Thermoexpandable Urethral Nickel–Titanium Stent Memokath for Managing Urethral Bulbar Stricture After Failed Urethroplasty

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Abstract

Introduction: Urethral stenting became popular two decades ago, but nowadays its frequency is slightly decreased because of the rising application of urethroplasty. Today urethral stenting is reserved only for failure after urethral reconstruction or in cases when the plastic surgery is unfavorable. The Memokath stent (Pnn Medical A/S, Kvistgaard, Denmark) is manufactured from a biocompatible alloy of nickel and titanium and known to be the most popular in this field.

Case Description: A 38-year-old man with a history of 9 years Memokath urethral stenting was admitted to our clinic with obstructive lower urinary tract symptoms. The indication for Memokath stenting was repeated recurrences after endoscopic and reconstructive operations. The plain radiography showed a normal position of the stent and only the endoscopic examination revealed its total calcification. New superpulse thulium fiber laser has been used to free the stent from the stones and safely remove it without additional urethral injury.

Results: The postoperative time was within normal limits, the catheter was removed on the fourth day after operation. Three months follow-up was without stricture recurrence. We continue active surveillance of the patient.

Conclusion: The calcification of the stent could be properly diagnosed endoscopically; the Memokath stent could be safely removed in 9 years after implantation; thulium fiber laser is effective and safe in the management of encrusted urethral stent.

Keywords: laser, stents, urethral stricture

Introduction

THE PATHOPHYSIOLOGY OF URETHRAL STRICTURE disease is related to replacement of normal corpus spongiosum with scar tissue. The treatment often remains challenging, especially in case of recurrent bulbar urethral stricture. According to established guidelines endoscopic management is reserved for primary bulbar urethral strictures <2 cm in length.¹ This kind of surgical treatment consists of direct visual internal urethrotomy (DVIU). In case of recurrent bulbar strictures repeated use of DVIU has shown poor long-term outcomes.² However, the overall risk of stricture recurrence after urethroplasty has been reported to be nearly 16%.³ To overcome the issues related to surgical treatment, the implantation of temporary thermoexpandable urethral stent was developed.

The Memokath stent (Pnn Medical A/S, Kvistgaard, Denmark) is manufactured from a biocompatible alloy of nickel and titanium. When positioned endoscopically the anchoring

of stent is performed by warm water instillation (55 C). The long-term data of urethral stenting are lacking and usually its results were evaluated several months after operation. Furthermore, we did not find in available literature the presentation of cases with a description the long-term results of Memokath stenting. In this study we would like to present our case, illustrating an issue of Memokath stent implantation for 9 years.

Case Presentation

A 38-year-old male patient with previously implanted stent Memokath presented complaining of extremely weak urinary flow and some discomfort within urethra in supine position. His previous history included blunt perineum trauma at an age of 16 years, followed by immediate urethral catheter placement. Furthermore, the patient noted a symptom of persisting pain within the urethra after any time of overcooling. One year later the second episode of blunt

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FIG. 1. Plain X-ray film, showing normal position of the Memokath stent. No signs of encrustation.

perineum trauma occurred. Consequently, during next 10 years the patient has developed few episodes of acute urinary retention. In July 2009 he underwent the surgical procedure of DVIU, complicated postoperatively with urinary retention requiring suprapubic tube placement. Two months later the buccal mucosa graft urethroplasty was performed.

The postoperative period was complicated with scrotal and perineal abscess (Clavien grade III). One month later another acute urinary retention occurred, followed by DVIU and removing of intraurethral ligatures. Four months later the patient

FIG. 2. The retrograde urethrogram. The contrast flows into the bladder. Bladder neck sclerosis is suspected.

FIG. 3. The urethroscopy. The thulium superpulse fiber laser lithotripsy is started.

presented in hospital with obstructive lower urinary tract symptoms. Postvoid residual urine measured by ultrasonography was 150 mL. The retrograde cystourethrography showed the stricture of bulbar urethra with length of 2.5 cm. Urinary culture obtained was sterile. In January 2010 the patient underwent the Memokath stent implantation (Pnn.Medical A/S, Kvistgaard, Denmark). The postoperative period was uneventful. Ultrasound examination showed no postvoid residual urine.

Furthermore, next 8 years the patient presented with no complaints until 2018 year, when he started to note the decreased urinary flow and some discomfort inside the urethra in supine position. On 1 year follow-up visit the postvoid residual urine volume was 100 mL. The plain X-ray showed a shadow of intraurethral stent, the position of which seems to be normal (Fig. 1). The intraluminal space of stent seemed to be obliterated with calcifications of low density. The retrograde urethrography showed the whole urethra filled with contrast till the prostatic zone, where concomitant bladder neck stenosis was supposed (Fig. 2). The intraurethral stent seemed not to pass the contrast, but in this setting the diagnosis of complete stone encrustation was not so evident preoperatively.

The preoperative International Prostate Symptom Score/quality of life score was 24/6. On June 27, 2019 the patient underwent the urethroscopy under general anesthesia. The distal part of Memokath stent was located in penile urethra and the total internal encrustation was revealed. The thulium superpulse fiber laser lithotripsy was started (Fig. 3), but discovering the total severe encrustation of stent, so there was a decision to detach stone casts from the stent and then remove it separately to avoid urethral injury. Then, the stent with four internal stone casts were removed under endoscopic control. The urethral catheter 16F was placed and removed on fourth day and the patient was discharged on fifth day. Three-month follow-up showed no urethral stricture recurrence. We continue to follow the patient.

Discussion

The application of Memokath stenting in treatment of urethral strictures still remains a controversial topic. With the aim to assess the efficacy of Memokath implantation for recurrent bulbar urethral strictures a large group of 92 patients was investigated in multicenter randomized controlled study performed by Jordan et al.⁴ The authors found that the use of Memokath stenting was effective in urethral patency maintenance in patients treated with dilation or urethrotomy.⁴ In another study, presented by Wong et al.,⁵ 78% patients remained stricture free after stent removal at median follow-up of 23 months.

Barbagli et al. presented their investigative pilot stage 2a study, resulted with not so encouraging issues.⁶ The authors found Memokath stent implantation as a part of recurrent bulbar strictures treatment to be not clinically helpful. The main adverse effects related to Memokath stenting are pain or discomfort, stent dislocation, stone encrustation, and recurrent strictures with the stent in place and after the stent removal.⁶ The study included 16 patients with maximum term for stent implantation of 1 year.

The management of recurrent bulbar strictures is a challenging clinical problem because of poor outcomes of repeated urethrotomies. As well the urethroplasty also bears the risk of stricture recurrence postoperatively.

Our case illustrates that severe encrustation inside the stent lumen should be suspected in setting of bladder outlet obstruction associated with pain or discomfort in urethra. In presented case the retrograde urethrography demonstrated the contrast filling the whole urethra bypassing between the encrusted stent and urethral wall. Thus, the diagnosis of internal stent encrustation should be finally confirmed only endoscopically.

According to aforementioned study of Barbaglia, minor calcifications inside the stent could be treated endoscopically by laser lithotripsy, avoiding the need to remove the stent and preventing severe stone obliteration.⁶ In the same study the stent extraction reported was difficult in 2 of 16 patients because of severe internal encrustation and internal growth of inflammatory tissue.⁶

The new thulium superpulse fiber laser has been shown to be a very effective in a safe removal of the encrusted urethral stent. However, in case when the decision is taken not to remove but treat the moderately encrusted stent by lithotripsy, the use of LithoClast™ (simultaneous ultrasonic and pneumatic lithotripter) could be proposed in order not to damage the structure of the stent wire.⁷

Conclusion

Stent calcification is known to be frequent late complication of the urethral stenting. Once the obstructive symptoms have been occurred, either stent encrustation or migration has to be suspected and ruled out. The X-ray is helpful in case of the stent migration, but the encrustation must be confirmed only endoscopically. Thulium superpulse fiber laser is effective in the removal of the obstructed stent. Our case describes that the Memokath stent could be safely removed after 9 years of placement without simultaneous urethral injury, which represents a rare durability of Memokath urethral stent remaining in place without stent migration, tissue proliferation, and with safe issues for patient.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editor-in-chief of this journal on request.

Disclosure Statement

No competing financial interests exist.

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Abbreviation Used

DVIU = direct visual internal urethrotomy

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