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Point-of-Care Ultrasound Diagnosis of Urethral Stone in A Patient with History of Urolithiasis: A Case Report

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Abstract **Case Report**

Background: Urethral stones are a relatively rare form of urolithiasis, accounting for a small percentage of all urinary tract stones. They are more commonly found in men, often as migrant stones from the upper urinary tract or bladder. Their clinical presentation is variable, ranging from dysuria and penile pain to acute urinary retention. Point-of-care ultrasound (POCUS) is emerging as a valuable tool in the evaluation of suspected urethral calculi, offering a quick, radiation-free method for diagnosis. ***Case summary:*** A 45-year-old male with a history of renal stones presented with increasing difficulty micturating and penile pain. Physical examination revealed tenderness along the penile shaft. Bedside ultrasound identified a hyperechoic structure with acoustic shadowing within the penile urethra, consistent with a urethral stone. ***Conclusion:*** This case highlights an unusual presentation of urethral obstruction due to a stone in a patient with a history of renal calculi. It demonstrates the utility of point-of-care ultrasound as a rapid diagnostic modality for identifying urethral stones, potentially guiding prompt management.

Keywords: Dendritic Follicular Sarcoma, Diagnosis, Histopathology, Immunohistochemistry, Surgery.

INTRODUCTION

Urolithiasis is a common urological problem, but stones lodging in the urethra are infrequent events, representing less than 1% of urinary calculi. Urethral stones are more prevalent in males and often originate from the kidneys or bladder, migrating distally into the urethra. While symptoms can vary, impacted urethral stones can cause significant discomfort and urinary obstruction. Traditional diagnostic methods include plain radiographs, retrograde urethrogram, and CT scans. However, bedside ultrasound is increasingly recognized for its ability to quickly evaluate urethral foreign bodies and anatomy without radiation exposure.

CASE PRESENTATION

A 45-year-old man presented to the emergency department with a one-week history of progressively worsening difficulty with urination, including a weak stream and a sensation of incomplete emptying. He also reported intermittent pain in his penile shaft, exacerbated during micturition. The patient had a significant past medical history notable for recurrent calcium oxalate renal stones, with his last known stone passage occurring two years prior. He denied any recent fever, chills, or flank pain.

On physical examination, vital signs were within normal limits. Abdominal examination revealed a palpable, distended bladder and mild suprapubic tenderness. Palpation along the ventral aspect of the penile shaft revealed a tender, firm area approximately 4 cm from the external urethral meatus. There was no visible urethral discharge, erythema, or inflammatory changes of the penis or scrotum.

Diagnostic Assessment

Based on the patient's history of renal stones, presenting symptoms of obstructive voiding, and palpable tenderness, suspicion for a urethral stone was high. A bedside point-of-care ultrasound was performed using a high-frequency linear array probe. Scanning along the penile shaft, the urethra was visualized within the corpus spongiosum. Ultrasound imaging in both transverse and longitudinal planes demonstrated a distinct hyperechoic structure within the urethral lumen. This structure exhibited prominent posterior acoustic shadowing, characteristic of a calculus. No evidence of urethral diverticula or significant stricture was noted on this limited view.

Grayscale ultrasound image obtained with a high-frequency linear array probe placed along the longitudinal axis of the penile shaft. The image displays the corpus spongiosum (grey tissue). Within the lumen of the urethra (appearing anechoic), a brightly echogenic (white) structure is visible. This structure casts a dark shadow (acoustic shadowing) posterior to it, indicative of a dense object like a stone. The presence of this hyperechoic structure within the urethra with acoustic shadowing confirms the presence of a urethral calculus obstructing the lumen.

The size of the calculus was estimated by ultrasound to be approximately 8 mm in its largest dimension. Urinalysis showed no evidence of infection. A plain radiograph of the pelvis was subsequently obtained, which showed a radio-opaque shadow in the penile region, correlating with the palpable finding and the location identified by ultrasound.

Interventions and Follow-up

Given the acute urinary retention caused by the obstructing stone, management options were considered. The patient underwent urethral catheterization. Gentle manipulation was attempted to push the stone back into the bladder, where it could potentially be managed with less invasive techniques or surgery. Successful reduction of the stone into the bladder allowed for relief of the urinary obstruction, and a Foley catheter was left in place. The patient was referred to urology for definitive management of the bladder stone, which could involve litholopaxy or lithotripsy.

DISCUSSION

This case illustrates the presentation and rapid diagnosis of an impacted urethral stone in a 45-year-old male with a history of renal calculi. While urethral stones are uncommon, a history of kidney stones is a known risk factor, as most urethral stones in men are migrant. The patient's symptoms of difficulty voiding and penile pain are consistent with the clinical presentation of an obstructing stone in the anterior urethra.

The use of point-of-care ultrasound was instrumental in quickly confirming the presence and location of the calculus at the bedside. Ultrasound is particularly valuable as an initial imaging modality in patients with suspected urethral stones, especially when a palpable mass is present, as it avoids radiation exposure associated with radiography and CT. The characteristic hyperechoic appearance with acoustic shadowing allowed for confident diagnosis. While stone size estimation can sometimes be inaccurate with ultrasound, it provided sufficient information to proceed with management aimed at relieving the obstruction.

Management of urethral stones depends on factors such as size, location, and associated urethral conditions. In this case, reducing the stone into the bladder via catheterization provided immediate relief of symptoms and allowed for subsequent urological evaluation and treatment of the stone within the bladder. This approach aligns with minimally invasive strategies preferred when feasible.

CONCLUSION

An impacted urethral stone, although rare, should be considered in the differential diagnosis for male patients presenting with acute lower urinary tract symptoms, particularly those with a history of urolithiasis. Point-of-care ultrasound is a valuable, non-invasive tool that can facilitate rapid diagnosis and guide management in the emergency or urgent care setting.

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