Renal pseudoaneurysm: a rare and potentially fatal complication following ureteroscopy and laser fragmentation of stones

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ABSTRACT

Ureteroscopy and laser fragmentation of stones is a commonly used method to treat ureteric and renal calculi. We report the exceedingly rare finding of a renal pseudoaneurysm in an interpolar renal artery following ureteroscopy and laser stone fragmentation, which was successfully managed with angioembolisation.

KEYWORDS

Calculi – Endourology – Laser – Stones – Ureteroscopy

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Introduction

Renal pseudoaneurysm is an uncommon vascular lesion that arises when an arterial injury within the kidney leads to a contained haemorrhage. The associated hematoma forms outside the arterial wall and is encapsulated by reactive fibrosis, forming a structure that resembles an aneurysmal sac. These lesions are potentially unstable as they involve an arterial puncture occluded only by a haematoma and connective tissue. Rupture of the pseudoaneurysm can lead to life-threatening haemorrhage if the intraluminal hydrostatic pressure overcomes the tamponade effect of the surrounding haematoma.¹

Case history

A 68-year old woman with a background of multiple sclerosis and recent non-ST elevation myocardial infarction (NSTEMI) underwent ureteroscopic treatment of two calculi measuring 11 mm and 4 mm in the renal pelvis and lower calyx of her left kidney. Rigid and flexible ureteroscopy and laser fragmentation of the stones using an access sheath were performed. Stones were fragmented with a 200-micron laser fibre, and a zero-tip basket was used to extract the larger fragments (> 2 mm). Stone analysis showed a composition of 61% triple phosphate and 39% calcium phosphate. A ureteric stent on a string was inserted at the end of the operation. Clopidogrel, which the patient was taking for a recent NSTEMI, was stopped five days prior to this

procedure. Preoperative laboratory findings demonstrated normal renal function and urine culture showed no significant growth. No intraoperative complications were observed. The patient was discharged the following day and the stent was removed nine days later in the outpatient department by pulling on the string.

Three weeks after the procedure, the patient presented to hospital with vomiting, abdominal pain and fever. She was treated with intravenous antibiotics for a urinary tract infection. Computed tomography (CT) of her abdomen and pelvis demonstrated a 9-cm collection arising from the left kidney. An ultrasound-guided drain was inserted and culture demonstrated heavy growth for *Proteus* species. Despite appropriate antibiotic therapy, she remained unwell and repeat CT of her abdomen and pelvis demonstrated an arterially enhancing 12-mm lesion at the interpolar region of the left kidney suspicious of a renal pseudoaneurysm (Fig 1). This lesion was not present on the preoperative CT of kidneys, ureters and bladder. Renal angiography confirmed the presence of a pseudoaneurysm at the interpolar region of the left kidney (Fig 2). Embolisation was undertaken using three interlock coils, with good results. The patient was discharged 48 hours later.

Discussion

Renal pseudoaneurysms have been reported to occur in different clinical scenarios including post-renal surgery, percutaneous procedures and trauma, in addition to inflammatory

Figure 1 Arterial phase computed tomography of the abdomen and pelvis with contrast showing an arterially enhancing 12-mm lesion at the interpolar region of the left kidney suspicious for a renal pseudoaneurysm

Figure 2 Angiography confirming the presence of a pseudoaneurysm at the interpolar region of the left kidney

and neoplastic processes within the kidney. Although exceptionally rare, pseudoaneurysms have been reported to occur following endourological procedures, including ureteroscopic electrohydraulic lithotripsy, endopyelotomy and endoscopic ablation of upper tract tumours.^{2,3,4} There is one case report in the literature describing a renal pseudoaneurysm diagnosed following ureteroscopy and laser stone fragmentation, which manifested as persistent visible

haematuria.⁵ The aetiology of this pseudoaneurysm was postulated to be due to guidewire-associated trauma, laser trauma or intrarenal pressure damage by irrigating fluid.

A range of clinical features associated with renal pseudoaneurysms have been documented, including pain, haematuria and hypertension. However, a renal pseudoaneurysm can be asymptomatic and found incidentally, as was demonstrated in our case. Clinical features of renal pseudoaneurysms have been reported to be an unreliable guide to the severity and underlying aetiology of the lesion.¹ The renal pseudoaneurysm in our case may be a result of guidewire or laser trauma, *Proteus* kidney infection eroding into a branch of the renal artery, or high intrarenal pressure from irrigating fluid, although the latter is unlikely, as an access sheath was used.

Untreated renal pseudoaneurysms are potentially life threatening, as haemorrhage can be sudden and rapid. Furthermore, while spontaneous resolution and closure of renal pseudoaneurysms have been described in the literature, there is a paucity of evidence regarding the characteristics that predict spontaneous closure and risk of rupture. Angioembolisation is currently accepted as the first line of management for renal pseudoaneurysm in haemodynamically stable patients, as it is highly effective, safe and unlikely to cause any long-term renal impairment. Conservative approaches with close surveillance of the renal pseudoaneurysm is appropriate only if there is compelling reason to avoid active treatment. Open surgery and percutaneous embolisation techniques have also been described.¹

Renal pseudoaneurysms may be more common than has been reported, as CT with contrast is not routinely performed following routine ureteroscopy. It should be recognised as a possible complication of ureteroscopy and laser stone fragmentation. Care should be taken to avoid contact between the laser fibre and the urothelial lining of calyces and to handle the guidewire with care to avoid traumatic injury to the renal parenchyma. In addition, where appropriate an access sheath should be used to keep intrarenal pressures low, minimising risk of possible pressure damage to intrarenal vessels. While a high index of suspicion is required in patients who undergo ureteroscopy and laser stone fragmentation and subsequently develop pain, haematuria, anaemia or who become haemodynamically unstable, renal pseudoaneurysm may be an incidental finding. These patients should be treated with angioembolisation if possible.

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