



**ORIGINAL RESEARCH PAPER**

**Urology**

**SUBCAPSULAR RENAL HEMATOMA AFTER URETEROSCOPIC LITHOTRIPSY- AN UNUSUAL ISSUE BEYOND DOUBTS**

**KEY WORDS:** Hematoma, Ureteroscope, Lithotripsy, Loin pain, Aspiration

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**ABSTRACT**

Subcapsular renal hematoma is well known complication associated with extracorporeal shockwave lithotripsy (ESWL) and percutaneous nephrolithotomy (PCNL) but after ureteroscopic lithotripsy (URSL) it rarely occurs. We reviewed our center's experience of post-URSL perinephric hematoma from 2012 to 2018. 872 URSLs using 7.5/9 F rigid ureteroscopes were performed. Documented operative information, postoperative presentation of symptoms, changes in blood parameters, USG findings, and subsequent management of complications were reviewed. Associated perioperative information on patient's preoperative morbidity, renal function, stone characteristics, and degree of hydronephrosis were noted. Post-URSL subcapsular hematoma was diagnosed in 3 of 872 (0.34%) patients in which two managed by ultrasonography-guided percutaneous aspiration and one by conservatively. A strong suspicion is needed for a rare complication when patients present with significant loin pain and fever after URSL. The management of post-URSL subcapsular hematomas needs to be customized for each patient with conservative approach even reveals a good outcome.

**INTRODUCTION**

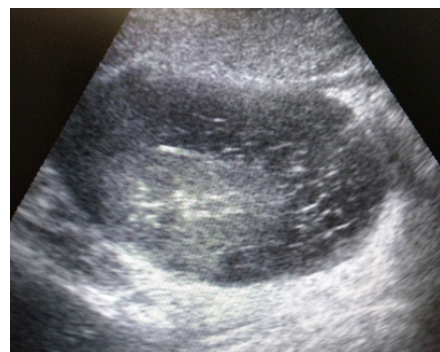
Renal subcapsular hematoma is reported as a complication after extracorporeal short wave lithotripsy(ESWL),trauma,renal angiographic procedures[4,6,7]. It can occurs spontaneously in patients of malignancy and also in patients taking anticoagulants[1]. It is one of the uncommon complication with URSL which with holmium: yttrium-aluminum-garnet (Ho:YAG) laser is preferred method of managing most of ureteral stones[2,5]] Newer modality advances, including smaller caliber ureteroscopes with greater flexibility,resulting in low complication rates for URSL[2]. Only few publications on perinephric hematoma as a postoperative complication in URSL with risk factors for the development in world literature are present [10,12].We retrospectively analysed in our tertiary level institution of this rare complication URSL. Patients of subcapsular renal hematoma usually presented with flank pain,hematuria and signs of blood loss[5,6,8]. A strong clinical suspicion needed for early diagnosis due to overlapping many etiology of the clinical features. Treatment of renal subcapsular hematoma varies patient to patient which are usually percutaneous aspiration or conservative[2,13].

**PATIENTS AND METHODS**

All URSLs performed in our center from January 2008 to December 2017 were retrospectively reviewed. Identification of Patients with post-URSL perinephric hematoma were done and studied in detail. Informed consent and risk bond were taken from all patients pre-operatively. All URSLs were performed by using 7.5F rigid non irrigating ureteroscope under spinal anesthesia. A 0.032-inch Terumo safety guidewire and an 8F infant feeding tube for bladder drainage were used in every case. The ureteroscope was introduced into the ureter without dilation under direct camera vision . The irrigating saline solution was positioned 60cm above the patient. A 0.365 m Ho:YAG laser fiber was used for lithotripsy, and the energy settings were set at 0.8 to 1.0 J at a rate of 10 to 15 Hz. Stones were fragmented upto 1-2mm size fragments. A 4-6F Double-J stent was inserted and kept in for 4 to 6 weeks . Patients were discharged usually within 36 to 48 hours

after the procedure. Patients who developed fever,flank pain,dysuria or hematuria had prolong hospital post-operative stay.

Three patients among all post-operative patients of URSL re-admitted with complain of persistent fever , loin pain ,paralytic ileus. Two developed these clinical symptoms on 3<sup>rd</sup> POD , and one on 5<sup>th</sup> Post-operative day.These symptoms were suspected to be URSL procedure-related. Ultrasonography of abdomen and pelvis with special focus on kidney,ureter and urinary bladder was performed which confirm the diagnosis of perirenal hematoma.Figure-1



**FIGURE:-**Ultrasonography showing subcapsular hematoma One patient managed only with antibiotics & observation and other two needed percutaneous aspiration of hematoma along with antibiotics .

**RESULT**

Among all URSL performed during study periods 3 cases of perinephric hematoma were identified. A general features observed in these patients are noted in table-1. Two patients were obese with a body mass index (BMI)>25 kg/m2

**TABLE-1**

Patients no.	Age/Sex	Comorbidity	Stone position	Stone size	Hydronephrosis	Size of hematoma	Managment
1	52/M	Obese	Right proximal	12mm	Moderate	11mm	Percutaneous drainage
2	55/F	Obese +Diabetic	Right proximal	18mm	Severe	13mm	Percutaneous drainage
3	44/M	Hypertensive	Right middle	15mm	Moderate	7mm	Conservative

with age 52 & 55 yrs . One was diabetic and one was hypertensive . The serum creatinine level before URSL was normal in all patients . Preoperative serum platelet level and coagulation profiles were all normal. Stones were radiopaque obstructive upper and mid ureter ranging from 1.2 to 1.8cm, associated with moderate hydronephrosis. Fever, flank pain are the presenting symptoms in all patients . Two developed on 3rd Post Operativ Day, other one on 5th Post Operativ Day. The pain and fever were suspected to be URSL procedure-related . UltraSonography of abdomen and pelvis was done which confirmed the diagnosis of perirenal hematoma.

TABLE-2

Characteristics associated with subcapsular perirenal hematoma	
Male	66%
Right side	100%
Hydronephrosis	100%
Obesity	66%
Hypertension	33%
Diabetes	33%
Fever, Flank pain	100%
Blood transfusion	33%
Percutaneous drainage	66%

One patient managed only with antibiotics & observation and other two treated by percutaneous aspiration of hematoma along with antibiotics. One patient was transfused blood . Associated characteristics observed in this study is noted in table 2.

**DISCUSSION**

Subcapsular and perinephric hematoma are one among established and reported complication after extracorporeal shock wave lithotripsy(ESWL) and percutaneous nephrolithotomy (PCNL), but its occurrence is very less common with URSL[2,4,11]. Despite its uncommon occurrence, this complication require particular attention because of its serious consequences for renal function. Without high index of suspicion, one can easily missed out it. This study describes the presentation and management of rare cases of subcapsular renal hematoma after URSL. The overall incidence of 0.34% in this study is almost similar to the other case series reported recently[4]. Bai and colleagues reported 0.4% subcapsular hematomas after 2848 URSLs using the Ho:YAG laser [3]. The clinical symptoms of subcapsular hematoma after URSL is almost similar to that after ESWL & PCNL[8]. All patients in this study presented with flank pain and fever. Chief complaint reported in many published study was loin pain[6,8]. Many patients also presents with fever and a palpable loin mass. Other associated symptoms can be included are hematuria, diffuse abdominal pain, and hypotension which may be due to blood loss[5,6,8]. Patients who has undergone uneventful URSL, usually recovers quickly and ambulates within twenty four hours of the procedure. Physician should alert in case of alteration of normal recovery .

Features of urosepsis, persistent obstruction by incomplete stone fragmentation mimics subcapsular hematoma. Significant drop in hemoglobin strongly favours of the diagnosis of perinephric hematoma[6,7]. Its etiology and mechanism of development is not clearly defined. Bansal and associates suggested that the most probable explanation for the development of hematoma could be trauma to the pelviciceal system during guidewire manipulation, or raised intrarenal pressure leading to fornical rupture and separation of the capsule from the parenchyma and hematoma[6]. It is assume that larger stone size ,severe ipsilateral hydronephrosis, longer operation duration, and higher perfusion pressure of hydraulic irrigation may be associated with subcapsular hematoma formation[6,10,12]. In this study all patients had obstructing proximal upper ureteral stones and affected kidneys were associated with thin renal cortices. Long-term obstruction from the stone resulting in tortuous ureter distal to obstruction so guidewire advancement become difficult and increase chance of injury. A dilated pelviciceal system with a reduced cortical thickness reduces the resistance to raised intrarenal pressure and makes the capsule more susceptible

to injury[3,5,6]. In this study hydrostatic pressure of 80cm H2O was adopted for all patients and no machine pumps were applied, but variations in the irrigating pressure provided by manual pressure may contribute in injury. The current evidence suggests that maintaining a steady and low intrarenal pressure is a prerequisite to avoid intrarenal reflux and injury to the fornices[5]. Physicians should be cautious when giving high irrigating pressure in patients with proximal ureteral stones with significant hydronephrosis and a thin renal cortex.

Comorbidity remains the risk factors as usual [10,12]. Two third of the patients are obese in this study which is similar to other published study so caution should be taken in handling ureteroscopes in obese patients.

There is no standardized management of subcapsular hematoma after URS. Management was tailored according to each patient's clinical condition, mass effect of the hematoma, and clinical progress with medical therapy, which were different in all patients. A percutaneous drainage, laparoscopic decortication may be done to decrease surgical aggressiveness in patients with stable vitals but with unbearable pain or renal compression .In view of Héctor Pastor Navarro et al., once the immediate acute condition has been resolved and the patient and the size of the hematoma are stable, hematoma should be evacuated as a delayed emergency procedure 8–15 after its occurrence, when active bleeding would have stopped[6,7]. There is no available protocol for the ideal timing of surgical intervention , because the indication varies with the individual condition.

**CONCLUSIONS**

Post-URSL subcapsular hematoma is a rare but potentially serious complication. A high index of suspicion is needed when patients with co-morbidity present with significant loin pain and fever after URSL for obstructing proximal ureteral stones. Management of post-URSL subcapsular hematomas varied patient to patient.

**REFERENCES**

1. Chao YC, Ming HL, Yeu CC, Sun YC. Spontaneous bilateral renal subcapsular hematoma as a possible complication of myeloproliferative disorders. *J Med Sci* 2009;29:273-5
2. Taie K, Jasemi M, Khzaeli D, et al. Prevalence and management of complications of ureteroscopy: A sevenyear experience with introduction of a new maneuver to prevent ureteral avulsion. *Urol J* 2012;9:356–360.
3. Bai J, Li C, Wang S, et al. Subcapsular renal haematoma after holmium:yttrium-aluminum-garnet laser ureterolithotripsy. *BJU Int* 2012;109:1230–1234.
4. Chichakli R, Krause R, Voelzke B, et al. Incidence of perinephric hematoma after percutaneous nephrolithotomy. *J Endourol* 2008;22:1227–1232
5. Chiu PK, Chan CK, Ma WK, et al. Subcapsular hematoma after ureteroscopy and laser lithotripsy. *J Endourol* 2013;27:1115–1119.
6. Bansal U, Sawant A, Dhabalia J. Subcapsular renal hematoma after ureterorenoscopy: An unknown complication of a known procedure. *Urol Ann* 2010;2:119–121.
7. Navarro HP, López PC, Ruiz JM. Renal hematoma after extracorporeal shock-wave lithotripsy (ESWL). *Actas Urol Esp* 2009;33:296-303.
8. KOZMINSKI ET AL: Symptomatic Subcapsular and Perinephric Hematoma Following Ureteroscopic Lithotripsy for Renal Calculi *J Endourol*. 2015 Mar;29(3):277-82. doi: 10.1089/end.2014.0176. Epub 2014 Aug 20.
9. Nuttall M, Abbaraju J, IK D, et al. A review of studies reporting on complications of upper urinary tract stone ablation using the holmium:YAG laser. *Br J Med Surg Urol* 2010;3:151–159.
10. Razi H, Fuller A, Nott L, et al. Risk factors for perinephric hematoma formation after shockwave lithotripsy:A matched case-control analysis. *J Endourol* 2012;26:1478–1482.
11. Meng H, Chen S, Chen G, et al. Renal subcapsular hemorrhage complicating ureterolithotripsy: An unknown complication of a known day-to-day procedure. *Urol Int* 2013;91:335–339.
12. Lee HY, Yang YH, Shen JT, et al. Risk factors survey for extracorporeal shockwave lithotripsy-induced renal hematoma. *J Endourol* 2013;27:763–767.
13. Duffey B, Lee J, Monga M. Perinephric hematoma following ureteroscopy and holmium laser lithotripsy. *Open Urol Nephrol J* 2008:36–37.