



VESICoureTERIC JUNCTION CALCULUS MASQUERADING AS BLADDER OUTLET OBSTRUCTION: MEDICAL EXPULSION THERAPY IN ATYPICAL PRESENTATIONS

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ABSTRACT

Background: Lower urinary tract symptoms (LUTS) in adult males are conventionally attributed to benign prostatic hyperplasia or bladder outlet obstruction (BOO), whereas ureteric calculi classically present with renal colic. Distal and vesicoureteric junction (VUJ) calculi can, however, present predominantly with irritative and obstructive voiding symptoms rather than typical colic, creating a recognised diagnostic pitfall. **Methods:** We conducted a retrospective, single-centre case series of 15 male patients (age range 18–40 years) who presented with LUTS and obstructive uroflowmetry and were subsequently found to have a VUJ calculus (4.4–6.5 mm) on renal tract ultrasonography. All patients were evaluated with history, digital rectal examination, urinalysis, urine culture, renal function tests, uroflowmetry and ultrasonography of the kidneys, ureters and bladder. All were managed conservatively with medical expulsive therapy (MET) tamsulosin 0.4 mg once daily, oral diclofenac, and oral hydration of 2–3 L/day and followed up with repeat uroflowmetry and ultrasonography. **Results:** The mean patient age was approximately 29 years and mean stone size was approximately 5.5 mm (range 4.4–6.5 mm); nine calculi were left-sided and six right-sided. All 15 patients demonstrated spontaneous stone passage confirmed on repeat ultrasonography, complete resolution of voiding symptoms and flank discomfort, and normalisation of uroflowmetric parameters (restoration of a bell-shaped curve) at follow-up, with no complications. The overall success rate of MET in this cohort was 100%. **Conclusion:** VUJ calculi should be actively excluded by renal tract ultrasonography in young men presenting with LUTS and obstructive uroflowmetry, particularly when prostate volume is disproportionately small relative to the degree of urodynamic impairment. Medical expulsive therapy is a safe and effective first-line strategy for small VUJ calculi presenting in this manner.

KEYWORDS: vesicoureteric junction calculus; lower urinary tract symptoms; bladder outlet obstruction; uroflowmetry; medical expulsive therapy.

INTRODUCTION

The vesicoureteric junction (VUJ) is the narrowest segment of the ureter and a common site of calculus impaction owing to its luminal diameter of 1–5 mm.^[1] The classical presentation of ureteric colic which includes acute flank pain, haematuria and nausea is well established. However, because the trigone and distal ureter share dense sensory innervation, VUJ calculi can instead present predominantly with irritative and obstructive voiding symptoms, closely mimicking bladder outlet obstruction (BOO) due to benign prostatic hyperplasia.

Uroflowmetry is a cornerstone non-invasive investigation in the initial evaluation of male LUTS. A maximum flow rate (Q_{max}) below 10 mL/s on a voided volume exceeding 150 mL is generally regarded as consistent with obstructive voiding, although similar parameters may arise from detrusor underactivity or extrinsic functional obstruction.^[2] Distal ureteral calculi have been shown to significantly reduce Q_{max} and average flow rate compared with stone-free controls, attributed to trigonal irritation and reflex detrusor dysfunction.

We present a case series of 15 young and middle-aged men in whom LUTS with obstructive uroflowmetry was ultimately attributable to a small VUJ calculus rather than prostatic pathology, all of whom were managed successfully with medical expulsive therapy (MET). This series aims to highlight the diagnostic pitfall and reinforce a management paradigm centred on renal tract ultrasonography before LUTS is attributed to prostatic disease in this age group.

METHODS

Study design

This was a single-centre case series conducted in the Department of Urology at our institution. Male patients presenting to the urology outpatient department with LUTS who were subsequently diagnosed with a VUJ calculus on renal tract ultrasonography were studied.

Patient selection

Inclusion criteria

- Adult male patients presenting with urinary frequency, urgency, and/or intermittent voiding difficulty
- Obstructive uroflowmetry pattern (Q_{max} < 10 mL/s) on a voided volume > 150 mL
- A single VUJ calculus measuring ≤ 7 mm identified on ultrasonography
- Absence of classical acute renal colic as the predominant symptom

Exclusion criteria

- Bilateral or multiple ipsilateral calculi
- Stone size > 7 mm or associated with significant hydronephrosis warranting primary surgical intervention

- Concurrent urethral stricture or neurogenic bladder
- Prior urolithiasis surgery on the ipsilateral ureter

Evaluation protocol

All patients underwent a detailed history, general and abdominal examination, urinalysis, urine culture and sensitivity, serum creatinine, uroflowmetry, and ultrasonography of the kidneys, ureters and bladder (including prostate volume estimation and post-void residual).

Management protocol

All patients were managed conservatively with medical expulsive therapy: tamsulosin 0.4 mg once daily, oral diclofenac for analgesia and its anti-inflammatory effect on periureteric oedema and ureteral spasm, and oral hydration maintained at 2–3 L/day. Patients were followed up clinically and with repeat uroflowmetry and ultrasonography to confirm stone passage.

RESULTS

Fifteen male patients, aged 18–40 years (mean approximately 29 years), met inclusion criteria over the study period. Stone size ranged from 4.4 to 6.5 mm (mean approximately 5.5 mm). Nine calculi (60%) were left-sided and six (40%) right-sided. All patients presented with a predominantly irritative/obstructive voiding symptom complex, with mild or absent flank discomfort rather than classical renal colic, and all had an obstructive uroflowmetry pattern at presentation with a prostate volume disproportionately small relative to the degree of urodynamic impairment.

All 15 patients were managed with the standardised MET protocol described above. On follow-up, every patient reported complete resolution of urinary frequency, urgency and voiding difficulty, with resolution of any flank discomfort. Repeat uroflowmetry demonstrated normalisation of Q_{max} and average flow rate with restoration of a bell-shaped curve in all patients. Repeat renal tract ultrasonography confirmed stone passage in all 15 patients, with resolution of pelvicalyceal fullness, symmetrical ureteric jets on Doppler assessment, and resolution of secondary bladder wall changes. No treatment-related complications or need for secondary intervention were recorded, giving an overall MET success rate of 100% in this cohort.

IMAGE LEGENDS



Figure 1: Representative ultrasonographic image of a vesicoureteric junction calculus (index case).

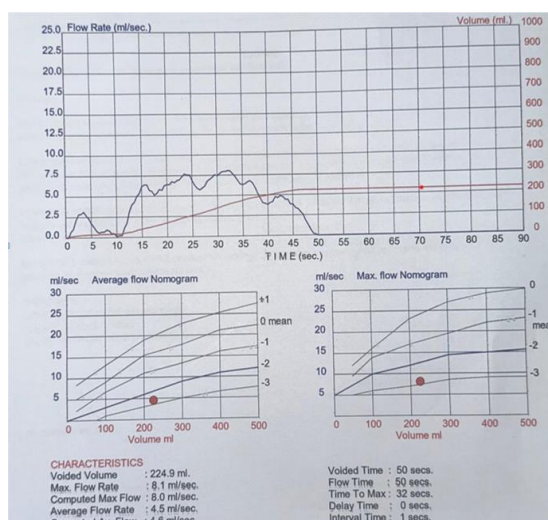


Figure 2: Representative uroflowmetry tracing before treatment, showing a flattened curve with reduced Qmax (index case).

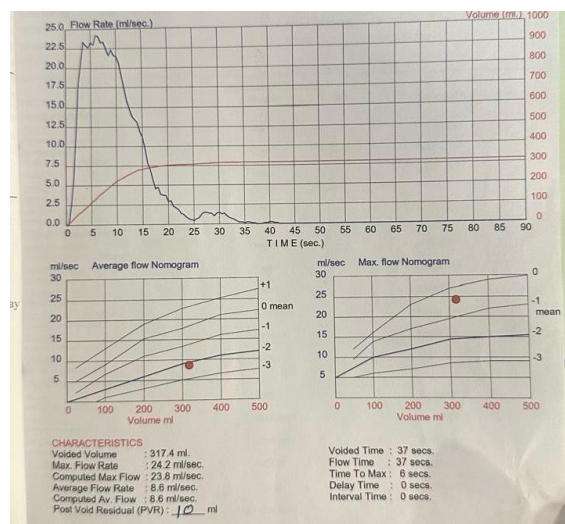


Figure 3: Representative uroflowmetry tracing after successful medical expulsive therapy, showing restoration of a bell-shaped curve (index case).



Figure 4: Representative ultrasonographic image following confirmed stone passage (index case).

DISCUSSION

Stone size is a key determinant of spontaneous passage; calculi under 5 mm pass in the large majority of cases, and even calculi up to 6–7 mm at the VUJ have a reasonable likelihood of spontaneous passage.^[1] This is consistent with the 100% success rate of MET observed in our cohort, in which stone size ranged from 4.4 to 6.5 mm. A Qmax below 10 mL/s carries a positive predictive value of only approximately 70% for BOO in the absence of pressure-flow urodynamic corroboration.^[2] In each of our patients, ultrasonographic identification of the VUJ calculus provided a compelling alternative explanation for the obstructive uroflowmetry pattern and obviated the need for invasive urodynamic evaluation.

The differential diagnosis of LUTS with obstructive uroflowmetry in a young or middle-aged male includes primary bladder neck obstruction, detrusor underactivity, urinary tract infection, cystitis, urethral stricture, VUJ calculus and dysfunctional voiding. The VUJ occupies a unique anatomical position at the bladder–ureteric interface; its proximity to the trigone which is an embryologically and neurologically distinct structure sharing dense sensory innervation with the distal ureter provides the pathophysiological substrate for trigonal irritation, reflex detrusor overactivity, and the generation of irritative and obstructive LUTS in preference to classical upper tract pain.^[3]

Kupeli et al. demonstrated significantly reduced Qmax and Qavg in patients with distal ureteric calculi compared with stone-free controls, with improvement following ureteroscopic removal.^[4] Our series extends this observation to a larger cohort of young and middle-aged men managed conservatively with MET rather than endoscopic intervention, and demonstrates that uroflowmetric normalisation can be achieved without

instrumentation when stone size is favourable for spontaneous passage.

Hammad and Kaya provided invasive urodynamic corroboration of detrusor overactivity secondary to distal ureteric calculi, which resolved completely after stone clearance.^[3] Our non-invasive uroflowmetric data across 15 patients offer a complementary, clinically translatable demonstration of the same mechanism at scale.

Smith-Bindman et al. demonstrated that initial ultrasonography for suspected nephrolithiasis did not result in missed diagnoses and was associated with significantly lower cumulative radiation exposure compared with CT KUB.^[5] Our series corroborates this directly: ultrasonography alone was diagnostic in all 15 patients, identified the VUJ calculus, and redirected clinical management without CT exposure in a predominantly young cohort.

Taken together, this series suggests that in any young or middle-aged male presenting with LUTS, obstructive uroflowmetry, and a prostate volume disproportionately small relative to the degree of urodynamic impairment, renal tract ultrasonography should be performed as a routine part of the LUTS work-up to exclude a distal or vesicoureteric junction calculus before symptoms are attributed solely to prostatic pathology.

CONCLUSION

Vesicoureteric junction calculi can produce an obstructive uroflowmetry pattern that closely mimics bladder outlet obstruction in young and middle-aged men. In this series of 15 patients, comprehensive evaluation including renal tract ultrasonography identified the underlying VUJ calculus in every case, and medical expulsive therapy achieved complete symptomatic and urodynamic resolution without

complication. Renal tract ultrasonography should be considered a routine component of LUTS evaluation in this demographic before voiding dysfunction is attributed solely to prostatic pathology.

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