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Research Article

Does the Ureteroscopy has Beneficial Advantages for Urethral Stricture Evaluation: A Prospective Single Center Study

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Abstract

Objectives: To assess the beneficial benefits of ureteroscopy for the evaluation and assessment of urethral stricture at the time of operation.

Method: Data of all admitted patients with urethral stricture detected on urethrography and uroflowmetry preoperatively that also confirmed with ureteroscopy at intraoperative period using a 7F ureteroscope who underwent direct vision internal urethrotomy from 2019-2020 were prospectively reviewed at Mogadishu Somali turkey training and research hospital. Based on ureteroscopic results, patients were classified into three different groups: Completely obliterated urethral stricture, very small caliber urethral stricture, and small-caliber urethral stricture. All patients with urethral stricture less than 18 years, patients with hypospadias surgery, patients requiring urethroplasty, bladder neck stenosis, and meatal stenosis were excluded from the study.

Results: The total patients analyzed were 82 cases. After assessment and evaluation of the stricture with the ureteroscope under direct vision intraoperatively, completely obliterated urethral stricture were seen in 8.5% of the cases, very mall caliber urethral stricture was encountered in 53.65% of the cases while small-caliber urethral stricture was seen in 37.8% of the cases. Successful passage of semi-rigid ureteroscopes was reached in 90.24% of the cases.

Conclusion: Ureteroscopic evaluation of urethral stricture has a higher accuracy rate for confirmation and estimation of location, length, and severity of stricture at the intraoperative period and provides additional beneficial information despite preoperative radiologic assessments.

Keywords: Ureteroscopy; Urethral stricture; Urethroplasty; Urethrotomy.

1. Introduction

For successful management of the urethral stricture disease, it is essential to assess the pattern of the stricture (location of the stricture, length, severity, and density of the stricture [1, 2]. Urethrogram and ultrasonography are conventional techniques to assess the pattern of the stricture [3, 4]. Urethrogram assesses the length of stricture distal and proximal of the urethra while ultrasound can detect the thickness of the stricture and long-standing obstruction associated sequels. Uroflowmetry can be used as an adjuvant diagnostic tool for diagnosis of urethral stricture; plateau pattern appearance is the hallmark sign of urethral stricture in the uroflowmetry.

We label a beneficial endoscopic technique that can be performed at the time of operation. Ureteroscopy helps to confirm the diagnosis of the stricture as well as an accurate assessment of the stricture under the vision and provides beneficial information regarding the management of the stricture. It gives delineate assessment of the proximal side of the stricture, state of prostate and prostatic urethra, and better visualization of the bladder for stones, diverticula, and bladder tumor. The prevalence of urethral stricture is 0.6% and it is more common in the elderly. More than 5,000 cases per year admission result from a urethral stricture [5, 6].

The purpose of this study is to evaluate the valuable benefits of ureteroscopy for the evaluation and assessment of urethral stricture, confirmation, identification of urethral stricture at the time of operation that facilitates the appropriateness surgical procedure to the patient and determination of recurrence of stricture.

2. Method

Data of all 82 patients aged between 19-90 years with urethral stricture who underwent direct vision internal urethrotomy at Mogadishu Somali turkey training and research hospital from 2019-2020 were prospectively reviewed. All patients had used a 7 F semi-rigid ureteroscope before the definitive operation. Patients had retrograde and Antegrade cystourethrogram and uroflowmetry preoperatively. Routine investigations were made including renal function tests and ultrasonography. All patients with urethral stricture less than 18years, patients with hypospadias surgery, patients requiring urethroplasty, bladder neck stenosis, and meatal stenosis were excluded from the study. Ethics approval was obtained from the ethics committee of Mogadishu Somali Turkey Reccep Tayyip Erdogan Training and Research Hospital (IRB number MSTH/3787). All patients were taken informed consent.

Inspection of urethral stricture was made under direct vision using a small 7 F semi-rigid ureteroscope. The site, caliber, length, and density of the urethral stricture were assessed. Based on ureteroscopic results, patient's urethral lumen were classified into three different groups: Completely obliterated urethral stricture with no visible lumen, very small caliber urethral stricture which is difficult to reach posterior the stricture and small-caliber urethral stricture that has a large lumen and can easily be passed and reached behind the stricture (Table 1). The

patient's urethral stricture length was also evaluated under the vision and grouped into (<1cm) and (>1cm). Ureteroscope has the benefit of confirming, evaluating, and dilating of the structure before the definitive urethrotomy. The univariate prospective descriptive study design was used to analyze the analytic parameters using IBM SPSS Statistics 23 version.

Urethral Caliber	Number of patients	Percentage
Completely obliterated	7 patients	8.5%
Very small caliber	44 patients	53.65%
Small-caliber	31 patients	37.8%

Table 1: Endoscopic evaluation of urethral stricture reveals different types of urethral caliber intraoperatively.

3. Results

7 F semi-rigid small-caliber ureteroscopes were performed in all 82 patients who underwent direct vision internal urethrotomy selected for the study after confirmed to have a stricture and obtaining informed consent preoperatively at Mogadishu Somali turkey training and research hospital from 2019-2020. The mean age of the patients was 61.7 years and all patients were male. The location of the stricture was assessed under vision with 7 F ureteroscopy; Membranous urethra was the most common site of the stricture constituting 73% of the cases. The caliber of the stricture was estimated under vision. completely obliterated urethral stricture with no visible lumen were seen in 7 patients (8.5% of the cases), very mall caliber urethral stricture which is difficult to reach posterior to the stricture was encountered in 53.65% of the cases (44 patients) while small-caliber urethral stricture that has a large lumen and can easily be passed and reached behind the stricture had met 31 patients (37.8% of the cases). The length of the stricture was estimated under vision, 86.5% of the cases had less than 1cm stricture while the remaining 11 patients had more than 1cm stricture length.

Successful passage of semi-rigid ureteroscope and guide-wire placement was reached in 74 patients accounting for 90.24% of the cases. Unfortunately, 9.76% of the cases did not achieve the successful passage of small caliber semi-rigid ureteroscopes. Besides these, the passage of guide-wire was attained in six patients while the remaining two patients completely failed to pass the stricture (Table 2).

Cystostomy before the operation was met in 29% of the cases. Methylene blue was used antegradely in those patients to facilitate the way as needed. 34% of the cases underwent their second internal urethrotomy while five patients underwent their third internal urethrotomy. 77% of the cases (63 patients) had post-transurethral resection of prostate associated urethral stricture and 20 patients had a concomitant urethral stricture and BPH. The most common etiology of urethral stricture in our series was iatrogenic mostly post-transurethral resection surgeries associated with urethral stricture accounting 77% of the cases followed by idiopathic cause. The predominant complaint at presentation was poor flow urination amongst nearly all the patients followed by acute urinary retention.

Types of the procedure	Number of patients	Percentage
Passage of Ureteroscope and guide-wire placement	74 patients	90.24%
Guide-wire placement	6 patients	7.32%
Failed Passage of Ureteroscope and guide-wire placement	2 patients	2.44%

Table 2: The outcome of ureteroscopic evaluation of urethral stricture during operation.

4. Discussion

Antegrade and retrograde urethrogram, Urethrosonography, and magnetic resonance imaging are the principal radiographic imaging modalities mostly used for diagnosis of urethral stricture [7, 8]. Herein, we report a valuable endoscopic technique that can be skillful at the time of surgery. Ureteroscopy facilitates to determine the location, length, and lumen of the stricture at the time of operation. It is the gold standard for confirmation and identification of urethral strictures and determination of recurrence of stricture after urethroplasty or urethrotomy.

Some of the important benefits of ureteroscopic evaluation of stricture are listed below:

- Ureteroscopy helps to confirm the diagnosis of urethral stricture.
- Provide an accurate assessment of the stricture under vision.
- Give beneficial endoscopic information regarding the management and surgical plan of the urethral stricture through endoscopically or urethroplasty.
- Give the operator a direct assessment of the location, caliber, and density of the stricture.
- Help to place the guide under the vision to prevent the blind placement of the guide-wire to reduce the creation of false passages.
- It has an advantage for the dilatation of the stricture before the urethrotomy.
- It allows the operator to proceed with the definitive procedure immediately.
- Assess the proximal site of the urethral stricture.
- Allow the assessment of prostate and prostatic urethra.
- Provide better visualization of the bladder for stones, diverticula, and bladder tumor.

There are fewer similar prospective studies in the literature. Figueroa JC reported the use of a 7.5F Flexible Pediatric Cystoscope in the Staging and Management of Urethral Stricture Disease [1]. N Kadi reported Use of rigid ureteroscope in the endoscopic assessment and management of urethral strictures [9]. Cystoscopic evaluation for recurrence of urethral stricture after urethroplasty was assessed by Nima Baradaran [1] et al. and noted that Cystoscopic evaluation can be used as an initial evaluation tool for recurrence of the urethral stricture [6]. For standard 17 F cystoscopy sizes are not proper for evaluation of urethral stricture unless it is not an evaluation of recurrence after reconstruction. Walid Shahrour and associated reported that the use of a small ureteroscope for the evaluation of stricture before urethroplasty gives additional information regarding the type of urethroplasty appropriate for the patient [10]. For urethroplasty circumstances, dilation of stricture is unsettled but is beneficial in visual urethrotomy. Besides these, we report the valuable benefits for the use of 7 F ureteroscope in the evaluation and assessment of urethral stricture at the time of operation in the largest prospective study. Our study

revealed that ureteroscopic evaluation of urethral lumen is imperative and classifies urethral stricture lumen into completely obliterated, very small caliber and small caliber which is essential for the success rate and operation time.

Gallentine ML et al. reported that retrograde urethrogram is the radiological investigation of choice and the preferred radiologic modality for the diagnosis of urethral stricture disease [8]. Urethrosonography overcomes the benefit of zero radiation, and an accurate assessment of the thickness of stricture as reported in Das S study [11]. These radiologic investigations may underestimate the length and density of urethral stricture, Ureteroscopy provides an adjuvant endoscopic assessment at the time of operation which is helpful for the surgical plan of the urethral stricture disease. Despite our patients performed retrograde and antegrade urethrogram preoperatively, ureteroscopy offers additional advantageous information regarding stricture pattern before the definitive visual urethrotomy.

A study from Choudhary S and associates described that retrograde urethrogram and ultrasound have limited value for the accurate length, location, and amount of tissue fibrosis regarding the posterior urethral strictures [7, 12]. Narumi Y and colleagues reported that magnetic resonance imaging has an adjuvant imaging role for the evaluation and assessment for these strictures but cannot be visualized the accurate caliber and lumen of the urethral stricture [13]. 7 F or smaller sizes of ureteroscope have an excellent role for the assessment of stricture regarding the accurate length, location, caliber, and density in these settings as noted in our study.

Fenton AS and associates reported that transurethral resection of the prostate (TURP) is the most common cause of iatrogenic urethral stricture followed by cystoscopy, prolonged catheterization, and prostatectomy [14]. The stricture formation after TURP has been reported at about 9.8% in the Rassweiler J study [15]. Nearly half of patients of urethral stricture had iatrogenic cause mainly TUR as reported by Nicolaas Lumen [16], and other studies [14, 17, 18]. The percentage of TURP associated urethral stricture in our study is higher accounting for 77% of the cases compared to previous studies. Our study confirmed the significant causes related to transurethral resection (TUR) associated urethral stricture formation is that the improper insertion of the resectoscope, use of the larger size of the resectoscope, and lack of attention for the insertion of instruments. Iatrogenic strictures are complicated and difficult compared to traumatic strictures complicating the reconstructive process whenever planned.

Direct vision internal urethrotomy (DVIU) became more popular over the world in the last decades and is the gold standard for the management of urethral strictures [19]. All patients in our series performed DVIU successfully except two completely obliterated cases. Another noteworthy finding in our study is that repeated urethrotomy exacerbates short strictures and may make them longer and more scar. In a study from Meeks JJ and associated reported that failed urethrotomy, urethroplasty is recommended and remains the most effective and lowest recurrence rate surgical procedure for urethral stricture [20].

In a large retrospective, a single-center study from Tolkach Y et al. reported that the success rate of first internal urethrotomy is about 70% with the second attempt fall into 30% and third attempt near 0% success rate except for temporary improvement [21-23]. Another considerable outcome in our series is that our patients who go through the second and third internal urethrotomy had similar

postoperative results compared to the above-mentioned studies.

5. Conclusion

Ureteroscopic evaluation of urethral stricture has a higher accuracy rate for the confirmation and estimation of location, length, and severity of urethral stricture at the intraoperative period and provides additional beneficial information despite preoperative radiologic assessments.

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