Case Report

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Retrograde Intrarenal Surgery for Nephrolithiasis with Partially Migrated Renal Artery Embolisation Coil: A Case Report

Surgery Section

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ABSTRACT

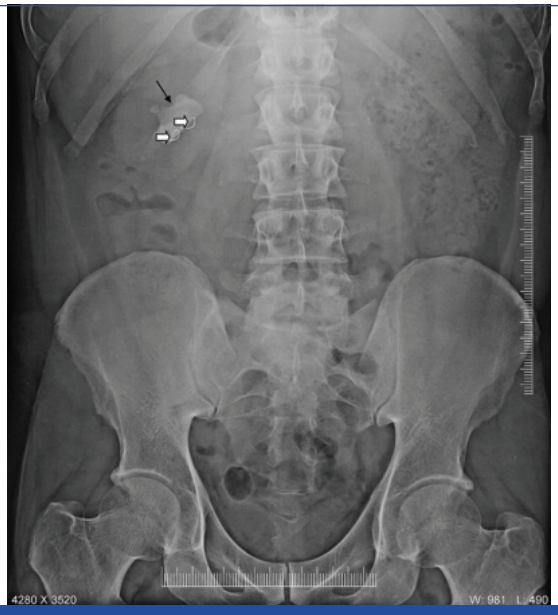
Transcatheter renal artery embolisation is an effective and minimally invasive treatment option for acute renal bleeding. However, it is associated with a variety of complications, which can be classified as early or late according to the time of presentation. Coil migration leading to renal calculi formation is a late complication of transcatheter or percutaneous renal arterial embolisation. A 47-year-old diabetic male patient presented with a recurrent right renal staghorn calculus. Four years ago, the patient underwent a right Percutaneous Nephrolithotomy (PCNL). Following the procedure, he had to undergo a renal arterial embolisation for postoperative haemorrhage. The patient this time did not consent for repeat PCNL, therefore a staged right Retrograde Intrarenal Surgery (RIRS) was performed. Complete clearance of stone and extraction of the migrated coil was achieved in a three-staged procedure. Embolisation coils in the proximity of the pelvi-calyceal system, can migrate into the system, and form a nidus for stone formation. These stones and the migrated coil can be managed effectively and safely with RIRS.

Keywords: Calculus, Coil-migration, Nephrolithotomy, Renal bleeding

CASE REPORT

A 47-year-old male patient, presented with right flank pain for one year, associated with dysuria. He had been on treatment for Type-II diabetes mellitus for five years. He had undergone right PCNL four years back elsewhere, with history of post-PCNL bleed requiring angio-embolisation. Patient was diagnosed with right renal calculus a year back elsewhere, but he was not keen on intervention owing to the stormy post-operative course during his previous PCNL procedure. His abdominal examination was normal.

His Ultrasonography (USG) was suggestive of right renal staghorn calculus with mild right hydronephrosis. X-ray Kidney, Ureter, and Bladder (KUB) [Table/Fig-1] showed a large calculus of about 3 cm with two metal coils in association with the stone. The first coil was in association with the renal pelvis and the second one at the level of the inferior calyx. His renal function tests were normal and urine analysis revealed microscopic haematuria. Intra-venous Pyelogram (IVP)/urography showed normal excreting kidneys bilaterally with calculus in right renal pelvis extending entirely into lower calyx leading to hydronephrosis [Table/Fig-2]. He was advised right PCNL, but this time he did not consent for a repeat PCNL, therefore a staged right RIRS was performed. After proper counseling about the procedure and the need for multiple stages, he underwent the right RIRS as a staged procedure, with complete clearance of calculi after three RIRS procedures.

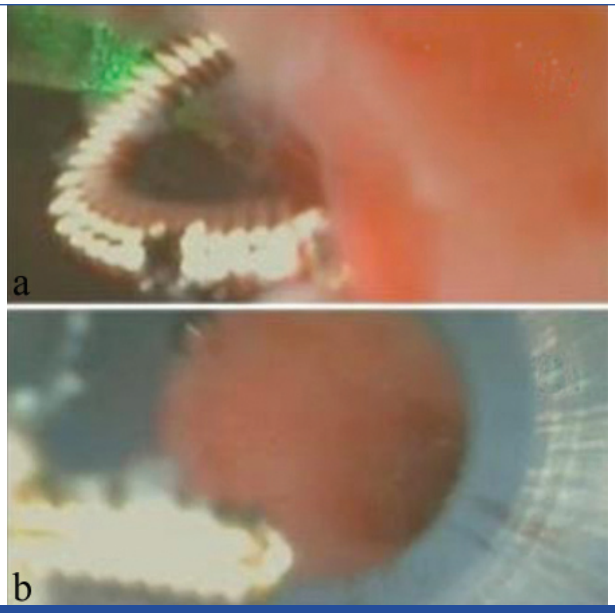


[Table/Fig-1]: X-ray KUB of a large calculus of the size of about 3 cm (black arrow) with two metal coils in association with the stone in the right kidney (white arrow).

[Table/Fig-2]: Intravenous Pyelogram (IVP) film showing the excreting right and left renal moieties.

RIRS was done with DEEPRA®-FLEX (UR-332) Flexible Uretero-renoscope. Flexor® Ureteral Access Sheath 12F (FUS-120045, Cook® Medical) was used in all the three procedures. The plan of dusting was to start from the renal pelvis and then proceed to the middle followed by the lower calyx. TraxerFlow™ Irrigation Set (Rocamed) was used as infusion pump for enabling better vision during uretero-renoscopy. Complete dusting of calculi was done using Holmium (Ho:YAG) Laser LITHO (Quanta System), with laser settings 0.7J, 15 Hz. Mean operating time was 80±10 minutes and lasing time was 45±5 minutes. JJ Stent was inserted postoperatively after each procedure. Intraoperative findings were shown in [Table/Fig-3].

After lasting the calculus, embolisation coils were seen to be protruding into the pelvicalyceal system. One coil was cut flush to



[Table/Fig-3]: a) Image showing intraoperative view of coil along with laser fibre; and b) showing retrieval of coil within the ureteral access sheath using basket.

the pelvic mucosa with holmium laser and the cut part was extracted with NGage® Nitinol Stone Extractor (Cook® Medical). Another coil was identified in the lower calyx; however, it was covered with fibrous tissue and was left as such.

The patient had an uneventful postoperative recovery and was discharged the next day. His postoperative X-ray [Table/Fig-4] and USG three weeks post the 3rd stage, showed complete clearance of calculi with JJ stent-in-situ. The stent was removed after three weeks. X-ray and USG KUB were normal on follow-up done three months after the removal of the stent, and the patient was advised an annual follow-up.

[Table/Fig-4]: Plain X-ray KUB showing complete clearance of calculi using JJ stent in-situ (white arrow).

DISCUSSION

The PCNL is the most frequently used technique for the management of large renal calculi. The incidence of post-PCNL bleed requiring angioembolisation is about 1% [1]. Transcatheter Renal Artery Embolisation (RAE) is an efficient and minimally invasive treatment for acute renal bleeding. RAE like any other treatment is associated with its short and long-term complications. Migration of the embolisation coils and its consequences like stone formation are one of the rare complications that a treating urologist may be faced with [2]. RAE is used for controlling bleeding of renal origin postinterventions like PCNL's and renal biopsies. It has also been used for renal tumours, angiomyolipoma's and vascular malformations of kidney [2].

Various embolic agents used include; mechanical agents such as metallic coils, sclerosants, abgel, autologous blood clot, foams, and microparticles. The choice of material used for embolisation depends on the size of the blood vessel, vascular anatomy, and haemodynamic parameters [2]. Metal coils are the most commonly used agent for the embolisation of a segment of renal artery. Acute complications of coil embolisation include distal coil migration, vasospasm, post-embolisation syndrome, non target embolisation, and infarction causing renal dysfunction. Erosion of embolisation coil into the pelvi-calyceal system is a rare late sequela that may lead to the development of calculus or infection. Management of the calculus secondary to coil erosion and the risk of bleeding due to removal of the coil is not discussed extensively in the literature.

Migration of the embolisation coils occurs only in 2% of cases [3]. It can occur either soon after embolisation or in later years, presenting with clinical symptoms such as pain, haematuria, urinary system obstruction, and impaired kidney function. Such migration may occur through calyceal tears which occur during PCNL, as these areas remain inherently weak. These weak areas may get eroded by coils consequent to inflammation, thus paving way for their migration into pelvi-calyceal system. Possibly, the coil may have migrated through calyceal tears that may be occurred during PCNL [3].

In this patient, coiling material might have served as a nidus for calculus formation, a late migration which is difficult to treat, as half of the coil may be protruding into the pelvi-calyceal system and the other half would be embedded into the parenchyma. Literature reports suggest, that the calculi can get formed inside and around the coils and migrate in the excretory system; however, the management of such a condition is yet to be standardised [3,4].

Rutchik S and Wong P, presented the first report describing the use of ureteroscopic pneumatic lithotripsy and grasping devices for the removal of calculus developed around the coil [4]. Subsequently, studies were reported by Poyet C et al., and Kumar S et al., where a retrograde intrarenal and percutaneous approach were used respectively to fragment the calculus and to extract the coil [5,6]. In the index case, patient refused to have a PCNL, and shockwave lithotripsy was not an option by virtue of the size of the stone, also one cannot be sure that after fragmentation the coil will pass off spontaneously. Considering the above situation, RIRS was performed.

The case was effectively managed using RIRS, and clear visibility provided by the flexible ureteroscope enabled the convenient identification of the encrusted calculus around the coil. Fragmentation and removal of calculus can be merged with the extraction of the calculus-inducing foreign body using RIRS. The following reasons make this case unique; such as the coil was partially intra-parenchymal and partially intra-luminal, making the removal of the coil challenging, the coil in these situations could be still associated with a segmental vessel, so the operator should be careful while extracting the coil as, a possible vascular injury may result. If the coil was completely covered with mucosa and only its impression was seen, the coil should be left behind as it has not migrated and if the surgeon tries to chase the buried coil, catastrophic bleeding may occur. In view of the same, the second coil was left in-situ.

CONCLUSION(S)

Complications due to migrated metal coils can occur years after its placement. Calculi can develop adjacent to the migrated metal coil and should not be neglected if identified. Though no one technique is superior to another in stone management in this situation, RIRS can aid in proper identification as well as concurrent removal of calculi and the coiling material. The preventive measures to avoid migration of the remaining coil need to be explored.

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