

Unraveling the Veil: Deflux Injection Masquerading as Calculus at the Vesicoureteric Junction

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We are pleased to present an intriguing case that underscores the potential for misinterpretation of ultrasound findings, particularly in the context of a relatively common clinical scenario.

During a routine ultrasound examination of a 12-year-old boy with a history of left-sided vesicoureteric reflux (VUR), a distinct hyperechoic focus measuring approximately 1.7 cm with posterior shadowing was observed at the left vesicoureteric junction (VUJ) (**►Fig. 1A**). Notably, color Doppler imaging revealed a characteristic twinkling artifact (**►Fig. 1B**), alongside the presence of ureteric jets from both VUJs into the bladder (**►Fig. 1C**).

Regrettably, in the enthusiasm of identifying what was presumed to be a 1.7-cm nonobstructive calculus, the crucial step of detailed patient history examination was overlooked. Subsequent inquiry into the patient's medical background revealed a history of successful treatment for left-sided VUR

3 years prior, through the administration of Deflux injection at the VUJ. This revelation challenged the initial diagnosis of VUJ calculus, shedding light on the possibility of Deflux injection mimicking such calcific appearances.

Deflux injection, comprising a biodegradable dextranomer-hyaluronic acid copolymer, is commonly employed in the management of vesicoureteral reflux in pediatric patients (**►Fig. 2**). Its mechanism involves inducing a mass effect at the VUJ, thereby enhancing valve competency and preventing reflux. Deflux injections are administered into specific layers of the ureter and the bladder. Subureteral injections are administered beneath the ureteral orifice, targeting the submucosal layer of the ureter at the VUJ (**►Fig. 3A**)—also known as STING (subureteric injection). Another technique called the hydrodistension implantation technique (HIT) consists of introducing the needle into the mucosa inside the ureteral tunnel. Finally, the double HIT is

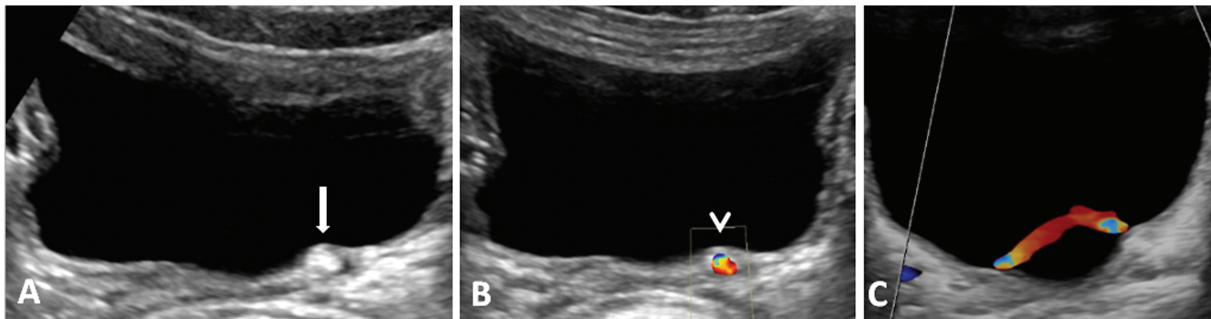


Fig. 1 Ultrasound image of the bladder shows (A) a well-defined hyperechoic focus with posterior shadowing at the left vesicoureteric junction (VUJ) (arrow). On color Doppler, there was (B) twinkling artifact (arrowhead). Doppler also showed ureteric jet from both VUJ into the bladder (C).

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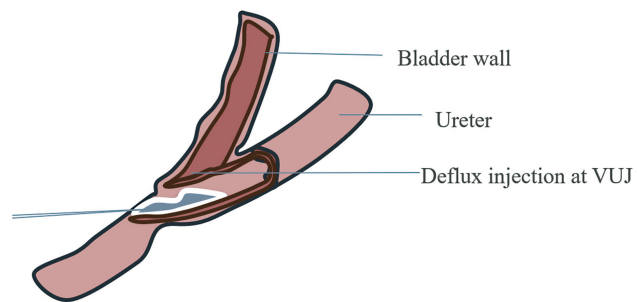


Fig. 2 Diagrammatic representation of Deflux injection at vesicoureteric junction (VUJ) through cystoscopy approach.

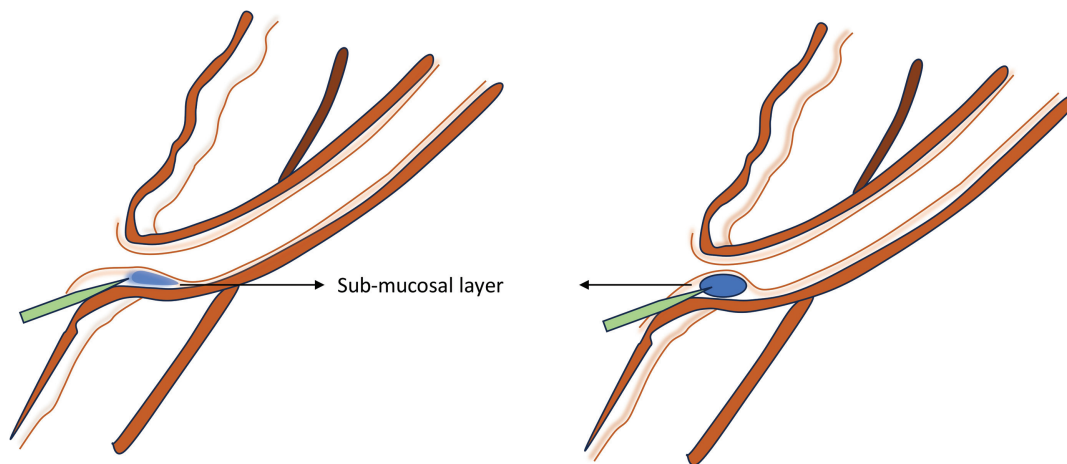
currently the most performed technique for endoscopic correction of VUR in the United States. It consists of two intraluminal ureteric tunnel injections with hydrodistension. The first injection of the bulking agent aims to coapt the detrusor tunnel whereas the second injection in a more distal intramural tunnel leads to coaptation of the ureteric

orifice. These intravesical injections are administered at the detrusor muscle layer (→ **Fig. 3B**). Endoscopic injections, performed via a urethral endoscope, can target either the submucosal layer of the ureter or the detrusor muscle layer.³

On ultrasound, these implants may initially appear isoechoic, later transitioning to a hyperechoic state with post-acoustic shadowing and twinkle artifacts. On noncontrast computed tomography (CT) scans Deflux appears hypodense. But density can change over time depending on biodegradation, displacement, dissolution, calcification, or disruption.⁴

In distinguishing Deflux injection from calculus on ultrasound, certain key considerations merit attention. First, meticulous patient history remains paramount. Additionally, the absence of hydronephrosis despite the presence of a seemingly large calculus, coupled with the persistence of ureteric jets into the bladder, can serve as crucial discriminators. Similarly, on CT absence of back pressure changes in the form of hydronephrosis and density < 400 HU were highly suggestive of calcified Deflux.⁴

STING



DOUBLE HIT

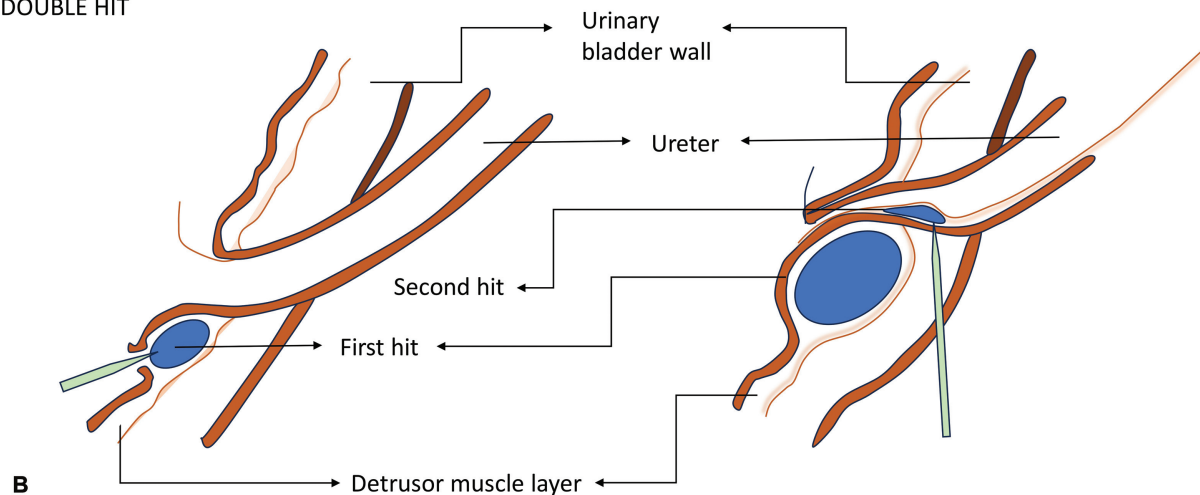


Fig. 3 (A) Diagrammatic representation of STING (subureteric injection) technique with submucosal injection of Deflux into the ureter. (B) Diagrammatic representation of double hit technique of Deflux injection into the detrusor muscle in the urinary bladder and the submucosal layer of the ureter.

The overarching lesson derived from this case extends beyond mere differentiation between Deflux injection and calculus. It underscores the fundamental principle of diagnostic medicine: the imperative to recognize the subtleties of individual patient presentations amidst the broader statistical landscape. While the majority of cases may conform to expected patterns, it is the identification and interpretation of atypical findings that truly distinguish clinical acumen.

In conclusion, this case serves as a poignant reminder of the nuanced nature of diagnostic radiology, urging practitioners to exercise diligence, clinical judgment, and an unwavering commitment to patient-centered care.

Conflict of Interest

None declared.

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