Case Report

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Submucosal Migration of Ureteric Calculi: Related to ESWL?

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Key Words

ESWL

Submucosal ureteric calculi

Abstract

Three patients were reinspected by ureteroscopy after repeat ESWL. Ureteroscopy initially did not disclose an intraluminal stone and only visualized a severe inflammatory reaction of the ureteric wall and a boss of the ureter at the level of the fluoroscopically suspected stone location. An intact stone in all 3 cases was finally exposed by tactile contact at the top of the ureterscope after perforating the mucosa with a guide wire. Retrospectively, the combination of long-standing stone impaction together with damage to the ureteric mucosa during Shockwave interaction may cause an inflammatory reaction with submucosal migration of the stone.

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Introduction

Since the introduction of ESWL, the management of urinary tract calculi has actually evolved towards minimally invasive therapy [1]. Not only the treatment but also the investigations have been simplified, unfortunately sometimes omitting basic examinations such as a urography and patients have been treated not only on history, plain X-ray and the lack of expansion [2] and the prone positioning, but also to the degree of stone impaction. Modern ureteroscopy [3] has now been accepted as an alternate to ESWL in the management of symptomatic calculi. Failing to detect a stone endoscopically is generally related to an accidental flush-up; simultaneous fluoroscopic control should be associated to exclude a submucosal stone location [4] at the initially suspected level.

Case Reports

Case 1

A 75-year-old woman consulted for long-standing flank pain: routine urinalysis revealed microscopic hematuria and plain X-ray showed an opacity in the right lumbar zone: no pyelocalyceal ectasia

was detected at ultrasound and the opacity was interpreted as a non-obstructive ureteric stone.

ESWL was performed on this opacity measuring 9×21 mm in 3 sessions (18.1 kV X 4,000/session) with an interval of 2 days between the procedures. Control X-ray did not disclose fragmentation nor distal migration at follow-up 2 months later.

A laser lithotripsy was planned urography confirmed the opacity partially deflecting the ureter suggesting a subobstructive stone.

Ureteroscopy failed to detect the stone but rather evidenced a boss at the suspected stone location and simultaneous fluoroscopy confirmed the opacity at the same level. Finally, stone contact at

the tip of the ureteroscope was felt although not visualized. With a stiff guide wire we disrupted the mucosa, releasing the stone, and laser lithotripsy achieved a complete disintegration in minute particles.

Case 2

A 55-year-old woman complained of intermittent flank pain in the last 5 years. Plain X-ray showed an opacity in the left lumbar zone measuring 13 mm, and sonography confirmed a reflection in the upper ureter.

ESWL was performed in 2 sessions of $18.1 \text{ kV} \times 5,000$ and $18.1 \text{ kV} \times 4,000$ within 4 weeks but without any immediate apparent result. After 2 months of follow-up with persisting intermittent complaints in the left lumbar region we performed a ureteroscopy; again, endoscopically, except for an inflammatory reaction, no intraluminal stone could be visualized and a flush up was advocated but fluoroscopy confirmed the opacity still in place.

An extreme inflammatory reaction was found which was possibly related to the previous stone impaction until the stone suddenly appeared from the ureteric wall whilst inspecting with a guide wire.

Subsequent laser lithotripsy with a pulsed dye laser finally disintegrated the intact stone and stone analysis revealed a calcium oxalate mono/dihydrate composition.

Case 3

A 53-year-old man consulted for continuous pain in the left flank. Plain X-ray showed an opacity (8 mm) in the left pelvis, but neither dilation nor reflection was found at ultrasound. ESWL was carried out in 2 sessions of $18.1 \text{ kV} \times 4,000$ but after an interval of 1 month, no evidence for fragmentation or migration was detected on plain X-ray. Regarding the persistence of symptoms, a ureteroscopy was performed and initially only showed an inflammatory ureter with a calcified plaque in the mucosa; during manipulation the stone became apparent within the mucosal effect. Laser lithotripsy resulted in complete fragmentation, and analysis of particles revealed a calcium oxalate dihydrate composition.

Discussion

Although the complete urinary tract can be scanned by modern lithotriptors, the comminution rate is lower for ureteric calculi compared to renal locations. Lacking the so-called chamber phenomenon needed for expansion restricts the efficacy of ESWL; for mid and distal ureteric calculi, the required prone installation of the patient has been advocated. Even though at this level, the action of the Shockwave may be ineffective, we are convinced that the energy of the extracorporeally generated Shockwave will still act at the stone surface causing at least a rebound effect against the ureteral wall: damage to the mucosa can be caused especially when existing inflammation rendered the ureter more fragile. The combination of these two factors may accelerate a progress of reactive epithelialization with a mucosal covering over the stone itself and promoting further intramucosal migration.

Modern imaging cannot distinguish an obstructive in-traluminal and submucosal stone location, but if only partially obstructing the ureter, the drainage of dye beneath the opacity should remind one of the possibility of a submucosal migration.

A pretreatment urography is mandatory for urinary tract stone disease, especially in the presence of longstanding complaints. CT imaging may enable the preoperative diagnosis of a submucosally migrated stone.

Absence of any result after ESWL should not lead to repeat and obstinate ESWL, but rather draw our attention. Endoscopy has gained its place in these refractory conditions [5] and failure is frequently related to stone fragility [6], anatomic or technical conditions.

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118

Vandeursen/Baert

Submucosal Ureteric Calculi