

Direct Visual Internal Urethrotomy (DVIU) in the Management of Male Urethral Strictures. A Single Center Experience about 44 Patients

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Abstract

Introduction: Male urethral stricture is one of the oldest urological disorders. Many techniques have been proposed to treat them, including endoscopic internal urethrotomy (DVIU). **Material and Methods:** To evaluate the contribution of this technique in the treatment of urethra narrowing, a retrospective study on the records of patients with urethral stricture treated with endoscopic internal urethrotomy between January 2014 and December 2021 in the urology division of the Souro Sanou University Teaching Hospital. **Results:** A total of 44 male patients with urethral stricture were treated with this technique and 48 procedures were performed. The average age of the patients was 53.2 ± 18.2 years. The etiology of the stricture was dominated by iatrogenic, infectious, traumatic and idiopathic causes in 43.2% (n = 19), 27.3% (n = 12), 20.4% (n = 9), and 9.1% (n = 4) respectively. The location of the stricture was bulbar in 72.7%, and the anterior penile urethra in 15.9%. The overall success rate was 72.7% with satisfactory urination without dysuria, evaluated after removal of the urinary catheter, at three months this rate fell to 69.1%, and at 6 months this rate was 67.5%. Five cases (5) of extravasation of blood or irrigation fluid into the scrotum were reported and managed conservatively as well as two (2) cases of false routes with postoperative oedema of the penis were observed. **Conclusion:** DVIU is a simple technique, free of major morbidity and requiring only short-term hospitalization. It can be proposed as a first-line treatment for urethral stricture.

Keywords

Internal Urethrotomy, Urethral Stricture, Outcomes, Complications

1. Introduction

Urethral strictures are common for urologists in Sub-Saharan Africa and constitute one of the oldest urological conditions [1] [2]. They are defined by a more or less extensive narrowing of the urethral lumen that impedes the free flow of urine from the bladder to the outside, regardless of its location and etiology [3] [4]. If infectious causes are declining in developed countries, in favor of post-traumatic and iatrogenic causes, urethral strictures are increasingly observed in our context, and their management remains a challenge for the urologist [3] [5]. Many techniques have been proposed to treat urethral strictures, including internal endoscopic urethrotomy. It was described by Maisonneuve and Otis, who performed it blindly, and later by Saches who, in 1973, developed the method under direct visual control [6]. Since then, DVIU has become the first-line treatment for urethral strictures for most authors [4] [7]. Several studies have been carried out on the contribution of endoscopic internal urethrotomy in the management of urethral strictures. Djé *et al.* in the Ivory Coast conducted a study on 140 patients and Zango *et al.* in a previous study in Burkina Faso had evaluated the feasibility of this technique and the short-term results in a short hospital series in the management of urethral strictures [7] [8]. This study was initiated to evaluate the contribution of this technique in the management of male urethral strictures at the Souro Sanou University Hospital.

2. Patients and Methods

This was a retrospective cross-sectional study conducted in a single center, the urology division of the Souro Sanou University Hospital in Bobo Dioulasso between January 1st, 2014, and December 31st, 2021. The study focused on patients' medical records treated with endoscopic internal urethrotomy. Patients included in the study had a diagnosis of urethral stricture based on preoperative imaging by retrograde urethrogram (RUG) or Voiding Cystourethrogram (VCUG) with negative urine culture and were treated by DVIU. The included patients were those without spongiositis or urethrocutaneous fistulas. For each patient, the collected data included patient demographics, the cause of urethral stricture, stricture characteristics, operative details and follow-up information. The DVIU was performed using a cold knife urethrotome, by incising the stricture at 12 o'clock under endoscopic guidance (**Figure 1**). The procedure was carried out under locoregional anesthesia with indwelling urethral catheter, which was left in place for three to seven days. In the absence of uroflowmetry, postoperative functional results were evaluated based on the quality of urination immediately after removal of the urinary catheter, at three months (3 months) and six months (6 months). Thus, these results were classified into three categories:

- Good: absence of dysuria, easy urination with a good urinary stream
- Satisfactory: slight dysuria, urination with effort, weak urinary stream
- Failure: frank dysuria, difficult or impossible urination

The procedure was considered successful if there was absence of symptoms or

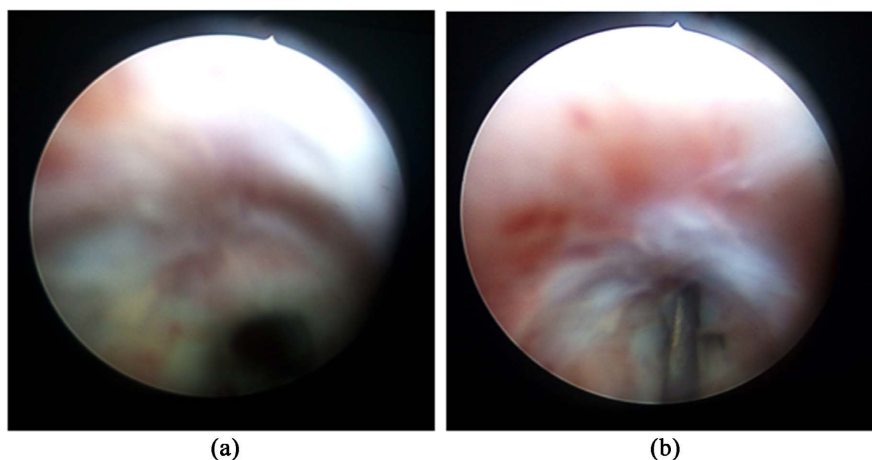


Figure 1. (a) Endoscopic view showing a narrowing in the form of a “black hole”, (b) Incision of the roof of the narrowed area with a cold knife.

signs of recurrent stricture and if patient had ability to pass urine. The overall success rate took into account the functional postoperative results judged as good and satisfactory. Data were analyzed using Epi.Info software version 7 and results displayed using tables and figures. Descriptive statistics for numerical variables in our study are given as mean \pm standard deviation and the categorical data are given as frequency (n) and percentage (%).

3. Results

1) Frequency

The hospital frequency of urethral strictures (US) accounted for 11.15% of all urological pathologies during the study period. During the study period, 44 patients underwent DVIU out of a total of 471 recorded cases of urethral strictures, representing a proportion of 9.34%. Four patients have needed a second procedure for treatment, with a total of 48 procedures performed. The annual frequency of DVIU was 6 procedures per year.

2) Age and residence of the patients:

The mean age of the patients was 53.2 ± 18.2 years with extreme ages ranging from 18 to 80 years old.

3) Residence of the patients

54.5% (24/44) of the patients came from rural areas while 45.5% (20/44) came from urban areas.

4) Professional occupation

The majority of patients (47.2%) were farmers, followed by retired and traders in equal proportions (18.2%), civil servants (9.2%) and students (6.7%). Professional occupation of patient is presented in **Table 1**.

5) Causes of urethral strictures.

The causes of urethral strictures were predominantly iatrogenic, accounting for 43.2% (n = 19) followed by infectious causes (27.3%), traumatic causes (20.4%), and idiopathic causes (9.1%) as presented in **Table 1**.

Table 1. Descriptive characteristics of patients.

Patient and stricture characteristics	Value	Percentage (%)
Mean Age (years)	53.2 ± 18.2 years	
Professional occupation		
• Farmer	21	47.2
• Retired	8	18.2
• Traders	8	18.2
• Civil servants	4	9.2
• Students	3	6.7
Place of residence		
• Rural	24	54.5
• Urban	20	45.5
Stricture aetiology		
• Iatrogenic	19	43.2
• Infectious	12	27.3
• Traumatic	9	20.4
• Unknown	4	9.1
Stricture location		
• Bulbar urethra	32	72.7
• Perineobulbar urethra	5	11.4
• Penile urethra	7	15.9

6) Reasons for patient consultation

The main reasons for patient consultation were urinary retention, whether acute or chronic (47.7%), dysuria (40.9%), and infectious complications such as urinary tract infections or orchiditis (6.8%).

7) Preoperative imaging of urethral Stricture by RUG or VCUG

The retrograde urethrogram (RUG) or Voiding urethrocytogram (VCUG) were performed in all patients and allowed for the confirmation of the diagnosis of urethral stricture by specifying the number of strictures, their location, and associated anomalies. A single urethral stricture was found in 36 patients (81.8%), while 8 patients (18.2%) presented with multiple strictures, illustrated in **Figure 2**. The location of the stricture was bulbar in 32 patients (72.7%), perineal-bulbar in 5 patients (11.4%), and anterior penile in 7 patients (15.9%) as shown in **Table 1**. RUG images revealed associated anomalies in the form of bladder diverticulum in three (3) patients, four (4) patients had vesicoureteral reflux, and five (5) cases of trabeculated bladder were noted.

8) Mode of anesthesia

Rachi anesthesia was the main mode of anesthesia in 38 patients (86.4%) and

general anesthesia in 6 patients (13.6%). Antibiotic prophylaxis was systematically applied to all patients.

9) Procedure occurrence

Single DVIU was performed as a first-line procedure in 40 of our patients (90.9%) and four patients (9.1%) required a second endoscopic internal urethrotomy.

10) Hospital stay

The average hospital stay was 4.2 days \pm 3.2 days, with extremes of 1 day and 14 days.

11) Post-operative functional results

Postoperative functional results were evaluated based on the quality of micturition after removal of the urinary catheter as uroflowmetry was not available in our urology division. The overall success rate (good and satisfactory results) at the removal of the urinary catheter was 72.7%. This rate fell to 69.1%, at three months and to 67.5% after 6 months. In **Table 2** was summarized the distribution of patients according to the final functional outcome of the DVIU.

12) Postoperative complications

During the procedure, five cases (5) of extravasation of blood or irrigation

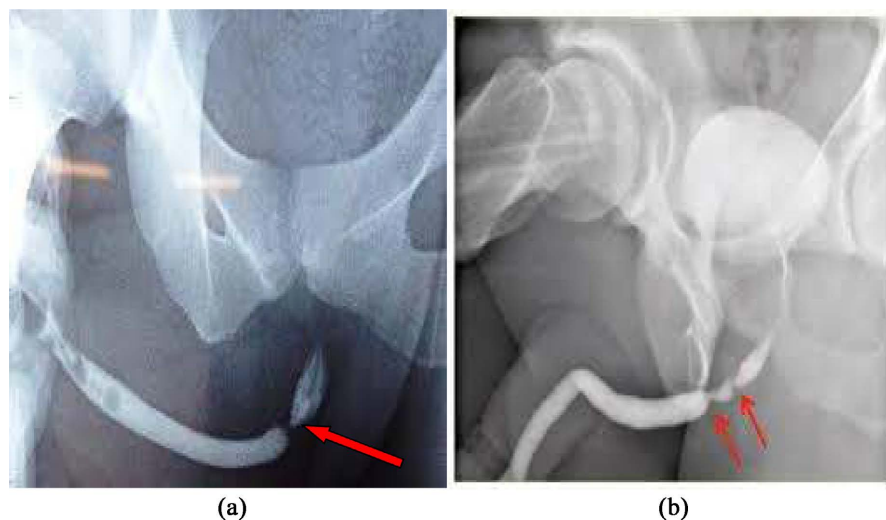


Figure 2. (a) RUG images showing a single bulbar stricture; (b) Multiple strictures (red arrow) at different locations.

Table 2. Distribution of patients according to the outcome of the procedure.

Results	Success rate at the removal of urinary catheter	Success rate evaluated at 3 months	Success rate evaluated at 6 months
Global success	32 (72.7%)	29 (69.1%)	27 (67.5%)
Failure	12 (27.3%)	13 (30.9%)	13 (33.5%)
Total	44 (100%)	42* (100%)	40* (100%)

*Two (2) patients were lost to follow-up at the 3 months postoperative visit and four (4) at the 6 months postoperative visit.

fluid into the scrotum were reported and two (2) cases of false routes with post-operative edema of the penis were observed. Cases of liquid infiltration of the scrotum were treated by incisions for draining the subcutaneous tissue with the evacuation of the irrigation fluid by compression of the scrotum, followed by a suspensory scrotal dressing and treatment with anti-inflammatory drugs and prophylactic antibiotics. No cases of death were reported in our series.

4. Discussion

Urethral stricture remains a relatively common condition in developing countries, particularly in sub-Saharan Africa [3] [7] [8]. Over eight years of surgical activities, our department recorded 471 cases of urethral strictures, and 44 patients were treated with endoscopic internal urethrotomy. This minimally invasive technique, introduced into our arsenal of management, constitutes the second endoscopic procedure after cystoscopies. The annual frequency of performing this procedure is 6 DVIU/year, which is lower than the 10 cases annually reported by Zango B. *et al.* [8] in the same urology division, and the 22 cases annually reported by Djé K. in Abidjan and Guirassy in Conakry [3] [7]. Therefore, it appears that the DVIU rate has decreased in our urology division due to the difficulties encountered in better organizing and conducting endoscopic activities, including recurrent breakdowns of the endoscopy column and the availability of consumables to ensure the continuity of endoscopic activities. The indications for endoscopic internal urethrotomy remain mainly for young patients, as found in many studies on this technique [9] [10]. The patients in our series were relatively young with a mean age of 53.2 ± 18.2 years, slightly higher than the average age of 47.8 years reported by Zango *et al.* [8] and lower than the average age reported by Djé *et al.* which was 55 years [7]. The main etiologies found in our series were endo-urethral maneuvers, urethral infections, and pelvic trauma. Specifically, we recorded 43.2% of iatrogenic etiologies, which differed from the results reported by Zango *et al.* [8], who found a predominance of infectious etiologies in their study. Culty *et al.* [11] at Bichat Hospital in Paris reported 105 cases of traumatic urethral strictures, exclusively dominated by pelvic fractures and perineal trauma. The predominance of post-infectious etiology related to poorly or untreated urethritis is fairly constant in the literature for developing countries, especially in Africa. Thus Djé in Côte d'Ivoire, Guirassy in Guinea, Zango in Burkina Faso all reported the predominance of infectious etiology in their respective series [3] [7] [8]. A possible explanation for this difference could be the recent decline of sexually transmitted infections (STIs) in most African countries, including Burkina Faso, which previously had a high prevalence of acute gonococcal urethritis. This decline in STI prevalence is likely due to the efforts of various programs to combat STIs/HIV through multiple information and communication campaigns aimed at behavior change. In our series, the preferred location of the stricture was bulbar, accounting for 72.7% of cases, which was consistent with literature data reported by many authors [5] [12] [13]. This preference may be related to the particular anatomy of this seg-

ment of the anterior urethra, with the bulbar cul-de-sac serving as a reservoir where germs proliferate due to stasis. Similar results were reported by Djé *et al.* with 67.9% [7], Benjelloun M *et al.* in Morocco with 73.8% [12], and L. Redón-Gálvez *et al.* with 64.2% bulbar location [4]. Post-traumatic strictures would more frequently, if not exclusively, occur at the level of the membranous urethra due to the anatomy of this segment of the urethra, which is closely related to the perineal fascia, which is very vulnerable during pelvic trauma.

Single strictures represented a significant proportion of strictures in our study, accounting for 81.8%. Single strictures are the ideal indication for internal endoscopic urethrotomy. Our results are consistent with those of Tazy *et al.* [1] in Morocco, where the majority of patients had single strictures. The treatment outcomes were evaluated based on the quality of voiding comfort and urinary stream, which were collected through patient interviews during follow-up visits. This purely clinical evaluation is quite subjective since we did not use uroflowmetry to assess postoperative results, and only a few patients underwent control urethrocytography (VCUG). The success rate of endoscopic internal urethrotomy (DVIU) assessed at the time of removal of the urinary catheter in our patients was 72.7%. This rate decreased to 69.1% at three (3) months and 67.5% at six (6) months. The lack of follow-up and the absence of 4 patients at the 6-month postoperative control contributed to the decrease of our success rates. Our 72.7% success rate remained close to that of Zango, which was 67% [8] in Burkina Faso, and higher than Ballanger's 57% [2] in France. DVIU is considered to be a procedure with very few complications, but it still carries risks and potential complications. Seven (7) perioperative complications were noted in our series, representing 21.8%, which is higher than the 9% reported by Guirassy [3]. These complications were mainly due to false routes, with swelling of the penis and fluid infiltration of the scrotum. In Zango's study, the complication rate was about 16%, also dominated by false routes [8]. In contrast to Chilton *et al.* [14], we did not report any complications such as incontinence or impotence. Similarly, we did not report any cases of urethrotome blade breakage, as reported by Steenkamp [5] at Tygerberg Hospital in South Africa, an incident also reported by Zango [8] in Burkina Faso and Djé [7] in Côte d'Ivoire. Mortality was zero in our series, confirming the safety of this intervention as reported by other authors in the literature [6] [15].

5. Conclusion

Direct visual internal urethrotomy is a simple, quick procedure, devoid of major morbidity and requiring only a short hospital stay. It can be proposed as a first-line treatment for urethral strictures when local conditions permit, as recommended by most urologic societies.

Conflicts of Interest

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

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