PRE-STENTING IN A DIFFICULT URETER: WHAT IS THE INCIDENCE?

Malik Nadeem Azam Khan, Faisal Hanif*, Haroon Sabir Khan*

Pak Emirates Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, *Pakistan Naval Ship (PNS) Shifa Karachi Pakistan

ABSTRACT

Objective: To estimate the occurrence of "difficult ureter" where stenting was performed as a preliminary step for passive ureteric dilatation before second ureterorenoscopy and to create awareness of the incidence of this abnormality in our setting.

Study Design: Cross sectional prospective case review study.

Place and Duration of Study: Study was conducted in Urology department of PNS Shifa Karachi, from Jul 2017 to Mar 2018.

Material and Methods: All patients who presented to our institute for ureteric calculi with normal creatinine and no urosepsis were included in the study. The procedure was carried out either in spinal anesthesia or general anesthesia using laryngeal mask. The outcome data of ureterorenoscopyin all patients including those patients who required pre-stenting for difficult ureters were documented.

Results: Ureterorenoscopy was performed in 164 patients (mean age 34 years, range 14 to 70 years) for treatment of ureteric calculi. Among these 29 patients (17.7%) had upper, 52 patients (31.7%) had middle and 83 patients (51%) had lower ureteric calculi. Stone clearance was achieved in 135 (82%) of patients. In 16 (9.7%) patients the stone had to be pushed back for Extracorporeal Shock Wave Lithotripsy later. "Difficult ureters" were encountered in 13 patients (7.9%) in which Double J stents were placed under fluoroscopy and staged successful ureterorenoscopy were performed after 2 to 3 weeks without any complication.

Conclusion: There was a 7.9% (about 8%) incidence of encountering "difficult ureter" while performing ureterorenoscopy for ureteric calculi resulting in failed access for which a Double-J stent will have to be introduced to avoid ureteric injury. This possibility of occurrence of a "difficult ureter" and a staged ureterorenoscopy after 2 to 3 weeks should be discussed with the patients preoperatively, in order to avoid patient dissatisfaction after the procedure and allay his undue emotional suffering.

Keywords: Difficult, Pre-stenting, Ureter, Ureterorenoscopy.

INTRODUCTION

Genitourinary stone disease is a major problem in Pakistan. The minimal incidence across Pakistan ranges from 7.4 patients in the North, 28 patients in the West to 200 patients per 100,000 population in the South[1]. The management of urinary stone disease has favorably been shifted from open surgeries to minimally invasive procedures in the last three decades for the benefit of all stake holders. The advantages of this shift owe it to the advances in biomedical technology and optics which has revolutionized the discipline of endourology and has made possible the ureteroscopic treatment of ureteric and renal calculi[2].

Many studies have proved ureterorenoscopy (URS) and extracorporeal shockwave lithotripsy (ESWL) to be comparable in their efficacy and safety in both ureteric and renal calculi. However, URS is preferred for the middle and lower ureteric calculi[3]. The success of the endoscopic procedure obviously depends upon many factors; but the level of expertise of the operator as well as the anatomic unpredictability of the urinary system are among the major factors for failure of passage of URS in difficult ureters[4,5].

The incidence of "difficult ureter" has been different in various studies but generally it ranges from 7 to 16%[6,7]. This difficulty in accessing the ureter may be due to variance in the

Correspondence: Dr Haroon Sabir Khan, Department of Urology, PNS Shifa Karachi Pakistan
Email: hskhan27@gmail.com
Received: 25 Sep 18; revised received: 20 Oct 2018; accepted: 22 Oct 2018

anatomy of the ureter, a tight or a tortuous ureter, or sometimes narrowing due to past ureteric procedures[8,9]. The right solution to a "difficult ureter" is to pass a ureteric stent for passive ureteric dilatation and to perform a staged URS after a few days[10-12]. Other alternatives are to actively dilate the ureter by balloon dilatation or by using the semi rigid ureteric dilators[13,14] and perform primary URS, however, this practice has a potential risk of ureteric injury and later formation of ureteric stricture[15].

Although introducing a ureteric catheter (stenting) in a "difficult ureter" is a safe and technically less demanding procedure however, it definitely demoralizes the patient who expects to have his stone clearance in a single procedure[16,17]. In this regard an informed consent of the patient for this possibility has to be taken in order to avoid unnecessary patient dissatisfaction[18].

The incidence of "difficult ureter" has been well documented in many international studies[6,7], however, in our setup none had been carried out previously.

PATIENTS AND METHODS

This cross sectional prospective case review study included patients undergoing ureteroreno scopy in Urology department of PNS Shifa, Karachi from July 2017 to March 2018. All those patients who presented with ureteric calculi were enrolled in this study; However those having urosepsis or raised creatinine levels were excluded. A complete preoperative work up including baseline blood tests and CT-KUB (plain) for stone evaluation was performed.

All procedures were carried out by experienced urologists who had performed more than 500 ureteroscopies. An 8 Fr semirigid 02 channel ureterorenoscope was used in all cases. A perioperative antibiotic and a ureteric safety guidewire were considered mandatory. In case of a "difficult ureter" the operator passed the DJ stent under the fluoroscopic guidance and a staged ureteroscopy was performed after 2 to 3 weeks.

Patient demographics, stone size and location, DJ stent placement, stone clearance, completion of procedure and post-operative complications were recorded. The data of those patients who were passed DJ stents for "difficult ureters" were particularly recorded and outcome of the secondary URS was also documented. All the data were analyzed by SPSS version 22.0. Descriptive statistics i.e. the Mean ± SD was calculated for numerical values like age while frequencies and percentages were calculated for categorical variables like gender, size and site of ureteric stones and about various outcomes of URS (difficult ureter, stone clearance).

RESULTS

A total of the 164 patients underwent ureterorenoscopy; Mean patient age was 34 years (range 14–70 years). Male to female ratio was 5:1 (137:27). Of these 83 patients (51%) had lower ureteric calculi, 52 patients (31.7%) had middle ureteric stones and 29 patients (17.7%) had upper ureteric calculi. In 16 (55.2%) out of the 29 patients having upper ureteric calculi, the stone was pushed back into kidneys during URS and they were successfully treated with ESWL later (table-I). Overall complete stone clearance was achieved after primary procedure in 124 patients (75.6% of total) which was confirmed by direct vision and fluoroscopy. In 11 patients (6.7% of total) calculi were partially cleared and they became stone free at a mean 39 days of follow up as evaluated with a plain X-ray KUB. Out of the total of 164 patients, 13 patients (7.9%) were having "difficult ureter"and were pre-stented without any complication because of failed access. They subsequently had successful staged URS within 2-3 weeks. Of these, three were female patients and ten were male patients, representing 11% of all female patients and 7% of all male patients undergoing URS.

Out of 151 cases of successfully accessed ureters, 81.5% (123/151) were undertaken for mid and lower ureteric calculi and 18.5% (28/151) for upper ureteric calculi.

The total ureteric stone clearance rate was 82.3%(135/164). In case of stones less than 10 mm in size clearance was 96% (110/114), however, the success rate for stones more than 10mm size dropped to 50% (table-II). There was no injury to ureters. Other complications were post-operative pain and vomitingin nine cases (5.5%) and three cases of postoperative fever (1.8%).

DISCUSSION

International guidelines clearly state that prior to any surgery the patient must be informed about the procedure. The doctor must also tell his patient about all major and minor potential adverse consequences of the procedure so as to obtain an informed consent. Even if there is a chance of failure of a procedure it must be communicated to the patient[18].

The incidence of difficult ureter in our study was 7.9% necessitating ureteric pre-stenting. All these were accomplished under fluoroscopic imaging without any complications. We had a higher access failure rate for female patients (11% vs 7%), though the total number was small. Failed access site was found to be throughout the ureteric length, with no constant failed access point found across both the genders that could be a scribed to their specific anatomical dis-similarities.

Fuller *et al* completed a multi institutional retrospective review and defined the frequency of primary ureteroscopy failure in patients who were unstented. His incidence of difficult ureter was 7.7% (41/535). The median age of males with primary URS failure was significantly lower than in females (34 vs 52 years). Proximal ureteral stones had the highest failure rate for ureteral access at 18.28%. They also found the stone location in the proximal ureter to be a major predictor of ureteric access failure[19].

Viers *et al* studied 154 renal models through preoperative computerized tomography uro-gram (CTU) in order to identify radiographic

Table-I: Ureteric stones location and outcome of URS as regard to stone clearance and incidence of "difficult ureter" at different ureteric levels.

Outcome of URS	Upper level ureter	Mid level ureter	Lower level ureter	Total
Difficult Ureters (Stented)	1	6	6	13 (7.9%)
Stone completely cleared in primary procedure	8	43	73	124 (75%)
Stone partially cleared in primary procedure	4	3	4	11 (6%)
Stone pushed back in kidney	16	0	0	16 (9.7%)
Total	29	52	83	164

Table-II: Percentage stone clearance rates of ureteric calculi treated with URS as regards to stone size and position.

Size of stone (mm)	Prox. third ureter	Mid. third ureter	Distal third ureter	Total
<5	0	100% (4/4)	100% (13/13)	17
5-10	100% (4/4)	100% (27/27)	93% (62/66)	97
>10	32% (8/25)	71% (15/21)	50% (2/4)	50
Total	17.7% (29)	31.7% (52)	51% (83)	164

Table-III: Comparison with international data vis-à-vis URS stone free rates for patients with ureteric stones less than 10mm with regards to ureteric level.

Ureteric Level	Our Study	EAU meta-analysis[23]
Proximal ureter	100%	80%
Mid ureter	100%	91%
Distal ureter	94%	97%

characteristics of difficult ureter. They encountered 25 cases (16% incidence) of failed ureteric access which was managed by DJ stenting. They documented a narrow pelviu-reteric junction (4mm vs 5mm) and less than 50% ureteral opacification on CTU as strong predictors of failed access. They also found that history of previous ipsilateral ureteral stent or ureteroscopy was also preventive for prestenting[20]. Our preoperative imaging preference was CT-KUB (without contrast) so narrow ureters on contrast were not identifiable preoperatively. We did not identify previous ureteric instrumentation as cause for difficult access.

Stoller *et al* performed 156 URS stone procedure without routine balloon dilatation and access was not successful in 18 patients. The incidence of "difficult ureter" was 11.5%, all were successfully accessed after stenting on second URS after 4 to 5 weeks of interval[7].

Wenzler *et al* reviewed their experience to look for factors that might indicate causes for "difficult ureter". They concluded that treatment failure was more likely to occur in male patients with severe hydronephrosis or an elevated creatinine level[21]. Our study could not identify any preponderance for failed access as far as the patient's age or location and size of the stone were concerned. Moreover, presence of hydronephrosis was also not found to be a risk factor for failed access.

Yang *et al* studied the success rate for second ureteroscopy following an initial failed proce-dure managed by ureteric pre-stenting. They documented success rate of 88.5% after second ureteroscopy[6]. Adnan *et al* studied the compli-cations of pre-stenting followed by URS in 2 to 4 weeks. He compared the results with those who under went single session URS. This study concluded that pre-stenting is a safe and effective method to accomplish stone clearance whenever the operator finds the access to the ureter difficult[22].

In our study the follow up outcome of difficult ureters after pre-stenting was recorded. All 13 cases (100%) were successfully accessed via URS after 2 to 3 weeks of interval and stone clearance was achieved in all without complication.

For the narrow ureter that will not allow a URS, placing a ureteral stent is valid and a safe option, to allow subsequent URS in the passively dilated ureter. Alternatively an extensive balloon dilatation for these difficult ureters is less frequently recommended due to a moderate risk of ureteric perforations and long-term stricture formation[14].

As regard to stone clearance rates our URS data compare better with that of EUA meta analysis. We can safely infer that URS is an effective procedure for treating ureteric calculi with nearly 100% clearing rate for stones less than 10mm size for all levels of ureter (table-III).

CONCLUSION

There was a 7.9% (about 8%) incidence of encountering "difficult ureter" while performing ureterorenoscopy for ureteric calculi resulting in failed access for which a Double J stent will have to be introduced to avoid ureteric injury. This possibility of occurrence of a "difficult ureter" and a staged ureterorenoscopy after 2 to 3 weeks should be discussed with the patients preoperatively, in order to avoid patient dissatisfaction after the procedure and allay his undue emotional suffering.

CONFLICT OF INTEREST

There was no conflict of interest for this study.

REFERENCES

1. Talati J, Khan F, Drago H, Lall E, Khan ZN, Talati A, et al. Epidemiology of urolithiasis in Pakistan. In: The Management of Lithiasis. Dordrecht: Springer Netherlands 1997; 38: 21-33.
2. Mcconnell JD. The development of urology in the 21st century. BJU Int 2001; 88 (Suppl-2): 2-6.
3. Aboumarzouk OM, Kata SG, Keeley FX, McClinton S, Nabi G. Extracorporeal shock wave lithotripsy (ESWL) versus ureteroscopic management for ureteric calculi. Cochrane Database Syst Rev 2012; 5: CD006029.

4. El-Assmy A, Hafez AT, Eraky I, El-Nahas AR, El-Kappany HA. Safety and outcome of rigid ureteroscopy for management of ureteral calculi in children. J Endourol 2006; 20(4): 252–5.
5. Geavlete P, Georgescu D, NiţĂ G, Mirciulescu V, Cauni V. Complications of 2735 retrograde semirigid ureteroscopy procedures: A single center experience. J Endourol 2006; 20(3): 179-85.
6. Ji C, Gan W, Guo H, Lian H, Zhang S, Yang R, et al. A prospective trial on ureteral stenting combined with secondary ureteroscopy after an initial failed procedure. Urol Res 2012; 40(5): 593-8.
7. Stoller ML, Wolf JS, Hofmann R, Marc B. Ureteroscopy without routine balloon dilation: An outcome assessment. J Urol 1992; 147(5): 1238-42.
8. Shields JM, Bird VG, Graves R, Gómez-Marín O. Impact of preoperative ureteral stenting on outcome of ureteroscopic treatment for urinary lithiasis. J Urol 2009; 182(6): 2768-74.
9. Assimos D, Crisci A, Culkin D, Xue W, Roelofs A, Duvdevani M, et al. Preoperative JJ stent placement in ureteric and renal stone treatment: Results from the clinical research office of endourological society (CROES) ureteroscopy (URS) global study. BJU Int 2016; 117(4): 648-54.
10. Rapoport D, Perks AE, Teichman JMH. Ureteral access sheath use and stenting in ureteroscopy: Effect on unplanned emergency room visits and cost. J Endourol 2007; 21(9): 993-8.
11. Chew BH, Knudsen BE, Denstedt JD. The use of stents in contemporary urology. Curr Opin Urol2004; 14(2): 111-5.
12. Haleblian G, Kijvikai K, de la Rosette J, Preminger G. Ureteral Stenting and Urinary Stone Management: A Systematic Review. J Urol 2008; 179(2): 424-30.
13. Delvecchio FC, Auge BK, Brizuela RM, Weizer AZ, Silverstein AD, Lallas CD, et al. Assessment of stricture formation with the ureteral access sheath. Urology 2003; 61(3): 518-22.
14. Pardalidis NP, Papatsoris AG, Kapotis CG, Kosmaoglou EV. Treatment of impacted lower third ureteral stones with the use of the ureteral access sheath. Urol Res 2006; 34(3): 211-4.
15. Bourdoumis A, Tanabalan C, Goyal A, Kachrilas S, Buchholz N, Masood J. The difficult ureter: Stent and come back or balloon dilate and proceed with ureteroscopy? What does the evidence say? Urology 2014; 83(1): 1-3.
16. Muslumanoglu AY, Fuglsig S, Frattini A, Labate G, Nadler RB, Martov A, et al. Risks and benefits of postoperative double-j stent placement after ureteroscopy: Results from the clinical research office of endourological society ureteroscopy global study. J endourol 2017; 31(5): 446-51.
17. Lumma PP, Schneider P, Strauss A, Plothe KD, Thelen P. Impact of ureteral stenting prior to ureterorenoscopy on stone-free rates and complications. World J Urol 2013; 31(4): 855-9.
18. Anderson OA, Wearne IMJ. Informed consent for elective surgery-what is best practice? J R Soc Med 2007; 100(2): 97-100.
19. Fuller TW, Rycyna KJ, Ayyash OM, Ferroni MC, Mitchell CR, Ohmann E, et al. Defining the rate of primary ureteroscopic failure in unstented patients: A multi-institutional study. J Endourol 2016; 30(9): 970-4.
20. Viers BR, Viers LD, Hull NC, Hanson TJ, Mehta RA, Bergstralh EJ, et al. The difficult ureter: Clinical and radiographic characteristics associated with upper urinary tract access at the time of ureteroscopic stone treatment. Urology 2015; 86(5): 878-84.
21. Wenzler DL, Kim SP, Rosevear HM, Faerber GJ, Roberts WW, Wolf JS. Success of ureteral stents for intrinsic ureteral obstruction. J Endourol 2008; 22(2): 295-300.
22. Adnan Al-Marzooq W. Preoperative passive ureteral dilatation using J stent in patients with ureteric stone (Benefits and Drawbacks). Med J Babylon 2016; 13(4): 834-8.
23. Türk C, Petřík A, Sarica K, Seitz C, Skolarikos A, Straub M, et al. EAU guidelines on interventional treatment for urolithiasis. Eur Urol 2016; 69(3): 475-82.