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Huge perinephric hematoma after ureteroscopy and pneumatic lithotripsy for ureteral stone; A life-threatening rare complication: Case report and review of literature

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ABSTRACT

INTRODUCTION: Ureteroscopy with pneumatic lithotripsy is a relatively safe procedure for the management of the ureteral stone disease. However; subcapsular hematoma and even huge perinephric hematoma are potentially serious events that may complicate this procedure and must be kept in mind. **CASE PRESENTATION:** We present a case of huge perinephric hematoma post ureteroscopy and pneumatic lithotripsy for an impacted ureteral stone.

CONCLUSION: The occurrence of such a rare complication in a relatively safe procedure must be taken into consideration especially while dealing with patients with long-standing obstruction and thin renal cortex. Furthermore, the risk of bleeding should be included in risk-benefit counselling before ureteroscopic lithotripsy.

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1. Introduction

Ureteroscopy (URS) is a well-established minimally invasive treatment for ureteral stones with high success and low morbidity rates [2]. The complication rate of URS ranges between 9 and 25 percent. Most of these complications are minor complications that do not require any intervention and even their incidence has decreased with the advanced technologies and increasing experience of urologists. However, the incidence of major complications as ureteral avulsion or stricture is lower than 1 percent [3]. Means of ureteroscopic lithotripsy include ultrasound, electrohydraulic, pneumatic, and laser. Pneumatic lithotripsy with Swiss Lithoclast is an effective and safe treatment modality for ureteral stones [4].

This article has been reported in line with the SCARE criteria [1].

2. Case presentation

A 61 Years old male patient, known to have hypertension, presented with left loin pain of several months' duration. The patient was not taking any anticoagulants. Non-contrasted computed tomography (CT) showed a distal left ureteral stone measured 2 cm

in diameter and a small left kidney with a thin cortex and moderate hydronephrosis proximal to the stone. The right kidney was looking normal. MAG3 (mercaptatracetyl triglycine) renal scan revealed that the left kidney is not functioning.

The management options were discussed with the patient and nephrectomy was the plan. However, we decided to go for renal salvage endourological procedures respecting the patient's wish to preserve the kidney and avoid major surgery.

The first URS was performed where the stone was identified and fragmented using pneumatic lithotripter (Swiss Lithoclast) and some of the fragments were extracted using dormia basket. Retrograde pyelogram was done with no extravasations and a ureteral stent was placed in the ureter. 2 months later, a follow up MAG3 scan was done and it showed improvement in the left renal function by 10%.

The second URS was performed where an upper ureteral stone residual fragment was identified, fragmented by pneumatic lithotripter, and the fragments were extracted. A ureteral stent was reinserted, and the patient was discharged home on the next day.

3 weeks later, the patient presented to the emergency department complaining of severe left loin pain, dizziness, and easy fatigability. He was found to have a drop in hemoglobin (from 14.4 mg/dl to 7.2 mg/dl) and his serum creatinine raised from 1.03 mg/dl to 1.45 mg/dl. The patient was hemodynamically stable. Non-contrasted CT scan was done (Fig. 1) which showed a huge left perinephric hematoma (PH) displacing the left kidney medially. The ureteral stent was seen in place with tiny stone fragments in the

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Fig. 1. Severe ballooning of the left kidney with loss of parenchyma and cortex and filled with hypodense content representing left kidney replaced by hematoma with perinephric extension (the star), left dj was seen with its tip in what is assumed to be the left PUJ (arrow).

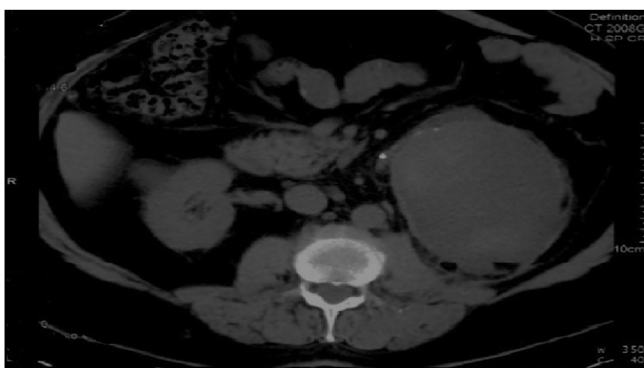


Fig. 2. Left renal and perirenal hematoma chronic in appearance measured 13.7 × 10.3 × 10 cm.

left upper ureter. The right kidney was normal. The bleeding profile was normal.

The patient was admitted and managed conservatively. He received 4 units of packed red blood cells and 6 units of fresh frozen plasma. The patient’s symptoms improved significantly and he remained hemodynamically stable without any further drop in hemoglobin. The patient was discharged after 4 days with hemoglobin of 11.5 mg/dl and serum creatinine of 1.05 mg/dl.

2 months later, a follow up non-contrast CT was done (Fig. 2) which showed the left PH to be smaller in size and chronic in appearance. The ureteral stent was in place with an upper ureteric tiny stone fragment. 4 months later, the patient was admitted for stent removal and stone extraction. A non-contrast CT scan was done (Fig. 3) and it showed small, atrophic left kidney with a smaller chronic hematoma. The 3rd URS was performed where the stent was removed and the residual stone was fragmented by pneumatic lithotripsy and extracted. The patient’s postoperative course was uneventful, and he was discharged home on the next day.

3. Discussion/conclusion

Ureteroscopy with lithotripsy is a minimally invasive and highly effective procedure in the management of ureteral and renal stones [5]. However, Subcapsular or perirenal hematoma is an unusual reported complication. This complication can be classified as Grade IIb complication according to the Satava classification system [6].

Currently, subcapsular renal hematoma (SRH) is frequently noticed after renal trauma or following extracorporeal shockwave lithotripsy (ESWL) and other invasive procedures such as percutaneous nephrolithotripsy (PCNL) [7]. However, only a few authors



Fig. 3. Small atrophied left kidney with chronic hematoma measured 6 × 5 × 5.5 cm.

Table 1

Reports about subcapsular renal hematoma (SRH) and perinephric hematoma (PH) post ureteroscopic laser lithotripsy.

Institute	Number of patients	SRH	PH
Chiu et al. [7]	4 out of 1114	4	0
Duffey et al. [8]	1	0	1
Bai and colleagues [9]	11 out of 2750	11	0
Nuttall et al. [10]	1 out of 4454	0	1
Kozminski et al. [11]	7 out of 877	4	3
National and Kapodistrian University of Athens, Sismanogleio General Hospital [12]	4	3	1
Taken et al. [13]	9 out of 1187	9	0

have reported hematoma as a postoperative event in ureteroscopic lithotripsy, and fewer still have been working to identify risk factors of the development of SRH and PH [8], most of the reported cases were associated with the use of laser lithotripsy and only very few cases were associated with pneumatic lithotripsy. SRH and PH post-Ureteroscopy and laser lithotripsy reported cases are illustrated in Table 1.

Bansal et al. were the first to report SRH after URS and pneumatic lithotripsy [15], while Resorlu et al. was the first to report PH [16].

The etiology of renal hematomas as a complication of URS and lithotripsy is uncertain yet, nonetheless trauma to the pelvicaliceal system during manipulation of a safety guide wire or forniceal rupture because of increased intrarenal pressure has been reported to facilitate hematoma formation [15,17]. Furthermore, Bai and associates proposed that the increase of intrarenal pressure during the procedure could lead to sudden expansion and rupture of the compressed renal parenchyma and vessels, causing bleeding and hematoma formation [10]. According to a systemic review of PH after ureteroscopy, the predisposing factors can be classified as patient factors (pre-operative moderate to severe hydronephrosis, thin renal cortex, large stone size, presence of urinary tract infection and hypertension) and procedural factors (prolonged operative time and the high irrigation pressures) [18].

In our case, the patient’s left obstructed kidney was atrophic with thin cortex. We suppose that the thin cortex makes the kidney more prone to rupture and develop hematoma even under normal perfusion pressure of hydraulic irrigation. This suggestion is supported by Chiu et al. who reports that 3 out of the 4 patients who developed hematoma post ureteroscopic laser lithotripsy were having a thin cortex [8].

In the previous reports, the presenting complaint of renal hematoma was flank pain [7,8,10,11,16,19]. However, the clinical presentation of these patients varied considerably based on the degree and duration of the bleeding [8]. Most patients were also having a fever and a palpable loin mass. Other symptoms include

Table 2
Clinical features and outcomes of Taken et al.'s 9 patients with SRH [14].

	Age (year)/sex	Procedure	Stone Location	Stone size (mm)	Degree of preoperative hydronephrosis	Duration of operation (mins)	Size of Hematoma (cm)	Treatment
1	45/m	RURS	Right, kidney	18	Moderate	80	5	Conservative
2	67/m	RURS	Left, proximal	7	Moderate	40	3	Conservative
3	23/m	RURS	Left, proximal	17	Severe	80	7	Blood transfusion
4	39/m	RURS	Right, middle	31	Severe	70	5	Conservative
5	20/f	RURS	Left, middle	12	Mild	30	4	Conservative
6	24/m	RURS	Left, distal	10	Moderate	40	9.5	Blood transfusion and drainage
7	24/f	FURS	Right, kidney	11	Mild	48	3.5	Conservative
8	79/m	FURS	Left, kidney	25	Moderate	60	4	Blood transfusion
9	37/m	FURS	Right, proximal	8	Moderate	35	3.5	Conservative

hematuria, diffuse abdominal pain, and dizziness [8]. In our case, the patient presented with flank pain and dizziness. Furthermore, a drop in hemoglobin and a rise in serum creatinine were reported in his laboratory tests.

Unlike the hematomas occur after ESWL, the management of renal hematoma after ureteroscopic lithotripsy is not standardized yet. Management should be tailored according to each patient's clinical condition, the mass effect of the hematoma, and clinical progress with conservative therapy [7]. The majority of articles reviewed by Whitehurst concluded that conservative treatment is the best initial management [16]. Kozminski et al. found that PH and SH can be conservatively managed with observation [15], while others support intervention to evacuate the hematoma [8,10].

The clinical features and outcomes of Taken et al.'s 9 patients were illustrated in Table 2.

Our patient was hospitalized, received blood, and well-observed (serial assessment of vital signs and hemoglobin level) without any active intervention. It is worth mentioning that our patient underwent a successful, uneventful ureteroscopic pneumatic lithotripsy 6 months post the hematoma occurrence.

Declaration of Competing Interest

The authors declare that they have no conflict of interest to disclose.

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Ethical approval

Case reports are exempted from ethical approval in our institution.

Consent

“Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request”.

Author's contribution

- Concept – Adel Alrabadi.
- Design – Adel Alrabadi, Sohaib Alhamss.
- Supervision – Adel Alrabadi.
- Resources – Saddam Al Demour, Mahmoud Odeh.
- Materials – Sohaib Alhamss, Mahmoud Odeh.
- Writing Manuscript – Adel Alrabadi, Hammam Mansi.
- Critical Review – Sohaib Alhamss.

Registration of research studies

N/A.

Guarantor

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