	11 (11.11)	9 (11.84)	20 (11.43)
pelvic ureter,	27 (27.27)	16 (21.05)	43 (24.57)
vesico-ureteric orifice	12 (12.12)	21 (27.63)	33 (18.86)
<b>Laterality of the affected ureter</b>			
Right	52 (52.53)	33 (43.42)	85 (48.57)
Left	47 (47.47)	43 (56.58)	90 (51.43)
<b>Culprit germs causing UTI pre-op</b>			
<i>Pseudomonas</i>	0	1 (1.32)	1 (0.57)
<i>Klebsiela</i>	0	1 (1.32)	1 (0.57)
<i>E. coli</i>	1 (1.01)	2 (2.63)	3 (1.71)
<i>Proteus sp</i>	0	1 (1.32)	1 (0.57)
Number of clients with double J stent pre-op	1 (1.01)	5 (6.58)	6 (3.43)
Number of clients with double J stent post-op	80 (80.81)	52 (68.42)	132 (75.43)
<b>Calculi fragmentation method</b>			
Laser lithotripsy	73 (73.74)	59 (77.63)	132 (75.43)
Pneumatic lithotripsy	20 (20.20)	12 (15.79)	32 (18.29)
No fragmentation	6 (6.06)	5 (6.58)	11 (6.29)
<b>Outcome of URS</b>			
success	93 (93.94)	71 (93.42)	164 (93.71)
failure	6 (6.06)	5 (6.58)	11 (6.29)
<b>Reason's for URS failure</b>			
Migration of the stone	3 (50.0)	1 (20.0)	4 (36.36)
Narrow ureters	3 (50.0)	4 (80.0)	7 (63.64)
<b>Post-URS complication n (%)</b>			
No complication	97 (97.98)	72 (94.74)	169 (96.57)
Septic shock	1 (1.01)	1 (1.32)	2 (1.14)
Fever	0 (0.0)	2 (2.64)	2 (1.14)
Ureteral perforation	1 (1.01)	1 (1.32)	2 (1.14)

**Continued**

<b>Duration of hospitalization median (range)</b>	1 (1 - 7)	1 (1 - 6)	1 (1 - 7)
<b>Duration of URS procedure in minutes, median (range)</b>	60 (20 - 130)	60 (20 - 120)	60 (20 - 130)

LUTS = lower urinary tract symptoms.

### **Success Rate Following URS According to Stone Size, Location, and Fragmentation Method**

In general, 164 (93.71%) patients were stone-free following URS and fragmentation. All 132 patients who underwent laser lithotripsy and 32 patients who underwent pneumatic lithotripsy were stone-free following the procedure. Nine (60%) stones were successfully removed from the upper ureter (pyeloureteric junction), 59 (92.19%) from the lumbar ureter, 20 (100%) from the iliac ureter, 43 (100%) from the pelvic ureter, and 33 (100%) from the vesico-ureteric orifice. All of the 72 stones measuring 5 - 10 mm were successfully removed. Of the 69 patients with stones measuring 11 - 15 mm, 65 (92.20%) became stone-free after URS. Of the 29 stones measuring 16 - 20 mm, 23 were successfully removed, giving a success rate of 79.31%. Of the 5 stones measuring greater than 20 mm, 4 (30.0%) were successfully removed by URS (**Table 2**).

## **4. Discussion**

The treatment modality adopted for the management of ureteral calculi is highly dependent on the size of the calculi. Treatment options for ureteral calculi include URS, SWL, laparoscopic ureterolithotomy, PCNL, and robotic surgery [3]. URS remains an attractive modality used to manage upper ureteral stones. We assessed the treatment outcomes of 175 patients with ureteral calculi who were treated by ureteroscopy and intraluminal lithotripsy. We described the success rate according to the initial presenting symptoms, localization of stone within the ureter, laterality of stone, stone size, and fragmentation method. The overall success rate (patients who became stone-free after URS) of 93.71% in the general population and 93.94% and 93.42%, in males and females, respectively. This was in accordance with the success rate of 89.7% reported by Fathelbab *et al.*, 85.71% reported by Ciftci *et al.*, and 84.8% reported by Tahsin *et al.* [9] [10] [11].

URS is used to locate ureteral calculi. Fragmentation and extraction of the calculi, however, is done by means of dormia baskets, lithotripters, or graspers. Instruments for intraluminal lithotripsy include ultrasound, electrohydraulic, electromechanical, pneumatic, or laser energies [4]. In our study, we used pneumatic lithotripsy to fragment the calculi in 32 of the 164 patients (18.29%) and had a 100% success rate, while laser lithotripsy was used in 132 (75.43%) patients with a 100% success rate. This result is in contrast to that reported by Abedi *et al.* [12] who achieved a stone-free rate of 65.2% with pneumatic lithotripsy, and 93.3% with laser lithotripsy, but ties with the results obtained by Travassos *et al.* of a 100% stone-free rate [13].

**Table 2.** Success rate following rigid ureteroscopy and intraluminal lithotripsy of ureteral calculi.

VARIABLE	Success rate following rigid ureteroscopy and lithotripsy N° (%)
<b>Initial presentation</b>	
Colic only	136 (93.79)
Colic + haematuria	18 (90.0)
Colic + sepsis	6 (100)
Colic + LUTS	4 (100)
<b>Localization of stone</b>	
upper ureter (pyeloureteric junction)	9 (60.0)
lumbar ureter,	59 (92.19)
iliac ureter,	20 (100)
pelvic ureter,	43 (100)
vesico-ureteric orifice.	33 (100)
<b>Laterality of the affected ureter</b>	
Right	78 (91.76)
Left	86 (95.56)
<b>Calculi fragmentation method</b>	
Laser lithotripsy	132 (100)
Pneumatic lithotripsy	32 (100)
<b>Size of stones</b>	
5 - 10 mm	72 (100)
11 - 15 mm	65 (92.20)
16 - 20 mm	23 (79.31)
>20 mm	4 (80)

In the current study, as the location of the ureteral calculi moved distally from the pyeloureteric junction towards the vesicoureteric orifice, the stone-free rate after URS increased from 60% (9 of 15) to 100% (33 of 33). This trend was similar to the overall initial success rate of 76.54%, 85.48%, 90.74% for proximal, middle, and distal ureteral stones, respectively, reported by Ciftci *et al.* in the 336 patients who underwent ureteroscopic pneumolithotripsy for ureteric stones [10].

In our study, 100% of patients with calculi measuring less than 10 mm were stone-free following URS, and this success rate decreased as the stone size increased, going as low as 80% for stones greater than 20 mm. This trend of decreasing success rate with increasing size of stones was also reported by Mursi *et al.* and Gunlusoy *et al.* [14] [15].

Although the placement of a ureteral stent is not routinely required prior to URS, it can be placed if a urinary tract infection is confirmed [3] [9]. In our study, 6 patients underwent double J stent placement before retrograde ureteroscopy since they had urinary tract infections.

Complications are commonly associated with URS, like with any surgical procedure. These complications include stent pain, residual stone fragments,

stone migration, ureteral injury, ureteral stricture, hematuria, and infection [16]. In the current study, the incidence of complications was low, with just 3.43% of the study participants developing post-URS complications (2 had septic shock, 2 experienced ureteral rupture, and 2 developed a fever). This was similar to the 4.44% complication incidence rate among patients treated with laser lithotripsy and the 12.17% among patients treated with pneumatic lithotripsy reported by Abedi *et al.* [12].

## 5. Conclusion

Rigid ureteroscopy is an excellent modality for the management of ureteral calculi, especially those located at the distal parts of the ureter. The procedure is associated with a shorter operation time and a shorter post-operative hospitalization period, in addition to its higher safety and efficacy compared to open surgery. We found that both pneumatic lithotripsy and laser lithotripsy were safe and effective methods of clearing ureteral stones.

## Conflicts of Interest

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

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# Predictive Factors for a Successful Day Case Benign Prostatic Hyperplasia Surgery: A Review

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## Abstract

**Introduction:** Lower urinary tract symptoms (LUTS) secondary to benign prostatic hyperplasia (BPH) is one among the foremost common diseases affecting the aging man with, almost 80% of the lads greater than 70 affected. BPH is caused by unregulated proliferation within the prostate, which may cause physical obstruction of the prostatic urethra and result in anatomic bladder outlet obstruction (BOO). Transurethral resection of the prostate (TURP) has been the historical gold standard up till now to which all endoscopic procedures for benign prostatic hyperplasia (BPH) are compared with a mean hospital stay of three days. This surgery although efficacious has been related with increased morbidity and increased day case failure rates as compared to newer techniques. These shortcomings have prompted the utilization of newer methods like Transurethral enucleation and resection of the prostate (TUERP), Holmium laser enucleation of the prostate (HoLEP) and Thulium laser enucleation of the prostate (ThuLEP). This review will discuss the enucleation techniques, advantages and therefore the predictive factors for a successful day case prostate surgery. **Materials and Methods:** During this review, we discuss the newer techniques utilized in day case BPH surgery as well as the predictive factors for a successful BPH surgery, both enucleation, benefits and morcellation are covered also. **Results:** TUERP, ThuLEP and HoLEP have literature supporting the advantages of these techniques, which demonstrates its ability in day case BPH surgeries in specially selected cases with favorable factors and a 61% overall success rate. **Conclusion:** TUERP, ThuLEP and HoLEP Have proven to show favorable outcomes in day case BPH surgery with urologist's experience, prostate size, duration of operation, age, use of anticoagulants, morning theatre list and ASA score being the key factors for a successful day case surgery.

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## Keywords

Benign Prostatic Hyperplasia (BPH), Transurethral Resection of the Prostate (TURP), Transurethral Enucleation and Resection of the Prostate (TUERP), Holmium Laser Enucleation (HoLEP), Thulium Laser Enucleation (THuLEP), Lower Urinary Tract Symptoms (LUTS), Catheterisation Time (CT), Operation Time (OT), Bladder Outlet Obstruction (BOO), American Society of Anesthesiologists (ASA)

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## 1. Introduction

Lower urinary tract symptoms (LUTS) secondary to benign prostatic hyperplasia (BPH) is one among the foremost common diseases affecting the aging man with, almost 80% of the lads greater than 70 affect [1]. BPH is caused by unregulated proliferation within the prostate, which may cause physical obstruction of the prostatic urethra and end in anatomic bladder outlet obstruction (BOO) [2]. Transurethral resection of the prostate (TURP) has been the historical gold standard up till now to which all endoscopic procedures for BPH are compared with a mean hospital stay of three days) [3] [4]. This surgery although efficacious has been related with increased morbidity and increased day case failure rates as compared to newer techniques [5]. This morbidity is related to many complications like prolonged postoperative catheterization, high retreatment rates and prolonged hospital stay which translates to increased cost of BPH management. These shortcomings have prompted the utilization of newer methods like Transurethral enucleation and resection of the prostate (TUERP), Holmium laser enucleation of the prostate (HoLEP) and Thulium laser enucleation of the prostate (ThuLEP) [6]. These newer techniques are associated with an improved success in day case surgery mainly thanks to less perioperative bleeding, it takes advantage of the distinct anatomical planes to enucleate the whole transition zone with improved outcomes like shorter hospital stay, enucleation of BPH regardless of size and shorter catheterization times [7]. This review will discuss the enucleation techniques, benefits and the predictive factors for a successful day case prostate surgery.

## 2. New Techniques

Classical TUERP was first described in 2006 performed using the plasma kinetic bipolar system with normal saline irrigation, under spinal or general anesthesia [8]. All surgeries were performed or closely supervised by an equivalent surgeon. Preprogrammed power settings for cutting (180 W) and coagulation (80 W) were used. Preliminary cystoscopy was done employing a 20-F-sized sheath, to assess both prostate size and shape, and visualize landmarks (including the 2 ureteric orifices and therefore the verumontanum). A 26-F-sized resectoscope was then introduced, and the TUERP procedure was performed as described

within the following paragraph.

The distal margin of the prostate lobes is marked with a cutting loop. Starting with the median lobe, the mark between the 5 o'clock and 7 o'clock positions is deepened right down to the surgical capsule. Next, the incision just proximal to the verumontanum is deepened in order that the plane between the adenoma and false capsule (*i.e.* the compressed normal prostatic tissue) might be identified with a thick resectoscope loop. The tip of the resectoscope is then inserted to further develop this plane. The adenoma is gradually dissected far away from the capsule within the avascular plane, toward the bladder neck, until the circular fibers of the bladder neck were seen. The perforating vessels are diathermied at the source and cut. Bleeding points noted during this mechanical dissection is definitely controlled with coagulation. The median lobe, which remains attached to the bladder neck, is then resected. The plane between the lateral lobe and false capsule is developed during a similar manner and resected. No morcellator is employed, the chips are then evacuated employing a bladder evacuator. On completion, a three-way Foley catheter is inserted and continuous bladder irrigation initiated. Bladder irrigation is kept overnight or until the effluent is obviously clear. Once the irrigation is stopped, the catheter is removed after two days, or when the urine is not bloody or had only a light pink coloration.

There are two main sorts of laser enucleation, HoLEP and ThuLEP with same principle and similar steps for both procedures, this text will describe ThuLEP method which is a current laser technique [9]. 26 French (Fr) continuous flow resectoscope with a laser bridge adapter and an endoscopic camera are used. The laser fiber is passed through a 6Fr open-ended ureteral catheter, a 100-Watt Thulium laser with an end-firing 550-micron laser fiber are used with settings at, 30 watts for coagulation and 87.5 watts for cutting. After enucleation is completed, a morcellator is used to clear the bladder of any prostatic tissue.

The ThuLEP procedure can be divided into five distinct steps which should be followed meticulously for complete and safe removal of the entire prostate adenoma and for adequate haemostasis. Preparation of the patient the patient is placed in the lithotomy position with the legs moved laterally. After sterile preparation and draping, the urethra is irrigated with sterile gel. The 26 F continuous flow resectoscope is inserted into the bladder under vision so as to avoid urethral or prostatic trauma. The camera should be fixed in a loose position. Finally, the 550 micron laser fibre is inserted through the working channel of the resectoscope. It might be helpful to guide the loose part of the laser fibre through a mosquito clamp, thereby fixing the fibre to the draping and keeping it out of the working area of the surgeon. The outflow channel should always be open during the enucleation procedure for prevention of bladder overdistension. Cystoscopy is performed to exclude concomitant bladder pathologies and visualize the ureteral orifices. The resectoscope is then pulled back into the prostatic urethra, the bladder neck and the extent of lobar protrusion is assessed. Finally, the positions of the verumontanum and the borders of the external urethral sphincter are determined.

The first step in the three-lobe technique is circumferential incision of the verumontanum in which an inverted U-incision close to the verumontanum is carried out using the 70 - 90 W power setting of the laser. The incision of prostatic tissue reaches until the distal third of the verumontanum. After incision of the mucosa, the incision is deepened till the surgical capsule of the prostate is reached.

The second step is the removal of the prostatic median lobe in which the prostatic median lobe is removed separately before enucleation of the lateral lobes. Bilateral bladder neck incisions close to the lateral margins of the prostatic median lobe are made approximately at the 5 and 7 o'clock positions. This incision is extended until the hemi-circumferential incision at the verumontanum and then deepened till the surgical capsule becomes visible which can clearly be identified as a white layer with superficial vessels. At this level, blunt retrograde enucleation of the prostatic median lobe is started while the laser energy is switched to 30 W. The resectoscope is moved under the edge of the median lobe and bluntly shifted towards the 12 o'clock direction, thereby mechanically disrupting the plane between surgical capsule and prostatic adenoma. During blunt disconnection, visual control of the surgical capsule and laser coagulation of perforating vessels at 30 W is necessary. Shifting and disconnection of the adenoma from the surgical capsule and coagulation of crossing vessels is continued until the bladder neck is reached. After complete disconnection of the median lobe from the surgical capsule, the liberated lobe is pushed into the bladder.

The third step is the apical incision of the lateral lobes in which the distal margin of the adenoma at the 12 o'clock position is marked and incised by the Thulium laser using 30 W. From the incision next to the verumontanum, two superficial incisions towards the 4 and 8 o'clock positions are carried out using the Thulium laser at 30 W. Superficial incisions with low laser energy prevents mucosal bleeding and ensures good visualization for the next steps.

The fourth step is the removal of the lateral lobes in which the lateral lobes are removed separately, beginning with the left lobe. The apical edges of the lateral lobes are then bluntly exposed by moving the resectoscope under the adenoma and pulling these towards the 2 o'clock position, thereby exposing the apical border of the surgical capsule. After the apical plane is opened, the entire lateral lobe is bluntly and progressively released towards the bladder neck. Because of the blunt dissection of the lateral lobes, the prostate is often ventro-caudally attached. This attachment appears like a broad mucosal band and must be dissected with low laser energy and not bluntly disrupted to prevent tearing at the apex and surrounding sphincter. Again, the surgical capsule can be easily identified by visualizing the small vessels which run in a parallel fashion next to the dissection plane. These vessels remain untouched unless they perforate the capsule and, in such cases, coagulation of capsule perforating vessels is performed with low laser energy in no-touch technique. The released lobe is then dissected from the bladder neck from the 12 to the 4 o'clock position and, afterwards, from the 6 to 4 o'clock position. After complete release from the surgical cap-

sule, the left lateral lobe is pushed into the bladder. The identical procedure is then identically repeated on the right side.

The last and fifth step is morcellation and removal of the prostatic tissue in which the rotating inner sheath and the working element of the laser armamentarium is replaced by a long nephroscope attached to the adapter and the morcellator with 5 mm blades is inserted through the resectoscope into the bladder. Continuous irrigation and a fully distended bladder are needed to avoid unintentional trauma to the bladder wall. Complete fragmentation of the prostatic adenoma in the bladder is carried out using combined morcellation and suction. The procedure is completed by removal of the instruments and insertion of a 22 F urethral catheter.

There have been some recent updates to both the ThuLEP technique and the equipment utilized. Newer techniques include complete en block enucleation and the more commonly used two lobes enucleation technique [10]. The two lobes enucleation technique, the median lobe is undermined at the capsular level and is enucleated with the lateral lobe as one unit. Initial reports on these newer techniques suggest a decrease in both enucleation and total operative time, and easier identification of the surgical capsule [11] [12]. Another big change in operative efficiency has come from the improvements in the type of morcellators available. Versacut, by luminis, was the first morcellator used with ThuLEP. Piranha, by Wolf, is the newer perhaps more advanced morcellator is also available. The versacut has reciprocating blades which are controlled by a foot pedal, while the Piranha has oscillating blades which rotate at a selected rate. The suction mechanism is different for each as well, with the luminis allowing for continuous suction with or without morcellation, while the Wolf only provides microbursts of suction. Studies have compared the two morcellators [13] [14]. Comparisons revealed similar results between the two, though the Piranha had a lower cost of use and higher rates of morcellation with a negligible learning curve. Most ThuLEP surgeons prefer the Piranha to the VersaCut due to an advanced ergonomic design, efficient tissue removal properties and its safety profile. Lastly, recent improvement in laser technology in the form of ThuLEP which is a continuous wave as opposed to HoLEP which is a pulse wave provides a quicker enucleation, effective coagulation and 9 times lesser energy consumption.

The many expected advantages of TUERP, HoLEP and ThuLEP begin with a lower risk of hospital infections and thromboembolism and can lead to a satisfactory feeling linked to an early return home and the rapid resumption of activities as shown on **Table 1**.

**Table 1** summaries the benefits of TUERP, HoLEP and ThuLEP for a day-case Prostate.

### 3. Predictive Factors

Five relevant studies were selected from 2011 till date concerning the factors

**Table 1.** Characteristics of the study population chronologically divided into 3 different groups (group 1 from January 2013 to July 2015, group 2 from August 2015 to June 2017 and group 3 from July 2017 to February 2019).

	Group 1 ( <i>n</i> = 88)	Group 2 ( <i>n</i> = 89)	Group 3 ( <i>n</i> = 89)	<i>p</i> -value
AGE	65.5 (±7.93)	66.8 (±6.86)	68.3 (±7.74)	0.042
ASA	2	2	2	ns
BMI (kg/m <sup>2</sup> )	26.2 (±3.54)	26.6 (±3.78)	26.1 (±4.16)	ns
PSA (ng/ml)	4.79 (±4.24)	6.01 (±6.29)	5.08 (±4.06)	ns
Qmax (ml/s)	8.51 (±4.25)	8.55 (±3.77)	8.99 (±4.27)	ns
PVR 9 (ml)	144 (±142)	120 (±112)	127 (±124)	ns
IPSS	19.1 (±7.04)	17.9 (±6.36)	17.1 (±6.68)	ns
Prostate volume (ml)	75.7 (±34.1)	85.2 (±44.1)	79.5 (±45.1)	ns
Patients with prostate volume > 90 (ml)	31 (37%)	29 (36%)	28 (33%)	ns
Operation time (minutes)	77.0 (±30.8)	60.4 (±24.5)	55.4 (±24.0)	<0.001
Resection tissue weight (g)	44.2 (±33.6)	50.4 (±33.8)	42.4 (±27.9)	ns
Delivered energy (kj)	95.2 (±49.8)	84.0 (±38.7)	77.9 (±45.4)	0.041
Indwelling catheter before surgery	5 (5.7%)	8 (9.9%)	9 (10%)	ns
Antiplatelet therapy	7 (8%)	15 (17%)	17 (19%)	ns
Day-case success	62 (70%)	75 (84%)	77 (87%)	0.014

Mean (± standard deviation);  $\Psi$  Median Bold indicates  $p < 0.05$ . ASA = American Society of Anesthesiologists; BMI = Body Mass Index; PSA = Prostate Specific Antigen;  $Q_{\max}$  = Maximum Urinary Flow Rate; PVR = Postvoid Residual; IPSS = International Prostatic Symptom Score, ns = Not Significant Klein *et al.* 2021.

influencing a day case prostate surgery with details described below, one prospective and four retrospective studies were carried out in France, Italy, United Kingdom and United States of America as shown in **Table 2**. A total of 1760 BPH patients underwent a day case surgery and 1074 patients were successfully discharged on the same day with no readmissions giving a success rate of 61%. The factors that were studied and found significant included the surgeon's experience, age, prostate size, early morning surgery, operation time and ASA score.

A retrospective review of all consecutive day-case holmium laser enucleation of the prostate (HoLEP) performed by a single surgeon between January 2013 and February 2019 using a prospective database revealed that the surgeons experience seems to be crucial to improve perioperative outcomes and prostate volume of less than 90 cc is associated with a higher success rates of day case surgery [15]. Day-case success was defined as discharge within less than 12 hours from admission without any readmission within 48 hours after discharge. A total of 266 patients were retrieved and dispatched as follows: group 1 ( $n = 88$ ) from January 2013 to July 2015, group 2 ( $n = 89$ ) from August 2015 to June 2017, and

**Table 2.** Influential day case prostate surgery factors.

Authors, Publications, Location	Study design	Time of enrollment, year	Patient with BPH, <i>n</i>	Managed as day case surgery, <i>n</i> (%)	Influential day case surgery factors
Klein <i>et al.</i> France	Retrospective cohort	2013-2019	266	214 (80.5%)	The surgeon's experience was associated with day case success while day-case failure was prostate volume greater than 90 cc
Lee <i>et al.</i> United Kingdom	Retrospective cohort	2013-2016	210	74 (35%)	Two factors were significantly associated with successful day case surgery: small volume prostate and morning theatre lists
Italy	Prospective study	2011-2013	53	53 (100%)	A 1-day surgery showed that a short operation time of 71 minutes and a small prostatic adenoma volume of 56 cc was associated very high success rate of a day surgery which was estimated at 14.8 hours
Agarwal <i>et al.</i> USA	Retrospective cohort	2013-2017	30	27 (90)	Positive predictive factors were younger age, low ASA score, shorter enucleation time, shorter resection time and in patients who did not use anticoagulants
Mouton <i>et al.</i> France	Retrospective cohort	2012-2016	1201	706 (58.7%)	Younger age, ASA score, large prostate volume, anticoagulant intake, urologist experience and operation time were key factors for a successful day case surgery
TOTAL			1760	1074 (61%)	

group 3 ( $n = 89$ ) from July 2017 to February 2019. The overall success rate was 80.5% (214/266) over the study period. It significantly improved over time from 70% in group 1 to 84% in group 2 and 87% in group 3 ( $p = 0.014$ ). In the meantime, the operating time and the total energy delivered to the tissue decreased from 77 minutes in the first group to 60.4 minutes in the second group and 55.4 minutes in the third group ( $p < 0.001$ ), and from 95.2 kJ in the first group to 84 kJ in the second group and 77.9 kJ in the third group ( $p = 0.041$ ). On multivariate analysis, the only risk factor significantly associated with day-case failure was prostate volume greater than 90 cc (odds ratio = 2.041,  $p = 0.047$ ).

Patients presenting for HoLEP by a single surgeon from September 2013 to September 2016 were considered for day-case surgery which revealed that two factors were significantly associated with successful day case surgery: small volume prostate and morning theatre lists [15] [16]. In total, 210 patients (mean age  $70.3 \pm 8.5$  years) underwent HoLEP, with 74 (35.3%) discharged as true day-cases and a further 84 (40.0%) discharged within 23 hours. Readmission rate was 5.5%, with all complications Clavien-Dindo grade I or II. Factors associated with successful day-case operation included low-volume prostates ( $\leq 40$  g) (odds ratio, OR, 3.097, 95% confidence interval, CI, 1.619 - 5.924,  $P = 0.0001$ ) and morning surgical lists (OR 6.124, 95% CI 2.526 - 14.845,  $p < 0.001$ ).

From September 2011 to September 2013, a prospective study on 53 patients who underwent surgery with ThuLEP in a 1-day surgery showed that a short operation time of 71 minutes and a small prostatic adenoma volume of 56 cc was associated very high success rate of a day surgery which was estimated at 14.8 hours [17]. No complications or readmissions were recorded.

The exponential development of the day-case procedures seems to be linked with the advent of laser technology. 92% of day case surgeries in France in 2016 were Laser surgeries and only about 8% were non laser [18]. This tendency is expected to increase in the coming years according to the spreading of laser surgery. In a similar retrospective study of 473 adult males who underwent HoLEP from July 2018 to December 2019 at a tertiary referral center and high-volume HoLEP hospital, same day discharge was possible in 87.4% of the patients and positive predictive factors were younger age, low ASA score, shorter enucleation time, shorter resection time and in patients who did not use anticoagulants [19]. Patients with longer morcellation times and with post-procedure hematuria with clots were more likely to have an unplanned admission and were the main reason for a failed successful day case surgery.

It was demonstrated in a single-center HoLEP procedures performed between January 1, 2012 and December 31, 2016 that; age, ASA score, large prostate volume, anticoagulant intake, urologist experience and operation time were key factors for a successful day case surgery [19] [20]. Age, at procedure ( $P = 0.019$ ), an ASA score  $> 2$  ( $P = 0.0019$ ), a high prostatic volume ( $P = 0.011$ ), an anticoagulant intake ( $P \leq 0.0001$ ), a poor-urologist experience ( $P = 0.048$ ) and a long operative time ( $P = 0.0144$ ) were at risks of complications.

#### 4. Discussion

The successful transfer of a standard inpatient operation to a day-case procedure demands that the treatment is equally effective, are often safely delivered which the patients are carefully selected to realize favorable outcome. TURP is the gold standard for the surgical relief of BPH. More advanced procedures designed to facilitate shorter hospitalization and particularly a successful day case surgery, e.g., TUERP, HoLEP and ThuLEP, have all shown to be superior to TURP with a future re-operation free rate of 95% at 10 years [21]. A successful outcome to the relief of prostatic obstruction requires adequate tissue removal as demonstrated in these newer techniques. The utilization of higher laser energy settings is related to a far better coagulation leading to the increase success rate of day case prostate surgery as confirmed from some studies [22] [23] [24] [25] [26]. For the urologists, these are exciting technological advances; except for the patients, these might merely be strings of medical jargon, as they are more concerned about whether the improvements in the urinary tract symptoms are going to be significant and sustainable after surgery, whether the clinical safety is assured, whether they require prolonged hospitalization and whether their hospital bills are often reduced from a successful day case surgery. Day case BPH surgery

leading to early discharge is an effort to translate the technological advances of enucleation into actual clinical outcomes that patients can appreciate. Overall, from **Tables 1-3** and **Figure 1**, the surgeons experience and a little prostate size is found to be the foremost important factor for a successful day case BPH surgery meanwhile, hematuria with clot is the most vital factor for failure.

**Table 3.** Advantages of TUERP, HoLEP and ThuLEP for a day-case prostate surgery.

Arthur(s)	Title	Year	Publication	Laser System	Advantage
Scoffon <i>et al.</i>	The en-bloc no-touch holmium laser enucleation of the prostate (HoLEP) technique. World J Urol.	2016	World J Urol. 34(8): 1175-1181.	Lumenis Pulse 100H and 120H	The en-bloc no-touch technique has the potential to ease some difficult intraoperative steps and to improve the learning curve of HoLEP.
Liu <i>et al.</i>	Transurethral enucleation and resection of prostate in patients with benign prostatic hyperplasia by plasma kinetics.	2010	J Urol. 184(6): 2440-2445.	Lumenis Pulse 120H	HoLEP treatment of benign prostatic hyperplasia could achieve the advantages of open surgery the same effect. It had fewer damage, faster recovery, fewer complications, and is a good treatment option.
Klein <i>et al.</i>	Evolution of Day-case HoLEP Success Rate Over Time.	2020	J Endourol. 81(3): 62-73.	Lumenis Pulse 100H	HoLEP is a reliable and safe procedure with a high success rate improving over time.
Pirola <i>et al.</i>	Holmium laser versus thulium laser enucleation of the prostate: a matched-pair analysis from two centers. Therapeutic advances in urology.	2018	Urology. 10(8): 223-233.	Lumenis Pulse 120H	Both HoLEP (100 W) and ThuLEP (110 W) relieve lower urinary tract symptoms in a comparable way with high efficacy and safety, with negligible clinical differences.
Lwin <i>et al.</i>	Holmium Laser Enucleation of the Prostate is Safe and Feasible as a Same Day Surgery.	2020	Urology. 138: 119-124.	Lumenis Pulse 120H	Same-day outpatient surgery for HoLEP is both safe and feasible and should be considered regardless of prostate size, comorbidities, age, or anticoagulation status.
Muhsin <i>et al.</i>	Feasibility of Holmium Laser Enucleation of the Prostate as a 1-day Surgery.	2019	World J Urol. 38(4): 1017-1025.	Lumenis Pulse 120H	HoLEP has proven successful as a same-day procedure with good safety profile in selected patients.
Lee <i>et al.</i>	Day-case Holmium Laser Enucleation of the Prostate: Feasibility, Safety and Predictive Factors.	2018	Ann R Coll Surg Engl. 100(6): 475-479.	N/A	Same-day HoLEP is both feasible and safe, with low readmission rates.
Minagawa <i>et al.</i>	En-Bloc Technique with Anteroposterior Dissection Holmium Laser Enucleation of the Prostate Allows a Short Operative Time and Acceptable Outcomes. Urology.	2015	Urology. 86(3): 628-633.	Lumenis Pulse 120H	A short operating time and may address concerns regarding the complexity of the enucleation procedure.

Continued

Comat <i>et al.</i>	Day-Case Holmium Laser Enucleation of the Prostate: Prospective Evaluation of 90 Consecutive Case.	2017	JJ Endourol 31(10): 1056-1061.	Lumenis Pulse 100H and 120H	Same-day HoLEP has proven successful regardless of prostate volume, and may be performed by a trained surgeon with an appropriate patient selection.
Rapopo <i>et al.</i>	En bloc holmium laser enucleation of the prostate (HOLEP EN BLOC): Our experience.	2018	Urologiia 65(3): 83-87.		HoLEP is a safe, highly efficacious and a size-independent procedure.
Tayeb <i>et al.</i>	Wolf Piranha Versus Lumenis VersaCut Prostate Morcellation Devices: A Prospective Randomized Trial.	2016	J Urol. 195(2): 413-417.		Piranha is more efficient in tissue removal
Rivera <i>et al.</i>	A Survey of Morcellator Preference and Cost Comparison of the Lumenis VersaCut and Wolf Piranha Morcellators.	2018	Urology. 111: 54-58.		Significant improved efficiency and improved cost savings utilizing the Piranha morcellator even when controlling for disposable costs
Deng <i>et al.</i>	Bipolar plasmakinetic transurethral enucleation and resection versus bipolar plasmakinetic transurethral resection for surgically treating large (≥60 g) prostates: a propensity score-matched analysis with a 3-year follow-up	2021	Urology and nephrology 73(3): 376-383.		For patients with large (≥60 g) prostates, BP-TUERP and BP-TURP are safe options, but the former is a more effective choice in long-term follow-up outcomes. BP-TUERP is related to reduced CT and hemoglobin decrease with more removal of prostatic tissue at the expense of longer OT than BP-TURP.

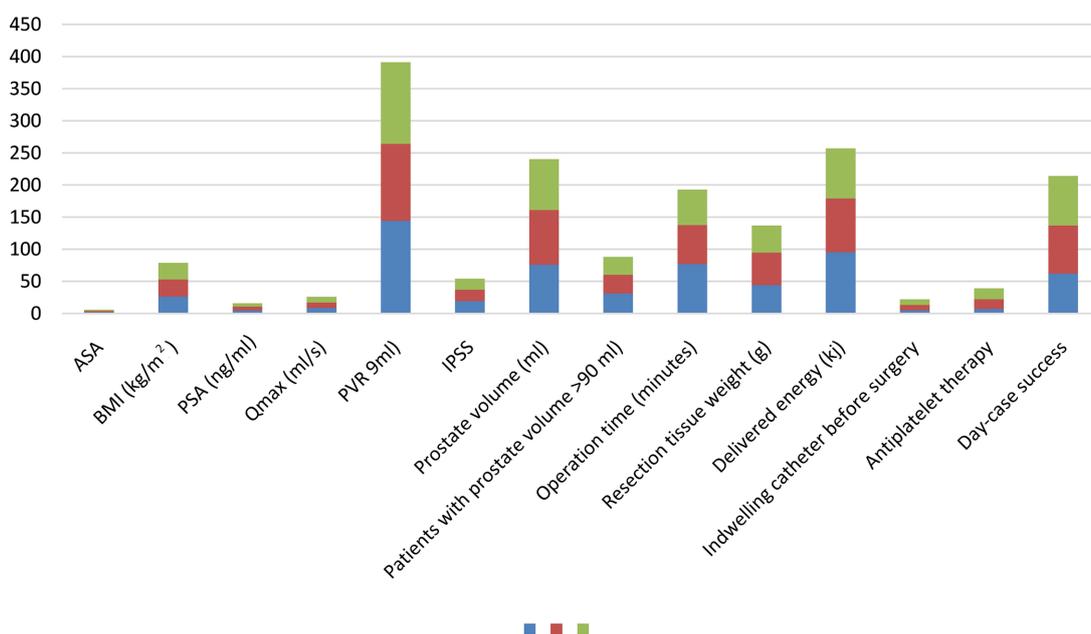


Figure 1. Evolution of day case success over time.

## 5. Conclusion

In conclusion, TUERP and laser enucleation techniques are durable and effective treatment for patients affected by LUTS due to BPH during a day case setting. The AUA guidelines highlight this by recommending laser enucleation as a size independent treatment option for those with moderate to severe symptoms from BPH. The literature shows that TUERP may be a superior solution to TURP for day case prostate surgery, meanwhile ThuLEP is superior to HoLEP in some respect with more favorable outcomes during a successful day case surgery. While there are some limitations to those newer techniques, such as the steep learning curve and high rate of retrograde ejaculation, these procedures have an outsized literature showing its efficacy and favorable outcomes in day case surgery. This research shows that the surgeons experience, the age of the patient, prostate size, operation time, anticoagulant intake, the ASA score and morning theatre list are predictive factors for a successful day case BPH surgery, with an overall success rate of 61%.

## Conflicts of Interest

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

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# Knowledge, Attitude and Practice of General Practitioners on Circumcision and Its Complications in the District Hospitals of the Center Region

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## Abstract

**Background:** The complication rate of circumcision in medical settings is between 0.4% and 2.0%. Circumcision accidents constituted 2.0% of urological emergencies at the Yaoundé Central Hospital. **Aim:** To assess the level of knowledge, attitudes and practices of general practitioners on circumcision and its complications in Central Region District Hospitals. **Population and Methods:** We conducted a multicenter descriptive cross-sectional study the CAP (Knowledge, Attitudes and Practices) type. Which took place from March 9 to June 30, 2021 (16 weeks). We included 138 physicians. The variables collected were: socio-demographic characteristics, knowledge about circumcision and its complications, attitudes towards circumcision and its complications, practices towards circumcision and its complications. **Results:** In our study, the median age of the study population was 29 years, the sex ratio (M/F) was 0.8. The median ideal age to perform circumcision was 12 months. In our study, 94.9% of general practitioners clearly identified bleeding disorders as a contraindication for circumcision. The material needed to be used to perform a circumcision was ignored by 81.2% of general practitioners. The global knowledge assessment showed that 68.9% of participants had unsatisfactory knowledge about circumcision and its complications. Before circumcision, 91.3% general practitioners first recommended effective disinfection of the operating field, and 83.3% used sterile equipment. Faced with a hemorrhage, 61.6% of general practitioners proposed surgical exploration in the face of rebellious bleeding. 60.2% of general practitioners had bad attitudes towards circumcision and its complications. In our study, 49.2% of the general practitioners questioned did not know the normal procedure for

performing a circumcision. Forty-one (29.7%) general practitioners had never performed a circumcision. The median occurrence of a complication during circumcision was 2 times. Bleeding was the most common early postoperative complication (89.2%) in general practitioner practice during circumcision.

**Conclusion:** The majority of general practitioners have not received formal education on circumcision.

## Keywords

Knowledge, Attitude, Practice, Circumcision, Posthectomy

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## 1. Introduction

In its most common form, the term circumcision (posthectomy) designates the total or partial removal of the foreskin [1]. It is practiced on all continents and according to the WHO 30.0% of the world's male population over the age of fifteen is circumcised [2]. Posthectomy is a surgical procedure indicated for surgical conditions or for the reduction of transmission of Human Immunodeficiency Virus (HIV) from women to men [3] [4] [5]. But most often, it is performed as part of a religious, ethnic or social ritual by personnel of various qualifications: traditional circumcisers, nurses, doctors [2] [6] [7]. Still classified under the rubric of "minor surgery", circumcision carries immediate health risks and can lead to serious complications. The complication rate in medical settings is between 0.4% and 2.0%. On the other hand, outside any medical environment, the complication rate is much higher and could reach 35.0% to 48.0% [2]. Owon'Abessolo *et al.* in 2020 found that circumcision accidents constituted 2.0% of urological emergencies at the Yaoundé Central Hospital [8]. The heavy surgical procedures indicated for the correction of complications justify that circumcision, if it is not reserved for expert hands, should be supervised when it is performed [9]. No similar study has been published. Thus, in order to establish a framework for better training of people empowered to perform circumcision; in order to establish a framework for a better training of people authorized to perform circumcision, we carried out this study in order to assess the level of knowledge, attitudes and practices of general practitioners on circumcision and its complications in Central Region District Hospitals.

## 2. Population and Methods

We conducted a multicenter descriptive cross-sectional study of the CAP (Knowledge, Attitudes and Practices) type which took place from March 9 to June 30, 2021 (16 weeks). Our study covered 25 District Hospitals of the Central Region chosen by lot. The study population were general practitioner, out of 189 physicians. We included 138 physicians present and having agreed to participate in the study. This recruitment was done according to the non-probability sampling model; and the data were collected in four stages: The first being based on the

selection by lot of 25 district hospitals out of 29 present. The second stage was based on the distribution of work by district hospital; 5 working days in some and 3 working days in others. The third step included the list of general practitioners and the fourth step, the strategy of inclusion of the study populations. The variables collected were: socio-demographic characteristics: age, sex, region of origin, marital status, religion, number of years of service; knowledge about circumcision and its complications; attitudes towards circumcision and its complications; practices regarding circumcision and its complications. We entered the data in Census and Survey Processing System (CSPro) version 7.5 analysis software and analyzed using Statistical Package for Social Science (SPSS) version 23.0.

### 3. Results

#### 3.1. Socio-Demographic Characteristics

Table showing the distribution of the study population by age group, sex, region of origin and number of years of service in age group.

Variables	Number (N = 138)	Percentage (%)
<b>Age groups (in years)</b>		
[25 - 30]	85	61.6
[30 - 35]	48	34.8
≥35	5	3.6
<b>Sex</b>		
male	64	46.4
female	74	53.6
<b>Region of origin</b>		
Center	52	37.7
West	30	21.7
Littoral	12	8.7
South	12	8.7
East	10	7.2
Far North	8	5.8
North-West	5	3.6
South-West	4	2.9
Adamaoua	3	2.2
North	2	1.4
<b>Number of years of service in age groups (in years)</b>		
<2	19	13.8
[2 - 4]	88	63.8
[4 - 6]	27	19.6
≥6	4	2.9

In our study, the median age of the study population was 29 years with an interquartile range of [28 - 30] years; a minimum of 25 years and a maximum of 38 years; and more than half (61.6%) were between 25 and 30 years old. The sex ratio (M/F) was 0.8 in favor of the female sex. The region mainly represented was that of the Center (37.7%).

General practitioners had a median professional length of service of 3 years with an interquartile range of 2 to 3 years; a minimum of 1 year and a maximum of 8 years; and more than half (63.8%) had between two and four years of service.

### 3.2. Knowledge Assessment

The majority (99.3%) of general practitioners knew how to define circumcision. The median ideal age to perform circumcision was 12 months with a minimum of 0.25 months and a maximum of 144 months. Eighty-two (59.6%) general practitioners thought it was better to perform circumcision after the neonatal period (after one month of life). One hundred and one (73.2%) revealed that they had acquired their knowledge from colleagues. In our study, 94.9% of general practitioners clearly identified bleeding disorders as a contraindication for circumcision. 73.9% and 63% respectively identified anemia and skin infection in the penis as a contraindication. The material needed to be used to perform a circumcision was ignored by 81.2% of general practitioners. In our study, 58.0% general practitioners revealed that complications from circumcision were very common in their work environment. The most well-known complication of circumcision (94.9%) by general practitioners was hemorrhage, followed by infection (87%), and amputation traumatic glans (75.4%). The global knowledge assessment showed that 68.9% of participants had unsatisfactory knowledge about circumcision and its complications. **Table 1** presents the overall assessment of general practitioners.

### 3.3. Attitude Assessment

Forty-three (31.2%) general practitioners rarely explained the procedure to parents before performing the procedure. Before circumcision, 91.3% general practitioners first recommended effective disinfection of the operating field, and 83.3% used sterile equipment. Faced with a hemorrhage, 61.6% of general practitioners proposed surgical exploration in the face of rebellious bleeding. Faced with an infection, 63.8% recommended debridement of necrotic and infected tissues under anesthesia. Faced with an amputation of the glans when performing a circumcision, 29.7% thought that an attempt should be made to re-implant the distal end of the organ. After circumcision, 87.7% general practitioners first offered counseling relating to compliance with care in the postoperative period. The overall assessment of attitudes is presented in **Table 2**. It shows that 60.2% of general practitioners had bad attitudes towards circumcision and its complications.

**Table 1.** Global assessment of the knowledge of general practitioners.

Levels of knowledge	Points to answer Maximum score n = 7		All respondents N = 138	
	Score obtained (n)	Score obtained (%)	Workforce (N)	Percent (%)
Bad	0 - 1	0 - 24	13	9.5
Insufficient	2 - 3	25 - 49	82	59.4
Average	4 - 5	50 - 69	41	29.7
Good	6 - 7	70 - 100	2	1.4

**Table 2.** Global assessment of the attitudes of general practitioners.

Level of attitudes	Points to answer Maximum score n = 7		All respondents N = 138	
	Score obtained (n)	Score obtained (%)	Workforce (N)	Percent (%)
Bad	0 - 1	0 - 24	20	14.5
Wrong	2 - 3	25 - 49	63	45.7
Approximate	4 - 5	50 - 69	52	37.7
Fair	6 - 7	70 - 100	3	2.1

### 3.4. Practice Evaluation

In our study, 49.2% of the general practitioners questioned did not know the normal procedure for performing a circumcision. Forty-one (29.7%) general practitioners had never performed a circumcision. Of these, 80.5% (33) said they were not fit or able to perform circumcision. Forty-five (46.4%) general practitioners never requested a preoperative assessment before performing a circumcision. Seventy-six (78.4%) general practitioners never requested a pre-anesthetic consultation before performing a circumcision. Seventy-four (76.3%) general practitioners performed the circumcision with the assistance of an assistant. Thirty-six (37.1%) general practitioners were unaware of the technique they used during a circumcision. Eighty-two (84.6%) general practitioners used local anesthesia to perform a circumcision. Seventy (72.2%) performed circumcision usually in the hospital in a minor surgery room. Forty-two (43.3%) performed less than 5 circumcisions per year. The median number of circumcisions performed per year was 5 times with an interquartile range of 3 to 20 times; a minimum of 3 times and a maximum of 20 times. Sixty-nine (71.1%) used the antiseptics for the dressing. Fifty-nine (60.8%) performed the dressing 2 days after circumcision. The median time to dressing was 2 days with an interquartile range of 2 to 3 days; a minimum of 1 day and a maximum of 7 days. Eighty-seven (89.7%) general practitioners performed the dressing in the minor surgery room. Thirty-seven (38.1%) had already had a complication when performing a circumcision. The median occurrence of a complication during cir-

cumcision was 2 times with an interquartile range of 1 to 3 times; a minimum of 1 time and a maximum of 5 times. Bleeding was the most common early post-operative complication (89.2%) in general practitioner practice during circumcision. Deformation of the penis was the most common late postoperative complication (18.9%) in general practitioner practice during circumcision. Seventeen (46.9%) of the general practitioners who had had a complication while performing the circumcision were slightly uncomfortable in managing the bleeding. Thirty-three (89.2%) were very uncomfortable in the management of traumatic glans amputation as well as urethral fistula. In total, 47.5% of the participants had an inadequate practice with regard to circumcision and its complications. The evaluation of the participants' practice is presented in **Table 3**.

#### 4. Discussion

The majority of general practitioners who participated in the study were women. This reflects the sex ratio at the level of higher education in Cameroon. On the other hand, according to Ekenze *et al.*, in Nigeria, there were more men (85.3%) than women [10]. The young age of the participants explained why professional seniority was reduced with a median of 3 years.

Almost all of the participants knew how to define circumcision. However, the contraindications for circumcision were not sufficiently known. The *et al.* found that no participant could correctly identify all the contraindications for circumcision [11]. The majority of general practitioners recommended having the child circumcised after the neonatal period. Machmouchi *et al.* in their series in Saudi Arabia in 2007 found that circumcision at 5 months resulted in significantly fewer serious complications than circumcision in the neonatal period [12]. However, circumcision in the neonatal period is favored by Warner [13]. According to Mouafo in Cameroon in 2012, the variability of age can be explained by the fact that in African countries, the age of circumcision is dependent on the habits and customs of the populations. Thus in our environment, circumcision is practiced late in early childhood and constitutes a sacred act which confers on the child the recognition of his belonging to the male sex, and the anticipation of a flawless sexuality to the child adulthood [14]. Complications of circumcision are very common in our study. This corroborates what Sylla found, who explained this by the fact that circumcision was still carried out in the vast majority

**Table 3.** Global assessment of the practices of general practitioners.

Level of practices	Points to answer Maximum score = 8		All respondents N = 138	
	Score obtained (n)	Score obtained (%)	Workforce (N)	Percent (%)
Harmful	0 - 2	0 - 24	8	8.2
Inadequate	3 - 4	25 - 49	46	47.5
Adequate	5 - 8	50 - 100	43	44.3

of cases, in a traditional way or by unqualified paramedical agents. The knowledge of general practitioners about circumcision and its complications was insufficient. This knowledge came mainly from colleagues and not from basic or continuing education. While, Ekenze *et al.* in Nigeria in 2015 found that 36.2% had received formal training in circumcision [10]. In the USA, Le *et al.* revealed that 44.0% had received formal training [11]. Demaria *et al.* emphasized the importance of proper training and follow-up [15].

Our study shows that the general practitioners questioned rarely explained the procedure to parents before performing the procedure. According to the American Academy of Pediatrics in 2012, clinicians should explain the potential benefits and risks of circumcision before circumcision is performed [16]. The attitude of doctors to a complication was often inadequate. Surgical exploration for intractable bleeding was not the rule for all participants. Surgical management for an infection or glans amputation was not known to all general practitioners. The majority of the doctors questioned proposed firstly to do a “counseling” relating to the respect of care in the postoperative period, then to carry out the dressing only in the hospital, and finally to prohibit the application of vegetable substances on the circumcision wound. This is consistent with what the American Academy of Pediatrics recommended in 2012 [16]. Overall, the majority of respondents had bad attitudes towards circumcision and its complications, which reflects their lack of initial and continuing training.

Half of the participants could not describe the normal procedure for performing a circumcision. A significant proportion of physicians performing circumcision were unaware of the technique they had used. According to Ekenze *et al.* a significant proportion of physicians faced with circumcision felt that their training was not optimal enough [10]. The average number of circumcisions performed per year was low. According to Demaria *et al.* 48.0% of non-surgeons performed more than 50 circumcisions per year [15]. This can be explained by the fact that in our environment circumcision is much more practiced by paramedics and traditional circumcisers in out-of-hospital settings. Local anesthesia was the most used. Dorsal penile nerve block with ring block is the most effective technique for providing anesthesia during neonatal circumcision [17]. In our survey, 38.1% of general practitioners who performed circumcision had already had a complication at least once. In a series including 29 cases of circumcision complication, Diabaté *et al.* had objectified 7.0% of circumcisions made by doctors [18]. According to the participants, 16.2% were comfortable during the management of the bleeding, none were comfortable during the treatment of the stenosis of the urethral meatus versus 63.0% and 10.0% respectively of non-surgeons according to Demaria *et al.* in Canada [15]. According to Mouafo *et al.* in his study in 2016 on circumcision accidents at the gynecology-obstetrics and pediatric hospital in Yaoundé, the accidents generated by the untimely practice of circumcision in our environment are numerous and serious enough for circumcision to be considered an act surgery in its own right [9]. Faced with the observation of inadequate practices vis-à-vis circumcision and its complications,

the time has come to study the proposals of authors such as Dieth *et al.* in Côte d'Ivoire in 2008 which would consist of integrating circumcision into the programs of medical students [19]. Because of the limitation of our study, we were unable to go through all the 28 District Hospitals of the Central Region. The study is limited to 25 District Hospitals in the Central Region. In addition, nothing guarantees the objectivity of the answers given by the participants of this study. Similar studies should be carried out in other regions of Cameroon with a larger sample size to generalize the results.

## 5. Conclusion

At the end of our study, it appears that the majority of general practitioners have not received formal education on circumcision. This can result in a lack of knowledge of contraindications, complications of circumcision, the performance of inadequate surgery and the lack of satisfactory pre and postoperative care.

## Conflicts of Interest

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

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# Transurethral Resection of the Prostate (TURP): About 146 Cases at Sheikh Zayed Hospital in Nouakchott Mauritania

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## Abstract

**Introduction:** Transurethral resection of the prostate (TURP), entered our service in October 2015, since then it became a part of the service daily activity. The aim of our study is to assess the acceptance of the technic by our patients and by the nursing staff and to analyze the results of our initial experience. **Materials and Methods:** Retrospective study over 14-month (October 2015 to December 2016); bringing together all the patients who received TURP. The inclusion criteria are to have benefited from a TURP in our service. The exclusion criteria all patients operated by other techniques. It was a monopolar resection of the prostate using a glycocolle loop, the size limit of the prostate was 65 cc or less. A questionnaire on the knowledge of the technique and its acceptance is made. The parameters studied the age of the patient; surgical indications; the course of the operation, the complications and the course. The frequency of TURP compared to other techniques and the demand for this technique by patients. The urinary catheter was left in place for 4 days, the patients were seen again on day 7 after the catheter was removed to assess the urine flow, a question regarding the opinion of the nursing staff was included and analyzed separately. **Results:** The total number of patients was 146; the mean age was 68.2 years. The main cause of consultation was urine retention 65%. The average duration of the intervention was 56 minutes. The average length of hospital stay was 28 hours. The urinary catheter was removed on day 4. Complications were bleeding in 7% of cases requiring blood transfusions. Failure to remove the indwelling catheter leads to revision via the transurethral route. The TURP syndrome was observed in 2 patients in our early patients but quickly resolved. The outcome was favorable in 75% of cases. Post operating management give satisfaction for nurse and acceptance was a success. **Conclusion:** TURP is now a routine surgical activity; it seems to have an upright place for BPH in our department; its impact on morbidity was remarkable.

## Keywords

Prostate, Resection, Endoscopy, Mauritania

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## 1. Introduction

Transurethral resection of the prostate (TURP) is the gold standard for the surgical treatment of benign prostatic hyperplasia. This technique entered our service in August 2015. It requires an investment in endoscopic equipment and a trained surgical team. We are postponing our early experiment in a hospital on the outskirts of Nouakchott. The objective of our study was to assess the acceptability of the technique, our results at the start of the experiment and the prospects for improvement. To introduce this treatment was a challenge for hospital where it never uses urological endoscopic before, for medical staff to have new habitude for managing patient and material, for patients who wait results of the new technique. Perspective is to do more minimally invasive for urological treatment in our department.

The introduction of this technique was a challenge for our hospital which did not perform minimally invasive surgery. The challenge for the healthcare team is to perfect themselves in new operating techniques.

The prospects are the generalization of minimally invasive surgery while urologic surgery.

## 2. Materials and Methods

It is a retrospective analytical study of the first 14-month from August 2015 to December 2016 (initial experience). The study setting was the urology department at Cheikh Zayed Hospital in Nouakchott. The department has 14 beds and four urologist surgeons at this time of the study. This establishment is located in the southern suburbs of the capital Nouakchott in a densely populated area with modest socio-economic levels. This was a monopolar loop resection using glycolle. The indwelling catheter was kept in place for four days. The result was assessed one week and three weeks after the catheter was removed. Favorable outcome for patients with a good voiding stream without residue, failure if signs of dysuria persist. All patients operated on by TURP during this period are included, the exclusion criteria were resections of bladder masses and adénomectomies by conventional surgery. The parameters were age, operating time, bleeding, complications, the burden of postoperative care in comparison with adenomectomy techniques and the evaluation of the adherence of nursing staff to the technique by a questionnaire. All nurses to our department between operating room and hospitalization are selected: total 24 nurses (nurses to surgery room, 16 nurses from hospitalization rooms). Questions were: Difference between TURP and open surgery of prostate, how is your charge of work between them, how is patient's pain between then. What are your preference between

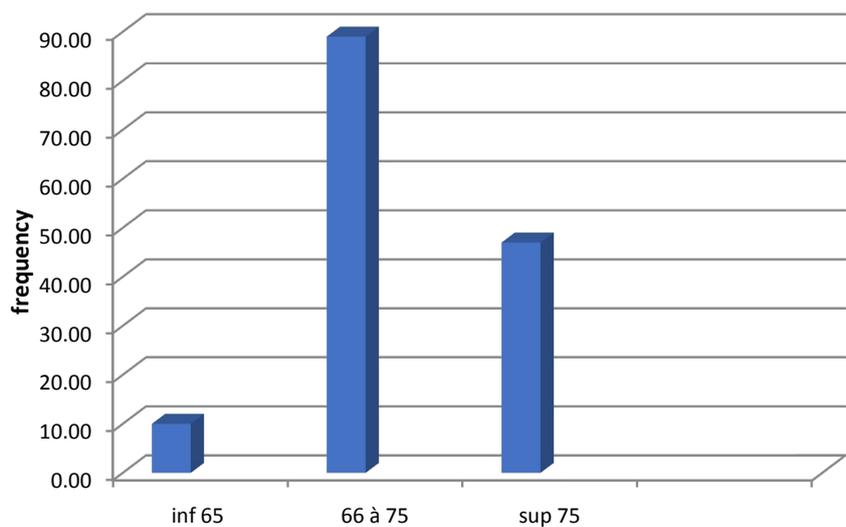
them? Degrees of satisfaction about this new technique in our department to prove the capacity of adaptation to the minimally invasive surgery for medical team and for patients.

All nurses in the service were included in the study. A total of 24 nurses including 8 in the operating room and 16 in hospitalization. Questions about adaptability to the new procedure, the difference in post-operative care and staff satisfaction.

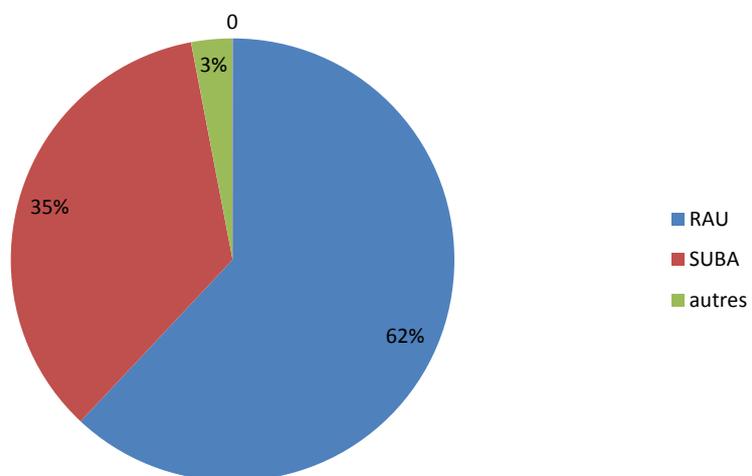
The statistic program is IPSS.

### 3. Results

A total of 146 patients were collected, the average age was 68.2 years with extremes ranging from 53 years to 89 years (**Figure 1**). The reason for consultation was dominated by urinary retention (UR) in 62% cases and signs of the lower urinary tract (SUBA) in 35% (**Figure 2**).



**Figure 1.** Distribution according to age.



**Figure 2.** Distribution according to the reason for consultation.

The average duration of the intervention was 56 minutes with extremes ranging from 41 minutes to 1 hour 10 minutes; the irrigation liquid for monopolar resection was glycocoll at a rate of 6 liters on average per patient. The average length of hospitalization was 28 hours with a maximum duration of 3 days. The urinary catheter was removed on Day 4 in the majority of cases. One procedure was stopped by abdominal distension following a bladder perforation. A blood transfusion in 7 of our patients who had a hemoglobin level of less than 9 g/dl postoperatively. TURP syndrome was found in 2 cases with good progress after correction of the fluid and electrolyte disturbances. Urine retention in a patient who required a second look because resection shavings remained in the bladder. The adherence of the nursing staff was satisfactory in 72% of the cases, the reduction in the workload was 25% to 30% less compared to an adenomectomy by conventional surgery. The biggest difficulty for the nursing team was the maintenance of endoscopic equipment.

A significant immunization of the bladder washes liquor of 40% on average. The occurrence of bladder clotting decreases by more than 50%. The use of post-operative antagonists by 42% and the reduction in the number of patients for dressings significantly (**Table 1**).

#### 4. Discussion

In our study of the first 14 months of the start of our experiment; TURP represented 146 patients (29% of all prostate surgery). This result reflects our patients' rapid adherence to the technique. Kane *et al.* [1] in Senegal had 84 cases in 2 years and Diakité [2] in Mali had 344 over 4 years. The average prostate volume was 60 grams. The length of hospital stay was drastically reduced with an average of 28 hours, in fact the patients were released on Day1 postoperatively with their indwelling catheter without any complications. According to the authors, this duration varies from 1 to 5 days [3] [4] [5]. The length of hospital stay increased for those who experienced bleeding and required blood transfusions. Kane *et al.* [1] had found 3.2 days. The urinary catheter is removed on Day 4 postoperative, the nursing workload in postoperative care had decreased considerably, justified by the reduction in postoperative clotting. Mamoulakiss *et al.* [6] estimated this reduction in the burden of post-operative care by 25% to 30%. Bladder clotting and postoperative pain are less than open adenomectomy [4] [6]. The postoperative bleeding remains high at 7% requiring blood transfusions. Kane *et al.* [1] found 10% bleeding compared to 5% for Rassweiler *et al.* [7]. The

**Table 1.** Questions to nurses to compare care in prostatic adenomectomy and TURP.

Setting	Bladder wash Fluid	Bladder clotting	Pain	Patient dressing	Preferred procedure
Prostate adenomrctomy	24 liters	95%	100%	100%	25%
TURP	9 liters	50%	42%	48%	75%

bleeding had significantly decreased in the series using exclusive bipolar resection [8] [9]. TURP syndrome was found in 2 patients with effective correction, these results are similar to those of Diakité in Mali [2]. TURP syndrome is the most complication with monopolar resection [10]; Bladder perforation and the long duration of the procedure, are the main causes of TURP syndrome [11] [12]. Retention by residual chips in the bladder has been reported from 0.5% to 1% of cases [13] [14]. Two patients presented with bleeding from pressure ulcers on day 7 and day 9 postoperatively. Bleeding from falling eschar was more frequent in large prostate and extensive use of the ball coagulation loop [7] [15]. Bleeding and turp syndrome are less in bipolar resection [16]. Postoperative pain was found in 40% of our patients, this pain was linked to the large caliber of the sheath for tight urethra [17]. The infectious complications described by Alsaywid *et al.* [18], should encourage obtaining a sterile ECBU before the surgical procedure. Postoperative progress and complications are rare in our series due to the relatively short follow-up. The authors describe post-resection stenosis and sclerosis of the prostatic compartment responsible for urinary disorders [19] [20]. Postoperative quality of life: urinary incontinence, erectile dysfunction and retrod ejaculation are significantly reduced in TURP [7]. TURP was recommended by 75% of nurses in our study. This recommendation reaches 100% in the literature [21]. The rapid return of patients to their activity is on average 2 weeks against 4 weeks for open-air surgery. The resumption of activity varies between 10 and 21 days depending on the authors [22].

## 5. Conclusion

The introduction of the TURP in our service had considerably improved our technical platform. The Strong adherence from nursing staff and patients, results in terms of reduction of post-operative care are significant. The postoperative quality of life and the rapid resumption of activity and maintenance of the factors encourage patients. This study will be completed by the results of the bipolar resection recently introduced in our service.

## Conflicts of Interest

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

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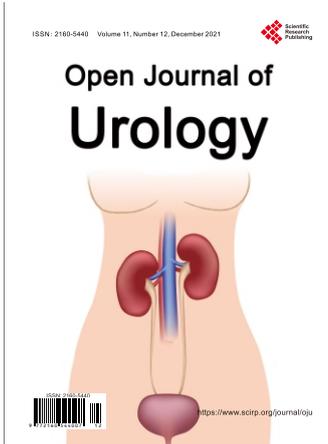
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## Abbreviation

TURP: Transurethral resection of the prostate

BPH: Benign hypertrophy of prostate



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