Pathological changes associated with DEFLUX use in vesicoureteric reflux

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ABSTRACT

Vesicouretral reflux (VUR) which is the backflow of urine from the bladder to the kidneys leading to renal dysfunction. It is a common problem that is being encountered. Most of children and infants with UTI turn to be having VUR and patients who left untreated turned to have renal scarring and in turn to have end stage renal disease. For preventing these consequences, an intervention is needed. Previously, surgical intervention was the mainstay treatment and the new practice have endoscopic injection of deflux that is a gel-like material that consist of Dextranomer/Hyaluronic acid copolymer, which had replaced other methods of invasive antireflux surgeries and becoming the preferred method used in practice for solving VUR by building an artificial valve system. In the following case, we will highlight the histologic manifestation of the deflux injection.

Keywords: Deflux injection, Dextranomer micro-spheres, Vesicouretral reflux

INTRODUCTION

Vesicouretral reflux (VUR) is congenital anomaly of the vesicoureteric junction causing backflow of urine from the bladder to the ureters with reflux to kidneys in more severe cases [1]. It is more common in infants and children placing them at risk of developing serious complications if unrecognized at its earlier stages [1]. In an attempt to minimize long-term complications of pyelonephritis and renal failure, surgical intervention has been the mainstay of treatment. Recently, DEFLUX has been introduced as a less aggressive surgical intervention to minimize these complications [2]. DEFLUX is a gel-like material that consists of Dextranomer/Hyaluronic acid copolymer, which was introduced in 1995 and was approved for use by different medical bodies by 2003 [3, 4]. It has a success rate between 50 and 94% [2]. The histological changes in the ureter associated with the utility of this material has been sparsely documented. In this report, we focus on the histological manifestations associated with DEFLUX use.

CASE REPORT

A 9-year-old female with VUR was managed with DEFLUX injection. She had grade-V VUR and impaired renal function with scarring of right kidney as demonstrated on DMSA scan. As her condition has not improved with DEFLUX injection, she underwent a cystoscopy and ureteric reimplantation (ureteroneocystostomy).

Intraoperatively, the patient was found to have double ureters on the right side. The more cephalic one had a wider diameter. A hard mass was palpated on the trigon and the distal part of ureter, corresponding to the site of prior DEFLUX injection.

Gross examination of the resected specimen consisted of a hemorrhagic tissue fragment measuring 1.8×1.3×0.9 cm. A surgical suture was present at one end. Cut section
reveals a tubal structure in the middle of the soft tissue that measured 1.8 cm in length by 0.5 cm in diameter. The lumen was patent and measured 0.2 cm in diameter. Surrounding the tubal structure on both sides were two cystic areas filled with yellow soft material (Figure 1A).

Microscopic examination revealed two ureters with a periureteric cystic cavity compressing the ureteric lumens and forming a mural mass (Figure 1B). The cystic spaces contained abundant amorphous basophilic material forming cystic spaces around the ureter on either side (Figure 1C). There was foreign body type giant cell reaction and calcifications (Figure 1D). In some sections the intracystic material formed round eosinophilic spherules of an amorphous material. The surrounding ureteric wall demonstrated fibrosis and chronic inflammation.

DISCUSSION

Congenital anomalies of vesicoureteral junction are common primary cause of VUR. Among children who present with urinary tract infection, 25–40% are associated with VUR [1]. The utility of DEFLUX has been considered a popular alternative to surgery due to its less invasive nature with minimal tissue reaction when injected locally, short duration of the intervention and a high success rate with a low morbidity. A cure rate of 80% has been documented, thus, representative of an attractive alternative to invasive surgery [3].

DEFLUX is a gel-like material that consists of dextranomer microspheres. It is injected around the ureters to create an external valve system that prevents reflux of urine. There has not been any reported immune reaction to the injection of this material or migration to other organs in the body. In addition, it has a short recovery period [4, 5]. But our concern here whether it does completely solve the problem or it might play a role in causing other complications for the patients. Among reported complications is temporary obstruction of vesicoureteral junction [2]. Generally using DEFLUX is relatively safe and minor complication might develop. The success rate of DEFLUX injection is between 68 and 92% [5]. In the current case, it was associated with failure and progression of renal impairment. This might have been complicated by the fact that the patient had a double ureter. In the current case, due to failure of DEFLUX injection, the physicians had to resolve to surgery and reimplantation of the ureter was performed. Failure of DEFLUX injection does not preclude further surgical intervention [6]. The prior reports documenting the histological findings with DEFLUX injection report chronic inflammation, giant cell reaction, and granulation tissue [7].

CONCLUSION

Endoscopic use of DEFLUX material that is a safe, effective, and less aggressive method of managing patients with VUR. The histological features demonstrate a mural foreign body-type giant cell reaction with amorphous eosinophilic spherules or nondescript basophilic material with calcification. Associated fibrosis and chronic inflammation is noted. The changes facilitate the development of an artificial external valve system that minimizes reflux of urine to the kidney and thus prevents subsequent irreversible renal damage.

REFERENCES


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Author Contributions
Hajir Abdelrahman Abid – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Data Availability
All relevant data are within the paper and its Supporting Information files.

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