CASE REPORT

Death due to retroperitoneal haemorrhage following ureteroscopic intervention: Two case reports

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Introduction

The usage of ureteroscopy has been increasing over the years and is considered as a nontraumatic, safe intervention compared to several other urologic procedures.[1][2]

Although there have been occasional life threatening complications reported[3] there were no reported deaths due to retroperitoneal haemorrhage or perinephric haematoma following this procedure. Here we describe two fatalities following ureteroscopy and laser lithotripsy with double-J stent revision.

Case 1

67-year-old male with a past history of ischaemic heart disease (IHD), coronary stenting, hypertension (HTN) and dyslipidaemia presented to a tertiary care unit for ureteroscopic laser lithotripsy and stent revision for urolithiasis involving the right-sided ureter and renal pelvis which was diagnosed 3 months prior to the current admission (Table 1). He was completely asymptomatic, and the physical examination was normal.

Pre-op assessment revealed asymptomatic Klebsiella urinary tract infection (UTI) associated with pyuria. Except for serum creatinine which was elevated, other parameters were normal (Table 1).

Table 1: Timeline of events and pre-op assessment for Case 1

Case 1: Timeline of events	
3 months	Diagnosis of renal calculi
Day 0	Presents to tertiary hospital for elective surgery
Day 1	Omission of Clopidogrel
Day 3	Asymptomatic UTI detected
Day 9	URS + laser lithotripsy and stent revision performed
	Transferred to ward
	Fever with chills
	Death
Day 10	Autopsy

Case 1: Pre-op Assessment		
Investigations	**Results**	**Normal range**
Urine culture	Klebsiella with 10^5 colony forming units	
Urine full report		
Pus cells	40-50/ hpf	< 2-5/ hpf
Red cells	--	≤3/ hpf
Casts	--	≤5 / hpf
Organisms	--	--
Crystals	--	Occasional
Full blood count		
Haemoglobin	12.8 g/dl	11-16 g/dl
Leukocytes	7.44 x 10^3 ul	4-10 g/dl
Platelets	158x10^3 ul	150-450x10^3 ul
Clotting profile		
PT	13s	12 – 14.8s
C- reactive protein	<5 mg/l	<5 mg/l
Serum creatinine	2.47 mg/dl	0.6-1.2 mg/dl
eGFR	26 ml/min/1.73 m^2	85 ml/min/1.73m^2

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A preoperative echocardiogram showed an ejection fraction of 40% and cardiology opinion was that he was sufficiently fit for surgery under spinal anaesthesia. Clopidogrel was omitted pre-operatively while aspirin was continued.

During the ureteroscopic laser lithotripsy and stent revision, multiple renal pelvic calculi were noted. Lithotripsy was performed. A 5Fr double-J stent was inserted into the right ureter and the bladder was catheterized with a 16Fr foley catheter.

Four hours after surgery, the patient developed fever with chills and subsequently became unresponsive. Despite repeated attempts at resuscitation the patient passed away 6 hours into the postoperative period. The death was referred for inquest and autopsy.

At autopsy (Figure 1) the body showed severe pallor in the conjunctiva, oral mucosa and most of the organs including the kidneys. The right and left kidneys weighed 50g and 75g respectively. There was a large retroperitoneal haemorrhage in the right perinephric region. A double-J stent was in situ in the right renal pelvis with multiple fragmented calculi. There was no visible trauma to the renal tract. 2500ml of blood was present in the peritoneal cavity. In the heart there was diffuse fibrosis over the antero-septal region with aneurysm formation. The Left anterior descending artery lumen showed atherosclerotic narrowing >75%. There were no sub-endocardial haemorrhages. Both the lungs showed congestion and pulmonary oedema with no evidence of thromboembolic phenomena. Cause of death was given as haemorrhagic shock due to retroperitoneal haemorrhage as a result of ureteroscopy and double-J stent reversal surgery.

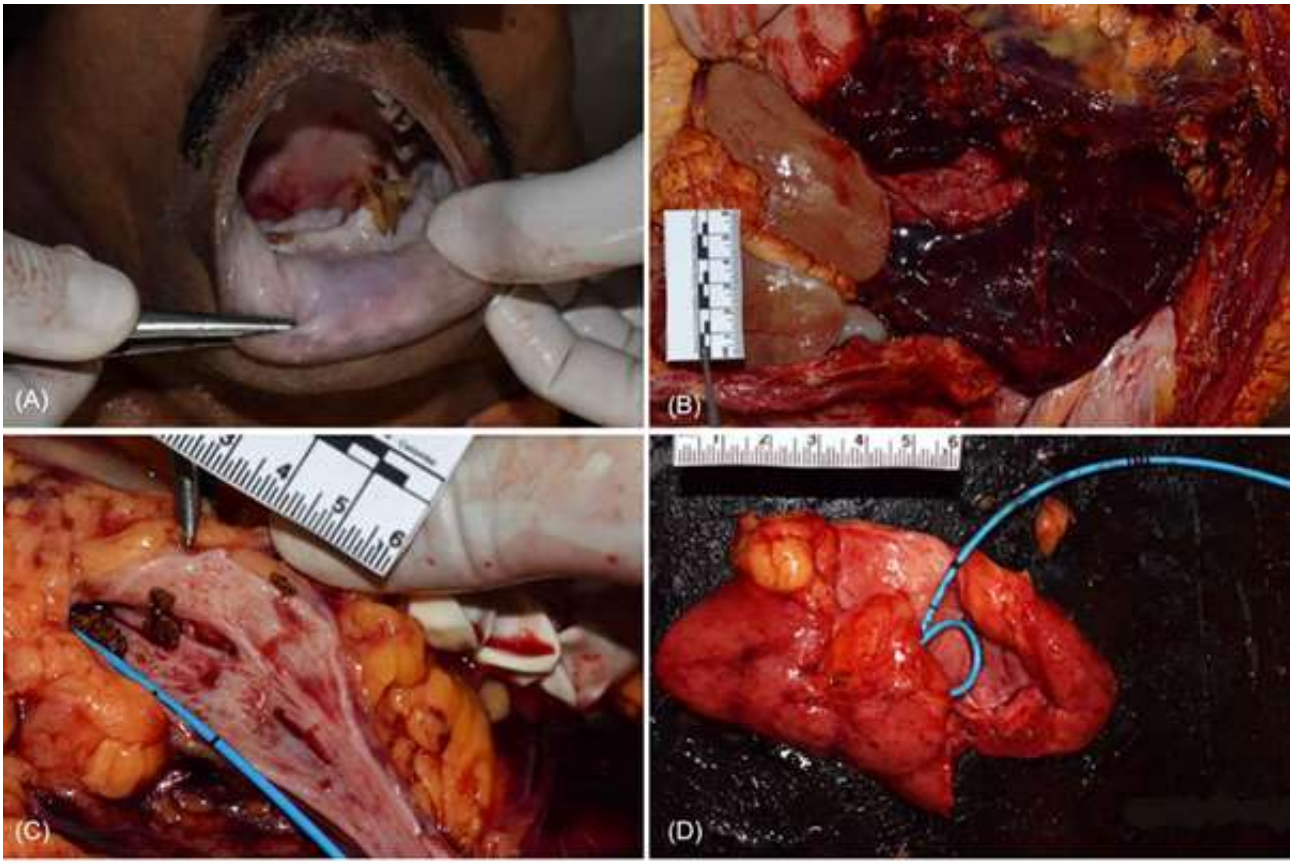

Fig. 1 (A) Pallor of the oral mucosa due to severe bleeding. (B) Haemorrhage involving the peritoneal and retroperitoneal cavities. (C) Incision made in the right ureter shows the double J stent and residual calculi. (D) Right kidney with a pale surface and the double J stent in situ.

Case 2

A 65-year-old man with a history of diabetes, HTN and IHD was admitted to a tertiary care hospital with haematuria and abdominal pain(Table 2). Sonography showed a calculus in the left mid ureter along with grade II hydronephrosis and upper hydroureter. His CRP and white cell count was elevated but there was no evidence of a UTI. The rest of the clinical evaluation was unremarkable. Rigid cystoscopy and bladder wash was performed along with URS laser lithotripsy and double-J stent insertion under spinal anaesthesia. There was severe inflammation of the mid ureter along with pus. The calculus was extracted successfully. 6 hours after surgery he developed chest pain, bi-basal crepitations and fever.

There was a reduction in the haemoglobin count and the ECG showed features of inferior myocardial ischaemia. Thereafter the patient became unresponsive and passed away despite resuscitation attempts.

The autopsy revealed retroperitoneal haemorrhage in the left perinephric region and a double-J stent which was in-situ (Figure 2). There was no perforation or trauma in the urinary tract. Examination of the heart showed sub-endocardial haemorrhages in the left ventricle along with patchy fibrosis suggestive of old infarcts. There was 80% narrowing of the left anterior descending artery. Both lungs were congested due to pulmonary oedema but there was no consolidation or thromboembolic phenomena. Cause of death was given as acute myocardial infarction due to coronary atherosclerosis contributed by post surgical haemorrhage, diabetes and urosepsis.

Information gathered during the pre-autopsy interview with the families and perusal of medical records in both these cases showed that the possibility of retroperitoneal haemorrhage following these procedures were not adequately informed to the deceased and their families which raised allegations of negligence. Post autopsy discussions also revealed that the surgical team did not expect these complications to occur.

Table 1: Timeline and summary of pre-op assessment for Case 2

Case 2: Timeline of events	
Day 1	Haematuria
Day 3	Admission to hospital
Day 4	Diagnosed with ureteric stone complicated with hydronephrosis and hydroureter
Day 6 (12.30pm)	Rigid cystoscopy + bladder wash+ URS + laser lithotripsy and Double J stent insertion
(6.25pm)	Chest pain Myocardial infarction and anaemia detected
Day 7	Death
Day 8	Autopsy

Case 2: Pre-op Assessment		
Investigations	**Results**	**Normal range**
Urine culture	No bacterial growth	
Urine full report		
Pus cells	1-2/ hpf	< 2-5/ hpf
Red cells	Moderately field full	≤3/ hpf
Casts	--	≤5/ hpf
Organisms	--	--
Crystals	--	Occasional
Full blood count		
Haemoglobin	9.8 g/dl → 7.5g/dl (23rd)	11-16 g/dl
Leukocytes	12.93 x10^{3}ul → 33.27x10^{3}ul	4-10 g/dl
Platelets	268x10^3 ul	150-450x10^3 ul
Clotting profile		
PT	13.6s	12 – 14.8s
INR	1.01	
C- reactive protein	181.4 mg/l	<5 mg/l
Serum creatinine	3.1 mg/dl	0.6-1.2 mg/dl
eGFR	20 ml/min/1.73 m^2	85 ml/min/1.73m^2
Troponin I	8.616 ng/ml	0 – 0.04 ng/ml

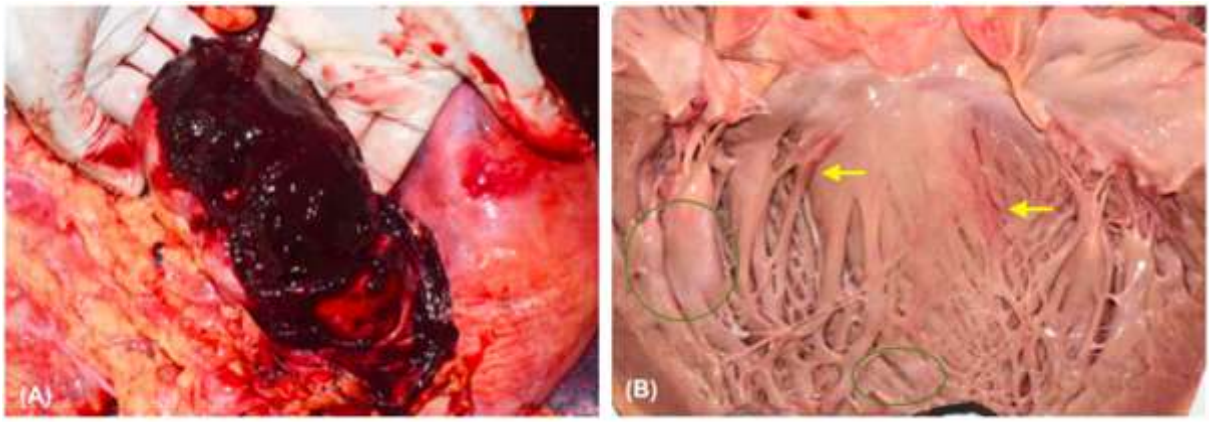

Fig. 2 (A)Retroperitoneal haemorrhage in the left peri-nephric region. (B)Subendocardial haemorrhages(yellow arrows) and few fibrotic patches(green circles) in the heart.

Discussion

Ureteroscopy (URS) is considered as a relatively safer option than interventions such as extracorporeal shockwave lithotripsy (ESWL) and percutaneous nephrolithotomy (PCNL), especially when considering complications such as peri-nephric haematoma and retroperitoneal haemorrhage.[1] URS is the procedure of choice in patients with clotting abnormalities which further highlights its safety.[2]

Retroperitoneal haemorrhage has been previously reported as a rare but life-threatening complication of ureteroscopic interventions due to manipulation of instruments[3] (guidewire, access sheath, ureterorenoscope etc.) or due to forniceal rupture secondary to increased irrigation pressures during the procedure.[4][5]

There are several factors which predispose an individual to develop this complication such as pre-operative UTI, hypertension, moderate to severe hydronephrosis, thin renal cortex, and prolonged operative time.[1]

Deaths due to retroperitoneal haemorrhage following ureteroscopic procedures have not been previously reported. In both these cases high serum creatinine, hypertension and UTIs could have been predisposing factors as even in case 2, although the urinalysis was normal, pus along the ureteric mucosa was detected during surgery. Hydronephrosis is also a possible factor in case 2.

Conclusion

These cases indicate that though ureterorenoscopy is considered to be a safe procedure with a low risk of bleeding, the possibility of fatal retroperitoneal haemorrhage should be expected, especially when predisposing factors such as UTIs, hypertension, high serum creatinine, and cardiac comorbidities exist. Therefore, extra precaution should be taken during manipulation and irrigation when performing such procedures in high-risk patients and it is prudent to mention the possibility of this fatal complication to the patient and family when obtaining informed consent.

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Learning Points:

- Retroperitoneal haemorrhage following ureteroscopy although rare, may result in fatality in the presence of comorbidities
- Extra precaution should be taken during uretroscopic procedures in high-risk patients
- Mentioning this rare possibility to the patient and family when obtaining informed consent can minimize allegations of negligence.