

An Extremely Rare Complication of Extracorporeal Shock Wave Lithotripsy: Ureteral Rupture: Case Report

Vücut Dışından Şok Dalgalarıyla Taş Kırma Tedavisinin Oldukça Nadir Bir Komplikasyonu: Üreteral Rüptür

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ABSTRACT Extracorporeal shock wave lithotripsy (ESWL) has become the preferred treatment modality for urinary stone disease, with a high success rate. However, ESWL is not an innocuous therapeutic procedure and can lead to many serious complications. Perforation of the ureter is an extremely rare complication after ESWL that causes a series of problems including retroperitoneal urinoma, urosepsis, infection, abscess formation, subsequent renal impairment and nephroureterectomy. We report a case of ureteral rupture leading retroperitoneal urinoma as a diagnostic finding after ESWL.

Key Words: Lithotripsy; ureterolithiasis; ureteroscopy

ÖZET Vücut dışından şok dalgalarıyla taş kırma (VŞT) tedavisi, üriner sistem taş hastalığının tedavisinde yüksek başarı oranıyla tercih edilen bir tedavi yöntemi olmuştur. Ancak, VŞT masum bir tedavi işlemi değildir ve pek çok ciddi komplikasyona yol açabilir. VŞT sonrasında üreterin perforasyonu; retroperitoneal ürinom, ürosepsis, enfeksiyon, abse formasyonu, daha sonra gelişebilecek böbrek işlev bozukluğu ve nefroureterektomi dahil bir dizi probleme yol açan oldukça nadir bir komplikasyondur. VŞT sonrasında gelişen, tanısız bulgu olarak retroperitoneal ürinoma yol açan üreter perforasyonu olgusunu bildiriyoruz.

Anahtar Kelimeler: Litotripsi; üreterolitiazis; üreteroskopi

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Extracorporeal shock wave lithotripsy (ESWL) has been widely used for the treatment of urolithiasis since it was first introduced in 1980.¹ Lithotripsy attempts to break up the stone with minimal collateral damage through the use of an externally applied, focused, and high-intensity acoustic pulse.² ESWL can be considered as a kind of trauma to the urinary system and the adjacent organs and tissues, while it can produce a high stone-free rate, depending on stone size and localization in the management of urolithiasis.^{2,3} Therefore, it may lead to varied complications and some of them may be challenging to manage or life-threatening, such as renal (intrarenal and perirenal hematoma, hemorrhage requiring nephrectomy) and extrarenal visceral injuries (such as perforation of the colon, hepatic hematoma, splenic rupture, pancreatitis, and abdominal wall abscess) or extrarenal vascular complications (hepatic arterial rupture, rupture of

the abdominal aorta, and iliac vein thrombosis), as well as thoracic events (pneumothorax and urinothorax) and cardiac arrhythmia and sepsis.³

Ureteral perforation or rupture is an extremely rare complication after SWL, and can be associated with retroperitoneal urinoma, urosepsis, infection, abscess formation, and may result in subsequent renal impairment or nephroureterectomy.^{4,5} We report a case of ureteral rupture leading retroperitoneal urinoma as a diagnostic finding after ESWL.

CASE REPORT

A 58-year-old Caucasian man was referred to our clinic from emergency department, with the complaints of abdominal distension, pain, nausea, and vomiting after 24 hours of the last ESWL session. The patient had tenderness on right flank region on physical examination. Laboratory analysis revealed leucocytosis and pyuria. Ultrasound examination demonstrated an apparent fluid collection around the right kidney and the diameter of distal ureter was 10 mm. Computed tomography (CT) showed a urinoma that extended 6 cm caudally from ureteropelvic junction and caused by the leakage from the right ureter, as well as a 7 mm of calculus distal to the point of leakage (Figure 1).

His medical record was reviewed and showed that he was diagnosed as urinary stone disease, and underwent two ESWL sessions; the first session of 3000 shocks for a 10 mm calculus in the inferior calyx of the right kidney and the second session of 2000 shocks for a 7 mm calculus in the proximal

ureter with grade II hydroureteronephrosis 5 days after first session, using Siemens Lithoskop® (Siemens AG, Erlangen, Germany) lithotripter (Figure 2).

Under these circumstances, we decided performing ureteroscopy to remove the calculus and prevent stone obstruction. However, we just pushed up the calculus from distal ureter to the kidney, with a concern of enhancing the ruptured part of the ureter and placed a JJ ureteral stent into the right ureter by the guidance of a safety guide wire inserted before (Figure 3). The course was uneventful, and follow up ultrasound revealed the absorption of the fluid collection. One month later, the patient underwent a final ESWL session leading to a complete stone fragmentation and the ureteral stent was removed. He is doing well now.

DISCUSSION

Urinary Stone disease represents a common condition that urologists encounter in everyday practice. Several treatment options are available for calculi that do not pass spontaneously or are unlikely to do so. Among these options, ESWL has several attractive attributes, including a noninvasive nature, wide acceptance, and possibility to perform as an outpatient treatment using only sedation and analgesia and high effectiveness.⁶ Despite these advantages, ESWL is not a completely innocuous therapeutic procedure and may lead to many complications. Complications after SWL are mainly connected to the formation and passage of frag-



FIGURE 1: CT showed a fluid leakage around the right kidney.



FIGURE 2: 7 mm stone at upper part of ureter.



FIGURE 3: JJ stent on right ureter.

ments, infections, the effects on renal and nonrenal tissues as a blunt trauma and the effects on kidney function.^{7,8} Although most of the complications are minor, such as infection, hematuria and pain, some serious or life-threatening adverse effects may rarely occur.^{3,4,6,7}

Our case was a very rare form of ureteral rupture. It was caused by an iatrogenic blunt abdominal trauma reason that was SWL. The shock wave number, increased intraureteric pressure, inflamed ureteral wall and impacted stone might be the potential factors.⁷ There is no consensus on the maximal number of shock waves that can be delivered at each session and the maximal number depends on the type of lithotripter and the shock wave power used.⁸ The totally higher number of shock waves (4,500) used in the present case seems to be excessive and might be one of the potential factors leading to ureter perforation. The other factor may be infections.⁷ There were also two risks in our patient.

The most common symptoms are sudden, severe, persistent lower abdominal pain with severe peritoneal irritation.⁴ Another report described massive urinary leakage into the peritoneal cavity, resulting in abdominal compartment syndrome, respiratory distress, and anuria.⁹

On the light of the previous reports and our limited experience; ultrasonography might be effective on demonstrating the extravasation, however CT should be performed to confirm the diagnosis. We can also state that minimal invasive treatment modalities are usually adequate for the treatment of ureteral rupture as in the present case. Stone composition, size, impaction, and stone-induced hydronephrosis, limit the success rate of SWL for ureteral stones.¹⁰

This case indicates that ureter rupture may form after SWL treatments. Especially in infected stones and high frequency of shock wave applications. This complication emphasizes the importance of evaluation of patient pre-per-post SWL.

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