

INTERNAL URETHROTOMY AS A CHOICE OF TREATMENT ON A RECURRENT URETHRAL STRICTURE

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Abstract: A urethral stricture is scarring in or around the urethra that narrows or blocks the passageway through which urine flows from the bladder. The aim of the present case report was to evaluate the outcome of direct vision internal urethrotomy (DVIU) in the management of deaf-mute patient with recurrent bulbar urethral stricture. On September 2019 a 38 year old deaf-mute young male patient presented with dysuria, decreased urinary stream with very thin jet, incomplete emptying and associated with fever. Because of high temperature (39° C) and fever, he was hospitalised and treated on a department for infectious disease for the last 4 days. He was treated with cephalosporines (Ceftriaxone 2x2 gr i.v. daily). After the urologist was consulted he was transferred to the urology department. The anamnesis was difficult and the relevant information were taken from his mother and his wife. He was a physical worker, married and with two children. There was a positive history of trauma in childhood 24 years ago when he was injured by a falling bicycle. About 16 years later he sought help in urology unit because of acute urinary retention (RUC). An urethral catheterization wasn't possible due to the urethral obstruction caused by stricture even with catheter 8-Fr, so suprapubic cystostomy was performed. Afterward, internal urethrotomy was done at the urologic clinic in Skopje. Over all this years, he never did urethral dilatation for unknown reasons, probably due to a misunderstanding with his urologist. His complaints about urinating difficulties followed in weakening of the urinary stream and frequent urinary tract infections began 2 years ago. Upon receipt the following searches were made, laboratory results: white blood cell count 18,7 x 10⁹/l; red blood cell count 4,2 x 10⁹/l; hemoglobin level 13.4 g/dl; platelet count 396 x 10⁹/l; C-reactive protein 36 mg/l. Urine analysis showed erythrocyturia with pyuria and with abundant bacteria. Urine culture was positive for E. Coli (103 CFU/ml) and according the antibiogram Ciprofloxacin 2x200 mg i.v. daily. On the second day an 17-Fr urethrocystoscopy performed which revealed a severe stricture of a bulbar urethra with urethral calibration <6 Fr. Retrograde urethrography (RUG) done 18 months ago showed narrowed urethral lumen 1,3 cm in length on the bulbar part. Uroflowmetry showed flow rate below 7 ml/s. Ultrasound of the urinary tract and intravenous urography as supplementary investigations doesn't detect any abnormality of the urinary tract. Patient was counseled about the possibility of the recurrence of the stricture doing internal urethrotomy and was given urethroplasty as a modus of choise. As a family they decided for internal urethrotomy. Under general anesthesia we performed internal urethrotomy ie direct vision internal urethrotomy (DVIU). With a cold-knife we made transurethral incision at 12h to release scar tissue, on wich urethra dilated and we reached to pass through to the urinary bladder. We exam the orifices which were orthotopic and we saw cystitic changes of the urinary bladder. The incision was very hard because of the fibrosis of recurrent stricture of the urethra. The duration of the intervention was just under 25 minutes. The internal urethrotomy finished without any complication and on the end we placed catheter Fr 20. The patient was discharged on the fifth postoperative day with urinary catheter in situ which was removed 3 weeks later. Six month after the intervention, every 4 weeks we stretch the urethra using metal dilator Fr 18. The last measured maximum flow rate (Qmax) in uroflowmetry was 24 ml/s and the last urine culture was sterile.

Keywords: internal urethromy, urethral stricture, case report

1. INTRODUCTION

Urethral stricture is one of the oldest diseases known to man. The term urethral stricture refers to anterior urethral disease and is a scarring process that involves the epithelium and the corpus spongiosum. Contraction of the scar reduces the urethral lumen with subsequent development of lower urinary tract symptoms. In certain cases there is complete obliteration of the urethral lumen leading to urinary retention necessitating suprapubic cystostomy. Posterior urethral strictures are more correctly referred to as Pelvic Fracture Urethral Injuries (PFUIs). Strictures of the prostatic urethra or bladder neck are properly referred to as contractures or stenosis. True world incidence of urethral stricture is difficult to come by in the literature (Ofoha, C. G. et al. 2019). Urethral stricture is a common condition that can lead to serious complications such as urinary infections and renal insufficiency secondary to urinary retention (Stamatiou, K. et al. 2014). Urethral stricture is a narrowing of the urethra caused by scarring,

which functionally has the effect of obstructing the lower urinary tract. The consequences of this obstruction can enormously impair the patient's quality of life by causing micturition disturbances; they can also damage the entire urinary tract, resulting in loss of renal function. It is therefore essential that urethral strictures, which can occur at any age and in either men or women (though they are much rarer in women), are recognized early and appropriately treated. The prevalence in industrial countries is estimated at around 0.9% (Tritschler, S., et al. 2013). The etiology of urethral stricture disease mainly involves the following: idiopathic, iatrogenic, external trauma, infection, and lichen sclerosus (Verla, W., et al. 2019). Almost all strictures for which a cause can be identified are acquired. The largest group (45%) are iatrogenic and result from urethral manipulations (traumatic indwelling catheter, transurethral interventions, correction of hypospadias, prostatectomy, brachytherapy). Thus, for example, the incidence of urethral stricture after transurethral prostate resection (the most common prostate intervention) is 3% to 5%. Another cause of urethral stricture is traumatic urethral rupture associated with pelvic fracture. Bacterial urethritis can also lead to stricture (around 20% of cases); classically, these are cases of untreated gonorrhea. Another inflammatory disease associated with (distal) urethral stricture is balanitis xerotica obliterans, a chronic inflammatory disease whose exact etiology is unknown. Around 30% of urethral strictures are idiopathic. In these cases the most likely trigger is considered to be some forgotten minor trauma that occurred a long time in the past (e.g., perineal injury while riding a bicycle) (Tritschler, S., et al. 2013). The urethra is divided into different segments that are involved in stricture with varying frequency. The segments passing through the prostate (prostatic urethra) and pelvic floor musculature (membranous urethra) are referred to collectively as the posterior urethra, while the anterior urethra is made up of the segment fixed to the pelvic floor (bulbar urethra) and the segment passing through the pendulous portion and glans penis (penile and glandular urethra). Bulbar strictures are most common (around 50%), followed by penile strictures (around 30%) and strictures of the navicular fossa (around 20%). Strictures in the posterior urethra are rare and result either from traumatic urethral rupture or from radiotherapy for prostate cancer (Tritschler, S., et al. 2013). Male urethral stricture continues to be a common and challenging urologic condition. Various options for the management of urethral stricture disease are available, ranging from urethral dilatation, internal urethrotomy (IU), urethral stenting, and progressing to anastomotic and substitution urethroplasty (El Deen M. A., et al. 2017). With its high prevalence, male urethral stricture is one of the most ancient diseases in urological practice. Urethral stricture prevalence stated between 0.6 and 1.4% by different writers affects 15–20% of adult males at some point of time in their lives. Even though different etiological causes play a role in the formation of this disease, the most common being iatrogenic and idiopathic causes (Topaktas, R., et al. 2019). Men with symptomatic stricture disease will typically present with obstructive voiding symptoms such as straining, incomplete emptying, and a weak stream (Hampson, L. A. et al. 2014). In addition to the typical history and physical examination, urethral stricture can be diagnosed on uroflowmetry, urethroscopy, a retrograde urethrography (RUG) and urethral ultrasound. Direct vision internal urethrotomy (DVIU) represents the basis of endoscopically treating urethral strictures (Verla, W., et al. 2019). Internal urethrotomy is a commonly used procedure for treating urethral strictures, especially in undeveloped countries. Nonetheless, strong evidence capable of generating a recommendation based on the postoperative outcomes and complications of the laser urethrotomy versus the cold knife urethrotomy is lacking (Torres Castellanos, L., et al. 2017).

2. CASE REPORT

On September 2019 a 38 year old deaf-mute young male patient presented with dysuria, decreased urinary stream with very thin jet, incomplete emptying and associated with fever. Because of high temperature (39° C) and fever, he was hospitalised and treated on a department for infectious disease for the last 4 days. He was treated with cephalosporines (Ceftriaxone 2x2 gr i.v. daily). After the urologist was consulted he was transferred to the urology department. The anamnesis was difficult and the relevant informations were taken from his mother and his wife. He was a physical worker, married and with two childs. There was a positive history of trauma in childhood 24 years ago when he was injured by a falling bicycle. About 16 years later he sought help in urology unit because of acute urinary retention (RUC). An urethral catheterization wasn't possible due to the urethral obstruction caused by stricture even with catheter 8-Fr, so suprapubic cystostomy was performed. Afterward, internal urethrotomy was done at the urologic clinic in Skopje. Over all this years, he never did urethral dilatation for unknown reasons, probably due to a misunderstanding with his urologist. His complaints about urinating difficulties followed in weakening of the urinary stream and frequent urinary tract infections began 2 years ago. Upon receipt the following searches were made, laboratory results: white blood cell count $18,7 \times 10^9/l$; red blood cell count $4,2 \times 10^9/l$; hemoglobin level 13.4 g/dl; platelet count $396 \times 10^9/l$; C-reactive protein 36 mg/l. Urine analysis showed erythrocyturia with pyuria and with abundant bacteria. Urine culture was positive for E. Coli (103 CFU/ml) and according the antibiogram Ciprofloxacin 2x 200 mg i.v. daily. On the second day an 17-Fr urethrocystoscopy performed which revealed a severe stricture of a bulbar urethra with urethral calibration <6 Fr (Figure 1)

Figure 1.

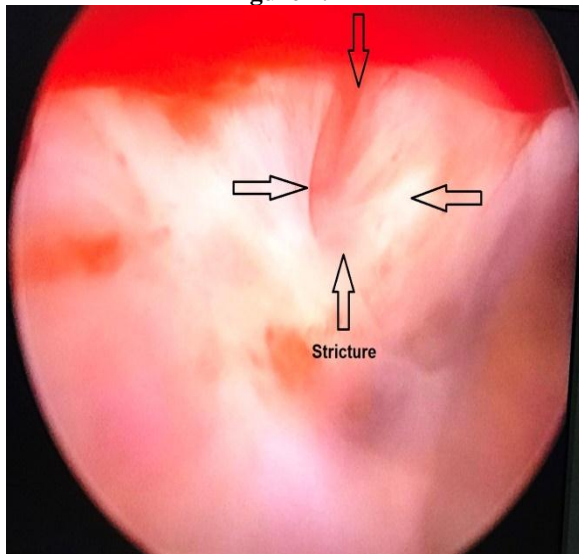
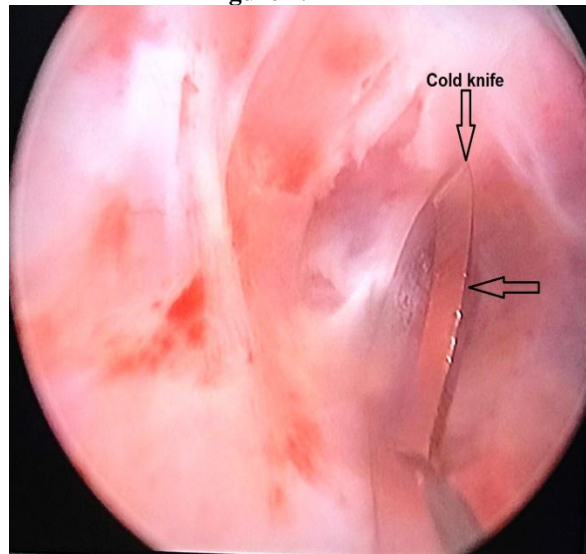


Figure 2.



Retrograde urethrography (RUG) done 18 months ago showed narrowed urethral lumen 1,3 cm in length on the bulbar part. Uroflowmetry showed flow rate below 7 ml/s. Ultrasound of the urinary tract and intravenous urography as supplementary investigations doesn't detect any abnormality of the urinary tract. Patient was counseled about the possibility of the recurrence of the stricture doing internal urethrotomy and was given urethroplasty as a modus of choice. As a family they decided for internal urethrotomy. Under general anesthesia we performed internal urethrotomy ie direct vision internal urethrotomy (DVIU). With a cold-knife (Figure 2) we made transurethral incision at 12h to release scar tissue (Figure 3), on wich urethra dilated (Figure 4) and we reached to pass through over verumontanum (Figure 5) to the urinary bladder. We exam the orifices which were orthotopic and we saw cystitic changes of the urinary bladder (Figure 6 & 7). The incision was very hard because of the fibrosis of recurrent stricture of the urethra.

Figure 3.



Figure 4.

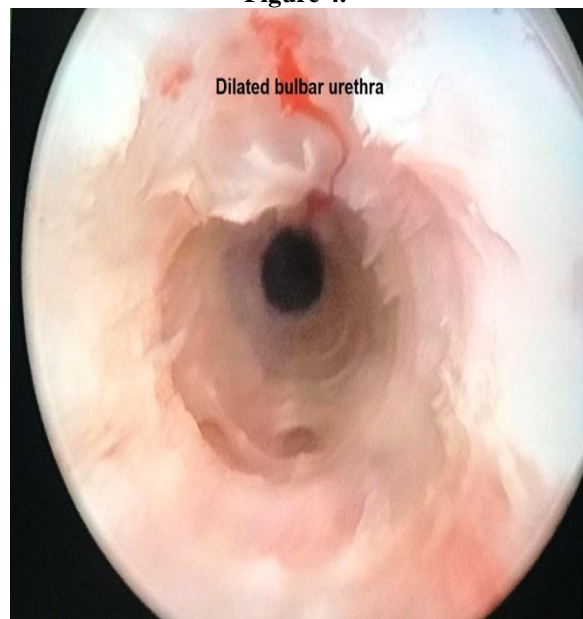


Figure 5.

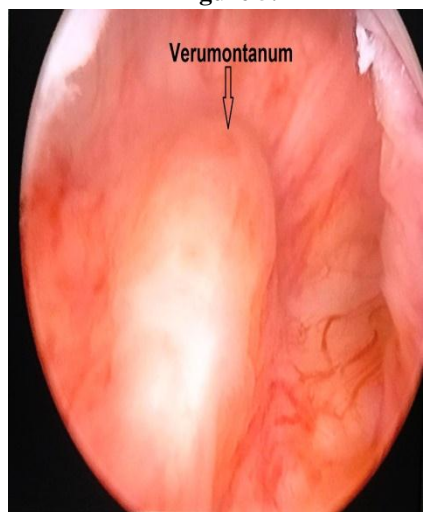


Figure 6.

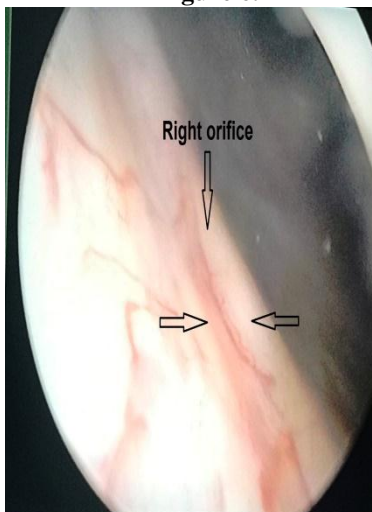
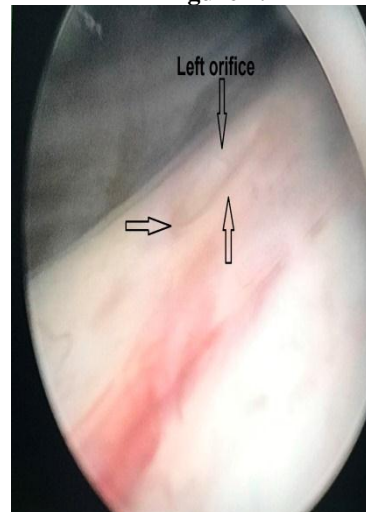


Figure 7.



The duration of the intervention was just under 25 minutes. The internal urethrotomy finished without any complication and on the end we placed catheter Fr 20. The patient was discharged on the fifth postoperative day with urinary catheter in situ which was removed 3 weeks later. Six month after the intervention, every 4 weeks we stretch the urethra using metal dilator Fr 18. The last measured maximum flow rate (Qmax) in uroflowmetry was 24 ml/s and the last urine culture was sterile.

3. DISCUSSION

Urethral stricture is one of the most difficult urological problems to heal adequately and many surgical and non-surgical techniques have been described to its management. The main emphasis of this report is whether urethrotomy was the right choice versus urethroplasty taking into account the fibrosis and the length of the narrowing. Internal urethrotomy success rates vary widely, ranging from 8–80%, depending on patient selection, length of follow-up assessment, and methods of determining success and recurrence. Overall long-term success rates are estimated to be just 20–30%. In general, recurrence is more likely with longer strictures; the risk of recurrence at 12 months is 40% for strictures shorter than 2 cm, 50% for strictures between 2–4 cm, and 80% for strictures longer than 4 cm (Hampson, L. A. et al. 2014). Incidence of urethral stricture recurrence ranges between 2% to 36.4%, with 75% occurring within the first six months of surgery. There are varied definitions of urethral stricture recurrence in the literature. These include recurrent urinary symptoms and/or poor uroflowmetry <15ml/s, imaging showing the recurrence of the stricture, the requirements of additional intervention during follow up after the primary urethroplasty which may include dilatations, urethrotomies or redo-urethroplasty and failure to pass <16 fr on cystoscopic assessment. Attempts have been made to identify some predictive factors for urethral stricture recurrence in the literature. Some of these factors include, preoperative, intraoperative and postoperative factors. There are studies looking at the preoperative factors, however, there are few studies on intraoperative and postoperative factors that may predict stricture recurrence (Ofoha, C. G. et al. 2019). Stricture length was always considered as an important predictive factor for the recurrence after internal urethrotomy. There is clear evidence that stricture length determines the stricture-free rate (SFR) of DVIU. When stricture location was considered as a predictive factor for recurrence after internal urethrotomy, most of the studies claimed better SFR with bulbar urethral stricture than the proximal and distal strictures (Pal, D. K., et al. 2016). Minimal invasive methods such as dilatation, direct visual internal urethrotomy (DVIU), and open urethroplasty techniques are the treatment methods. But it is unclear that which treatment method should be applied on which patient that still continues today among the urologists around the world. Even though open urethroplasty is stated as the golden standard in urethral stricture treatment in questionnaires made in different areas of the world, it is demonstrated that many urologists prefer minimal invasive methods such as dilatation and endoscopic treatments because of their ease of application, simplicity, affordability, and not being a time-consuming or experience-demanding operation such as urethroplasty. But apart from these advantages, low long-term success and formation of stricture again are the most important disadvantages of minimal invasive methods. Thus in new studies, it is stated that the tendency toward urethroplasty increased recently in urethral stricture treatment (Topaktas, R., et al. 2019). An abundance of penile urethroplasty techniques have been described over the years bearing witness to the difficulty in dealing with this condition. All are however based on stricture aetiology, length, location and previous surgical intervention. It is up to the

reconstructive surgeon to carefully evaluate the anatomy of the stricture and supporting tissues intraoperatively and only then decide which technique would give the greatest likelihood of success in any given circumstance. In our practice we consider to offer internal urethrotomy for selected cases as first surgical alternative - bulbar, short (<1 cm) and non-traumatic (with little or minimal spongiositis). All patients should be informed about the low success rates in the long term follow-up with this procedure and the possibility to be submitted to procedures with more definitive results as anastomotic urethroplasty or substitution urethroplasty. We do not offer a second urethrotomy as an option after an initial failure. The internal urethrotomy may also be used as an optional technique in some patients with post urethroplasty failures and even in patients with high surgical risk for a more aggressive procedures. Cold-knife direct vision urethrotomy is a technically simple and easy procedure to perform in patients with urethral strictures. As a result, it is the default treatment approach for urethral strictures compared to long-lasting, complex open urethral reconstructions, requiring experience, precise surgical technique, specific instruments and, often, additional materials. But, the long-term results of urethrotomy are questionable with convincing evidence of high recurrence rates. Nevertheless, general recommendations about who should undergo urethrotomy and who should not are still lacking (Tolkach, Y., et al. 2017).

4. CONCLUSION

Urethral stricture disease is common and constitutes a large proportion of the urologist's workload. When the internal urethrotomy could also be used as an optional technique in some patients with post urethroplasty failures, then we assume we can use it even during the appearance of recurrent urethral stricture.

REFERENCES

- Campos-Juanatey, F., Bugeja, S., Ivaz, S. L., Frost, A., Andrich, D. E., & Mundy, A. R. (2016). *Management of penile urethral strictures: Challenges and future directions*. World J Clin Urol 24; 5(1): 1-10
- Cavalcanti, A., & Fiedler, G. (2015). *Substitution urethroplasty or anastomotic urethroplasty for bulbar urethra strictures? Or endoscopic urethrotomy? Opinion: Endoscopic Urethrotomy*. Int Braz J Urol. 2015 Jul-Aug;41(4):619-22.
- El Deen, M. A., Abdelbaky, T. M., Selim, M. A., Gomaa, I. M. (2017). *Evaluation of direct visual internal urethrotomy in the management of anterior urethral strictures*. Menoufia Medical Journal, 30:367–371
- Hampson, L. A., McAninch, J. W. & Breyer, B. N. (2014). *Male urethral strictures and their management*. Nat Rev Urol; 11(1): 43–50.
- Ofoha, C. G., Ramyil, V. M., Dakum, N. K., Shu'aibu, S. I., Akpayak, I. C., Magnus, F. E., Swem, U., Oshagbemi, A., Osunaiye, O. & Akhaine, J. (2019). *Predictors of urethral stricture recurrence following urethroplasty: a retrospective review at the Jos University Teaching Hospital, Nigeria*. The Pan African Medical Journal; 32:190.
- Pal, D.K., Kumar, S. & Ghosh, B. (2016). *Direct visual internal urethrotomy: Is it a durable treatment option?* Urol Ann 2017;9:18-22.
- Stamatiou, K., Papadatou, A., Moschouris, H., Kornezos, I., Pavlis, A. & Christopoulos, G. (2014). *A Simple Technique to Facilitate Treatment of Urethral Strictures with Optical Internal Urethrotomy*. Case Rep Urol; 137605.
- Tolkach, Y., Herrmann, T., Merseburger, A., Burchardt, M., Wolters, M., Huusmann, S., Kramer, M., Kuczyk, M., & Imkamp, F. (2016). *Development of a clinical algorithm for treating urethral strictures based on a large retrospective single-center cohort*. F1000Research, 5, 2378
- Topaktaş, R., Akyüz, M., Kutluhan, M. A., Kanberoğlu, H., Koca, O., Öztürk, M. İ. & Urkmez, A. *Is minimal invasive technique harmful in treatment of urethral stricture?*. Niger J Clin Pract 2019;22:406-9.
- Torres Castellanos, L., Moreno Bencardino, M. C., Bravo-Balado, A., García Mayorga, C. A., Vargas Manrique, I. & Fernández, N. (2017). *Evaluation of the Efficacy and Safety of Laser versus Cold Knife Urethrotomy in the Management of Patients with Urethral Strictures: A Systematic Review and Meta-Analysis of Randomized Clinical Trials*. Urol Int.;99(4):453-459
- Tritschler, S., Roosen, A., Füllhase, C., Stief, C. G. & Rübber, H.(2013). *Urethral Stricture: Etiology, Investigation and Treatments*. Dtsch Arztebl Int; 110(13): 220–6
- Verla, W., Oosterlinck, W., Spinoit, A-F. & Waterloos, M. (2019). *A Comprehensive Review Emphasizing Anatomy, Etiology, Diagnosis, and Treatment of Male Urethral Stricture Disease*. Biomed Res Int.:9046430