Techniques: Shockwave lithotripsy may not be a good option in patients with previous renal superselective embolization

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Case and discussion

A 53-year-old male, presented with a 20-year history of recurrent left nephrolithiasis. His past medical history was notable for vitamin B12 deficiency leading to mild thrombocytopenia (baseline platelet count of ~70–100 x 10^9/L) and polycythemia secondary to smoking. He was not on any anticoagulants or anti-platelet agents. He had two previous ureteroscopic laser lithotripsies for distal ureteral stones and extracorporeal shockwave lithotripsy (SWL) for an upper pole stone. He presented with a new left lower pole partial staghorn stone of 2.4 x 1.2 x 1.0 cm (HU 736) and underwent left tubeless percutaneous nephrolithotomy (Figs. 1 A, B). On postoperative Day 1, he developed persistent hematuria and his hemoglobin dropped from 185 g/L to 144 g/L with a platelet count of 117 x 10^9. He required super-selective angioembolization for a thrombosed pseudoaneurysm in a subsegmental lower pole branch.[1] Eight months later, he presented with left flank pain. Repeat imaging showed recurrence of a 10 x 6 mm stone in the left lower pole (Fig. 1 C). The patient was referred for left-sided SWL. His pre-SWL platelet count was 90 x 10^9/L.[2] His pre- and intra-SWL blood pressure remained under 130/90 mmHg.[3] The stone was fragmented under fluoroscopic guidance using a Storz Medical Modulith SLX lithotripter (Karl Storz, Tuttlingen, Germany). Three thousand shockwaves were delivered with a dose escalation up to a maximum energy level of 5. Postoperatively, he returned to the emergency room with severe left flank pain. He was tachycardic and his hemoglobin dropped from 166 g/L to 83 g/L over 48 hours, with a platelet count of 141 x 10^9. A computed tomography (CT) scan confirmed a perirenal hematoma of 5.4 cm (Fig. 1D). He underwent left renal arteriography and required super-selective embolization of the bleeding lower pole subsegmental vessel, which was different from the previously embolized vessel.

Despite its non-invasive nature, SWL is associated with clinically significant perirenal hematomas in <1%. Risk factors include uncontrolled hypertension, increasing age, body mass index, diabetes mellitus, atherosclerosis, and the number/frequency/intensity of shockwaves.[3,4] The embolization coil within the lower pole of the kidney may have contributed to his peri-renal hematoma. Since the coil from the first embolization was in close proximity to the stone targeted during SWL, the embolization coil was within the path of the shockwaves, which could have caused the coil to migrate or cause damage to adjacent vessels via shear stress.[5] We believe that this was the mechanism that caused the perirenal hematoma post-SWL in this patient. Therefore, patients with previous embolization coils requiring lithotripsy could be managed with other minimally invasive approaches, such as ureteroscopic laser lithotripsy.

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See Figure 1 on next page.

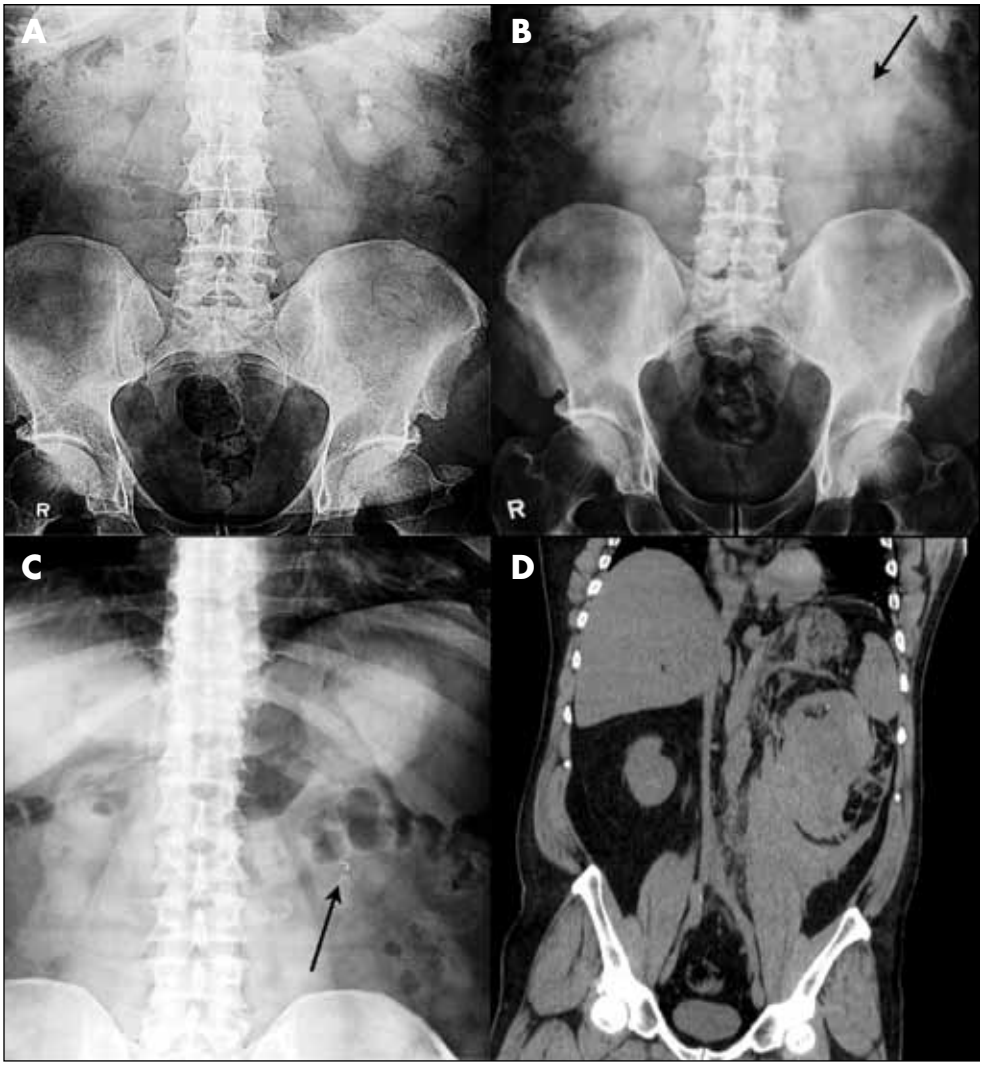

Fig. 1. (A) Pre-percutaneous nephrolithotomy of kidney-ureter-bladder (PCNL KUB) demonstrating left lower pole partial staghorn stone; ***(B)*** post-PCNL KUB demonstrating stone-free status and presence of embolization coil (arrow); ***(C)*** pre-shockwave lithotripsy (SWL) KUB demonstrating 10 x 6 mm lower pole stone (arrow) caudal to previous embolization coil; and ***(D)*** coronal computed tomography image demonstrating the peri-renal hematoma post-SWL.