

# Extracorporeal Shock Wave Lithotripsy-Induced Retroperitoneal Hemorrhage in a Case of Upper Ureteral Calculus With Angiomyolipoma

Rahul Gupta, Pankaj D, Pranjal Modi, Jamal Rizvi

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## INTRODUCTION

Angiomyolipoma (AML) is considered as the most common cause of spontaneous renal hemorrhage.<sup>(1)</sup> However, the hemorrhage may be precipitated by the use of antiplatelet drugs, pregnancy, and trauma, or may occur spontaneously in a large size tumor.

We present a case of isolated right-sided mid and upper pole AML associated with retroperitoneal bleeding following extracorporeal shock wave lithotripsy (SWL) for right upper ureteric stone. To the best of our knowledge, this is the first case of lithotripsy-induced retroperitoneal bleeding in a patient with AML, with no prior history of bleeding diathesis or use of

antiplatelet agents.

## CASE REPORT

A 32-year-old man presented with a history of right flank pain that lasted for 2 months and was found to have right renal mid and upper pole 6 cm × 4.5 cm-sized AML with a 1-cm upper ureteral stone at the level of L2-L3 on contrast enhanced computed tomography (CECT) of the abdomen and the pelvis (Figure 1).

He underwent SWL, which was done using an electrohydraulic unit (Direx Digiscope RX-2). Initially, 2000 shocks were given followed by 1800 shocks after 48 hours at settings 20 kV at pulse rate of 60/min and after 3 to 4 hours of second sitting of SWL.

Department of Urology, Institute of Kidney Diseases and Research Center, Ahmedabad, Gujarat, India

Corresponding Author:

Rahul Gupta, MD  
Institute of Kidney Diseases and Research Center, Ahmedabad, Gujarat, India  
Tel/Fax: +91 792 268 5605  
E-mail: rajaguptadr@rediffmail.com

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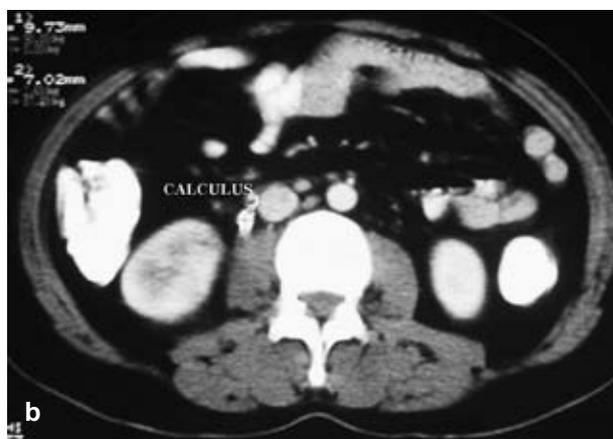
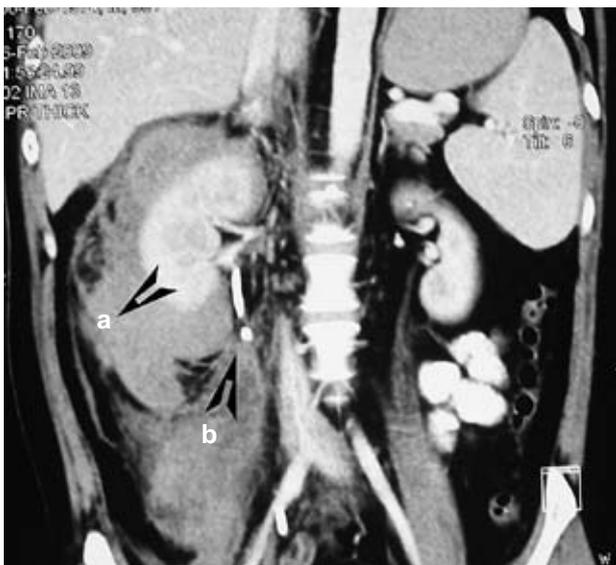


Figure 1. Contrast enhanced computed tomography of the abdomen and the pelvis showing right upper ureteral calculus.

He developed sudden onset of severe abdominal pain, vomiting, giddiness, and perspiration. After initial management of hypovolemic shock, the patient was referred to our institute. The patient was pale, with pulse rate of 120/min and blood pressure of 100/60 mmHg. On examination, he had a palpable firm tender lump confined to the right side of the abdomen with renal angle fullness.

Laboratory investigations revealed Hb of 8.0gm/dL, packed cell volume of 22, and complete blood count of 10 400/cmm. Coagulation profile as well as renal and liver function tests were normal. Abdominal ultrasonography showed a large perinephric hematoma. Patient was given blood transfusion and stabilized. Contrast enhanced computed tomography of the abdomen and the pelvis revealed a large retroperitoneal hematoma and right upper ureteral stone with double J ureteral stent in situ (Figure 2).

The patient was subjected to clot removal, upper-pole partial nephrectomy, and ureterolithotomy with double J stenting via right flank approach. Histopathology of the mass was suggestive of AML. Postoperative period was uneventful and he was discharged on the 6<sup>th</sup> postoperative day. Double J ureteral stent was removed at 4 weeks and the follow-up ultrasonography of the kidney, the ureter, and the bladder region was normal.



**Figure 2.** a) Large perinephric hematoma. b) Upper ureteral calculus with double J stent in place.

## DISCUSSION

Angiomyolipoma (choristoma) is a benign clonal neoplasm composed of variable amounts of mature adipose tissue, smooth muscle, and thick-walled blood vessels, which occurs predominantly in the kidney. More than 50% of AMLs are incidental because of the more prevalent use of abdominal imaging for evaluation of a wide variety of nonspecific complaints.

Distinctive radiographic findings associated with AML allow a definitive diagnosis in the majority of subjects. Contrast enhanced computed tomography of the abdomen and the pelvis has been the most useful and reliable diagnostic modality for this purpose. The presence of fat within a renal lesion on computed tomography scan (-20 HU or lower) is highly suggestive of AML.<sup>(2)</sup>

Common clinical presentations of AML include flank pain, hematuria, and palpable mass. Massive spontaneous retroperitoneal hemorrhage due to rupture of AML is found in 10% of patients. Presentation of acute flank pain, a palpable mass, and hypovolemic shock, also known as Lenk's triad, requires immediate management.<sup>(3)</sup>

The majority of AMLs rupture spontaneously, this is attributed to the inherent abnormal elastin-poor vascular structure, which makes these lesions prone to aneurysm formation and rupture.<sup>(4)</sup> Even a minimal straining in the form of Valsalva maneuver can precipitate a life-threatening Wunderlich syndrome, underlying the vascular fragility of this tumor.<sup>(5)</sup>

Renal hematomas following SWL is well-known.<sup>(6)</sup> Factors that facilitate the renal hematomas following SWL include number of shock waves, acute pyelonephritis, and the energy level at which the shock waves are delivered.<sup>(7-9)</sup> The most probable theory is the expansion of the bubbles in a vessel that resulting in its rupture leading to hemorrhage.<sup>(10)</sup> Evans and colleagues noted that once the blood vessels have ruptured, blood gets collected as a pool resulting in greater potential for cavitation to occur; thus, forming a vicious cycle.<sup>(11)</sup>

In our patient, the hemorrhage occurred after the second session of SWL. The cause of bleeding can

be attributed to the accidental shocks at high-energy settings to the AML during the SWL of the upper ureteric calculus, which would have been used to attain fragmentation after the failed first sitting. This is possible; especially in non respiratory gated machines, where the kidney may receive shocks as a result of mismatch between timing of shock and respiratory movements. This would have precipitated the rupture of the fragile vessels within the AML, resulting in severe hemorrhage.

In a patient with large retroperitoneal hematoma secondary to ruptured AML, the treatment modalities are stabilization of the patient followed by either therapeutic embolization or nephron-sparing surgery. Although angioembolization is a minimally-invasive option for management of renal AML, nephron-sparing surgery is an equally acceptable option, especially in life-threatening conditions. Moreover, it provides the tissue for pathological diagnosis.

Our patient was stabilized and later CECT of the abdomen and the pelvis was carried out. This gave us a clear picture of the degree of hematoma, size, and location of the AML lesion and that of the upper ureteral calculus.

Treatment options were discussed and we opted for a single stage definitive management of this complex rare case, which involved clot evacuation with partial nephrectomy and ureterolithotomy.

Extracorporeal shock wave lithotripsy in a case of AML can precipitate life-threatening hemorrhage, and hence, should be used judiciously.

## CONFLICT OF INTEREST

None declared.

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