

Late ureteral obstruction in an adult who had STING/Teflon in childhood: Should we expect an epidemic?

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Abstract

We present a case of left renal colic in a 25-year-old female patient. She had subureteral injection of Teflon (STING) at the age of 10 due to vesico-ureteral reflux (VUR) disease and recurrent urinary tract infections. Renal colic was the result of late ureteral obstruction due to Teflon-induced periureteral foreign body reaction. To our knowledge, this is the longest interval between STING and ureteral obstruction reported and the first case of delayed ureteral obstruction caused by Teflon. Monitoring the upper tracts of patients after STING should go beyond childhood.

Introduction

Polytetrafluoroethylene (Teflon) has been used in several disciplines in medicine. In urology Teflon is used as polytef paste, which is a mixture of Teflon particles measuring 4 to 100 micrometers, glycerin and polysorbate. Polytef paste was first used for treating stress incontinence as a bulking agent by periurethral injection in 1974.¹ Subureteral injection (STING) of biomaterials was introduced in 1984.² This minimally invasive technique evolved as an alternative to open surgery in children with vesicoureteral reflux (VUR) disease and recurrent urinary tract infections (UTIs). The first material used in STING was polytef paste. Since then thousands of children with VUR were treated by this modality. Although initially met with enthusiasm, the use of polytef paste in urology fell out of favour mainly due to concerns about the possibility of Teflon migration both locally and to distant parts of the body.³ Brain injury in a 6-year-old girl was suggested to be a result of STING/Teflon a year earlier.⁴ Pulmonary migration following periurethral Teflon injection has been described.⁵ Pelvic lymph node migration was found in 3 patients who had STING/Teflon injected previously. In one patient Teflon caused adenopathy.⁶

We present a case of delayed ureteral obstruction in a female patient who underwent STING/Teflon 14 years before. To our knowledge this is the first reported case of delayed ureteral obstruction caused by STING/Teflon and the longest interval, between STING and ureteral obstruction.

Case report

A 25-year-old female, married and mother of two, presented to the emergency room (ER) with severe left renal colic, which started few hours ago, associated with nausea and vomiting. Since her first pregnancy, she has been having paroxysmal left flank pain, but never this severe. Her medical history was significant for STING/Teflon (no information of the volume of polytef injected) done at another hospital in June 2001 when she was 10 due to left grade III VUR and recurrent UTI. A subsequent voiding cystourethrogram showed resolution of VUR. She was under surveillance for 2 more years. Serial ultrasounds were normal and UTIs ceased. She got married in 2009 and had 2 spontaneous pregnancies with normal vaginal deliveries in 2010 and 2013. On the 8th week of her second pregnancy she underwent abdominal ultrasound. Left mild to moderate hydronephrosis was seen. She was advised to evaluate left hydronephrosis, following delivery, but she was non-compliant.

In the ER, her physical exam was characteristic of renal colic. She had no fever; her laboratory values, including hemoglobin, creatinine, liver function tests and C-reactive protein, were within the normal range. Her white cell count was $12.63 \times 10^9/L$ (normal: $4-10 \times 10^9/L$) and her urine culture was negative. Abdominal ultrasound was done which was significant for severe left hydronephrosis. No abnormality was detected in the bladder and bilateral urinary "jets" were displayed. Computer tomography was done with intravenous contrast. Severe left hydroureteronephrosis was seen with renal pelvis anterior-posterior diameter measuring 5.4 cm (Fig. 1). In the bladder, at the site of the left



Fig. 1. Left severe hydronephrosis.

ureteral orifice, an amorphous calcification was seen measuring 2 cm in diameter (Fig. 2). A delayed phase 30 minutes after contrast injection was done displaying contrast in the left upper tract down to the uretero-vesical junction. An abdominal x-ray done 2 after intravenous contrast administration showed a dilated left system with negligible contrast seen on the right (Fig. 3). She was treated with analgesics but needed hospitalization due to intractable pain. A renal dimercaptosuccinic acid (DMSA) scan showed equal relative renal function. A subsequent cystogram did not show VUR.

At cystoscopy the left ureteral orifice was seen as a “volcanic mount.” Left retrograde pyelography simulated renal colic. Although a urine “jet” was evident, there was also reverse peristalsis and an hour later there was still contrast in the left upper tract. Urolithiasis was not seen. A diagnosis of partial ureteral obstruction was made and a ureteral stent was inserted.

A month later left ureteroneocystostomy was carried-out using the Leadbetter-Politano technique. Macroscopically the left ureteral orifice was edematous and raised (Fig. 4). Histology of the left ureteral orifice was significant for a marked FBR (Fig. 5a, Fig. 5b). Surgery and recovery were uneventful.

Discussion

Teflon particles, injected into the bladder or subureter, react unpredictably with the host tissue. In most patients there is a minor immune reaction, but in others a prominent FBR is elicited and migration occurs. Some have suggested that a FBR and migration are the result of the location of the polytef paste following injection. Little reaction follows submucosal injection, but if injected into the detrusor or perivesicular fat a marked FBR occurs with fibrosis. While it is thought that FBR may cause systemic complications related



Fig. 2. Amorphous hyperdense lesion at the left ureteral orifice.



Fig. 3. Abdominal x-ray done 2.5 hours following injection of the intravenous contrast.

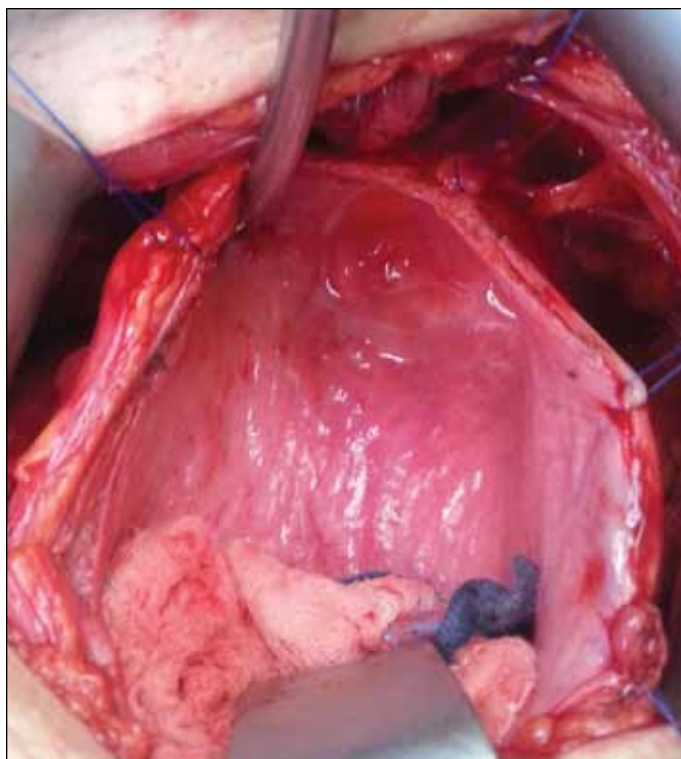


Fig. 4. Raised and edematous left ureteral orifice.

to Teflon migration, it causes local complications.⁷ Acute or acute transient ureteral obstruction following STING has been described for both Teflon and dextranomer/hyaluronic acid.^{8,9} The incidence of acute obstruction is 0.7% to 5.7% and several risk factors have been described.^{10,11} Treatment of acute obstruction can be by temporary drainage (ureteral

stenting/nephrostomy tube) or surgery. However delayed obstruction is rare and there are no other risk factors. The common denominator in all reports of delayed obstruction is a marked FBR at the obstructed ureteral orifice and all cases were corrected by surgery.^{12,13} In these reports, the interval between STING and detection of obstruction was 1 to 62 months.^{13,14} Our patient had normal non-dilated left upper tract 2 years after STING. Left mild to moderate hydronephrosis was detected by ultrasound in the first trimester of her second pregnancy 12.5 years following STING. She became symptomatic with renal colic 14 years following STING when she was 24. Partial obstruction of the left ureter in this patient was the result of Teflon-induced FBR.

Ureteral obstruction could have been a result of the migration of the FBR lesion as a result of the mechanical forces of labour. However, the stepwise increase in hydronephrosis suggested the progressive nature of this obstruction. On positron emission tomography-computed tomography with 18F-2-deoxyglucose, lesions of FBR stay metabolically active decades after the injection of Teflon.¹⁵ In another report facial FBR, to polymethylmethacrylate, was aggravated by pregnancy.¹⁶ Taken together it is not inconceivable that if such a lesion is "alive" for years, pregnancy may cause a change in its inherent immunity.

This patient is in her productive years and expressed the desire to conceive in the future. Since there is a higher incidence of UTI and pyelonephritis in pregnancy, we chose a non-refluxing technique for ureteroneocystostomy.¹⁷ During surgery we decided to remove the left ureteral Teflon containing orifice. In light of her long life expectancy, we think this was advisable.

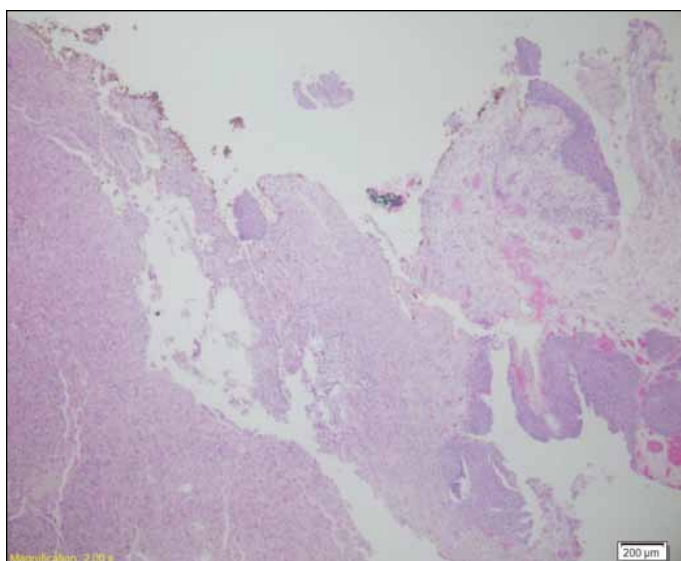


Fig. 5a. Histologic section (hematoxylin and eosin) through the excised ureteral orifice.

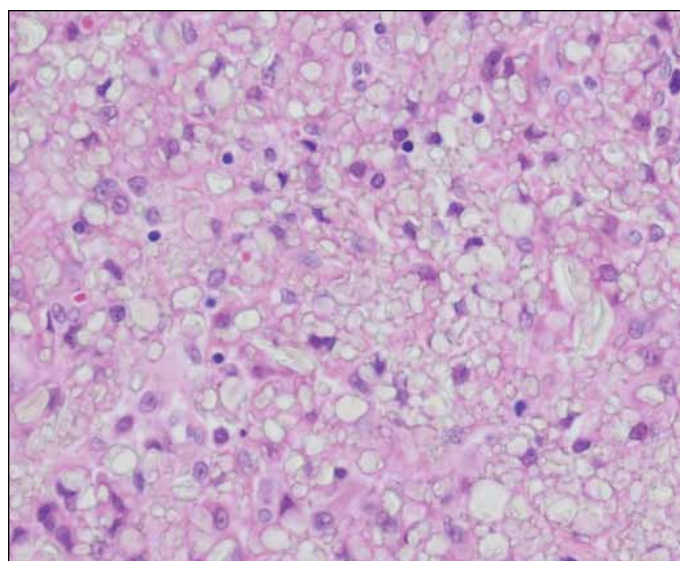


Fig. 5b. Magnification of the histologic section displaying characteristic FBR to Teflon.

Conclusion

To our knowledge this is the first case of delayed ureteral obstruction due to STING/Teflon and the longest delay to obstruction of any biomaterial used in STING. Awareness of this phenomenon by clinicians and patients is crucial. Follow-up of these patients should go beyond the first years after STING. We think young female patients, with a history of STING, are a special subset and should be screened before and after pregnancy. Should we expect an epidemic? Probably not, but we need to be vigilant.

Competing interests: The authors declare no competing financial or personal interests.

This paper has been peer-reviewed.

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