Submucosal stone formation after 14-years of polydimethylsiloxane (Macroplastique®) endoscopic subureteric injection for vesicoureteral reflux: Unusual presentation for a rare complication

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A B S T R A C T

Polydimethylsiloxane (Macroplastique®) endoscopic subureteric implantation is considered to be safe and effective for vesicoureteral reflux (VUR) treatment. The Macroplastique® implantation is popular for its high success rate and minimal complications. A 22-years-old male who underwent prior subureteric endoscopic therapy with Macroplastique for VUR 14-years ago was investigated for microscopic hematuria. Renal ultrasound confirmed the presence stone that was retrieved by cystolitholapaxy. Although endoscopic subureteric implantation with Macroplastique has a high success rate for VUR resolution, caution during the follow-up period in order to prevent potential long-term complications is required.

Introduction

Vesicoureteral reflux (VUR) affects 50% of children with urinary tract infection (UTI). A UTI contributes to renal function deterioration and affects overall health of a child. Treatment options include both medical and surgical therapies. Under surgical options, there are open procedures, such as ureteral reimplantation or endoscopic therapy with subureteric injection of a bulking agent. The aim of subureteric injection procedures, such as ureteral reimplantation or endoscopic therapy with Macroplastique for VUR 14-years ago was investigated for microscopic hematuria. Renal ultrasound confirmed the presence stone that was retrieved by cystolitholapaxy. Although endoscopic subureteric implantation with Macroplastique has a high success rate for VUR resolution, caution during the follow-up period in order to prevent potential long-term complications is required.

Case report

A 20-years-old male presented with microscopic hematuria, dysuria, and mild suprapubic pain over the last 18 months. He had a history of left subureteric injection by Macroplastique® at the age of six years as for left side grade five VUR treatment done at another institution. The patient had a positive urine culture that was managed with supportive treatment and antibiotics but showed no clinical improvement. Three months ago, he developed painless microscopic intermittent hematuria with mild suprapubic pain and no other associated symptoms. His family physician decided to perform an abdominal (US) that showed a bladder stone approximately 1 cm in size with no associated hydronephrosis bilaterally. We decided to perform cystoscopy and laser lithotripsy. The patient was placed into the lithotomy position, sterile drapes were applied, and cystoscopy 22 Fr showed normal urethra and bladder neck; however, we found a fixed, and partly submucosal bladder stone located medial to the left ureteric orifice. Laser lithotripsy was performed using a 50μ fiber with settings of 0.8J and 15Hz as shown in [Fig. 1, A-C]. No stent was inserted since there was no previous hydronephrosis. The patient’s condition was good, and he was discharged to home the same day. He was seen four weeks later and had a normal abdominal US.
Discussion

Several materials are available that are used in the endoscopic subureteric injection for VUR treatment. Agents can be autologous, such as fat or collagen, or non-autologous such as polytetrafluoroethylene (PTFE), dextranomer hyaluronic copolymer (Deflux®), and polydimethylsiloxane (Macroplastique®). The ideal injectable agent should be non-toxic, non-migratory, non-antigenic, and biocompatible but has not yet been discovered. Macroplastique® is a silicon elastomer with widespread medical applications, such as pacemaker leads, artificial urinary sphincter, and others. STING with Macroplastique® has acquired acceptance and popularity due to the material’s effectiveness and safety.

Post-operative complications following endoscopic administration of Macroplastique® are very limited. Short-term complications were found to be urinary tract infection (UTI) and ureteric obstruction. Long-term complications reported in two centers after one-year of follow-up were 1% ureteral obstruction, 0.6% ureteral erosion, and 2.1% contralateral VUR. Few cases reported stones at the prior STING site several years after Macroplastique® implantation. In one study, Macroplastique® implantation caused gross hematuria after four years. Imaging confirmed the presence of calcification, and the stone was disintegrated using a Holmium laser. Another study reported a patient who presented with pyelonephritis. Based on investigations and cystoscopic findings, there were two bladder stone found at the prior site of Macroplastique® implantation six years after undergoing the injection. Stones were removed, and patient remain asymptomatic upon subsequent follow-up. In addition, three out of 232 patients who underwent Macroplastique® implantation developed stones at the same site after five, seven and nine years of follow-up. In our case, we report the longest late presentation (after 14 years) found in the literature of such a complication. The recent guidelines by American Urological Association (AUA) for VUR management recommend a voiding cystography following intervention to ensure resolution. However, recommendations in terms of duration of post-intervention follow-up are still undefined.

Conclusion

Our case showed unusual delayed presentation in the form of microscopic hematuria caused by calcified Macroplastique® after 14 years. A vigilant follow-up program for monitoring patients post-endoscopic subureteric injection with Macroplastique® need to be defined as long-term complications can appear after several years.

Declaration of competing interest

Authors have no conflict of interest.

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