

Endourology

Unforeseen encounter: After liver abscess drainage, a foreign body was found in the renal pelvis

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ABSTRACT

Intrarenal foreign bodies are rare and could be iatrogenic through direct penetration, penetration through the gastrointestinal tract (GIT), or retrograde migration from the lower urinary tract. We present Intraoperatively incidental findings of an intrarenal foreign body during percutaneous nephrolithotomy (PCNL) with no previous urological intervention. However, there is a significant multiple percutaneous liver abscess drainage and endoscopic procedures. This case report of a pigtail thread rupture, likely resulting from recent hepatic abscess drainage. In conclusion, Intrarenal foreign bodies are rare, and there is no standard protocol for retrieving them. However, Treatment can be challenging by retrograde intrarenal surgery and PCNL.

1. Introduction:

According to their mode of entrance, foreign bodies in the upper urinary system were divided into three categories according to Gondos et al., 1955: direct penetration, penetration through a hole in the nearby GIT, and ascent from the lower urinary tract.¹ Sometimes, things accidentally left inside the body after surgeries cause retrograde migration.²

Herein, we report a challenging case of a 72-year-old man. Intraoperatively, there are incidental findings of an intrarenal foreign body during right percutaneous nephrolithotomy (PCNL) with no previous history of urological intervention. However, there is a significant multiple percutaneous liver abscess drainage and endoscopic procedures.

2. Case report:

A 72-year-old male diabetic with bronchial asthma, post-cholecystectomy, presented with right upper quadrant pain and fever and was admitted due to cholangitis with a large liver abscess.

The patient successfully underwent CT-guided drainage by an intervention radiologist. CT guided (Seldinger Tech.) 10F pigtail drainage catheter was inserted in the right hepatic abscess about 9*6 cm in diameter. The staghorn stone is planned to be managed electively for at least six months after complete recovery, clearance of infection, and anticoagulant. It shows an incidental staghorn stone in the pelvis and lower calyx, measuring about 3 cm and 400 HU; only the stone was

visible on the CT [Fig. 1A and B & C].

Two months later, an MRI follow-up showed dilated CBD of about 15mm with dilated IHBR. Moreover, there are multiple variable-sized hypointense filling defects along the course of CBD, the largest of which is about 10mm. ERCP was done for the patient with a biliary stent.

Eight months after the previous event, the patient electively underwent percutaneous nephrolithotomy. Intraoperatively, the lower calyx was used to access the kidney while the patient was prone [Fig. 2]. Dilators were used to expose the renal pelvis. The calculi were first broken up using the pneumatic lithotripter (Swiss Lithoclast, EMS, Le Sentier, Switzerland). With a 20Fr nephroscope, the stone was visualized, and after some fragmentation, an intra-renal foreign body was incidentally found [Fig. 3A and B]. Forceps removed the foreign body without complication after careful inspection. An antegrade double J stent was inserted, and the procedure was finished [Fig. 4]. Five days following the procedure, the patient was discharged from the hospital.

The foreign substance was discovered during the postoperative examination as a piece of the pigtail thread, most likely from a recent hepatic abscess drainage. It was hidden by the staghorn stone, explaining its invisibility in pre-operative imaging [Fig. 3, B]. One month later, he was scheduled for a follow-up appointment to have the double J stent removed, which was accomplished. The stones were submitted for component analysis. After eight months of monitoring, there was no stone recurrence.

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3. Discussion:

Intra-renal foreign bodies are rare, Sahai et al. reported 0.6 % incidences, as described in their 650 flexible ureteroscopy, but only four cases retained renal foreign bodies.³ Additionally, Eisenberg et al. retrospectively studied twenty-one cases with retained renal foreign bodies from previous endoscopic and/or percutaneous approaches, most of which included renal stents, followed by nephrostomy tubes and a guidewire fragment.⁴ In contrast, Hennessey et al. summarized that percutaneous nephrostomy placement and related to percutaneous methods accounted for 35 % of all foreign bodies in the upper tract.⁵ Previously, a few similar studies included different types of intrarenal foreign bodies, which were managed by PCNL; some of them were summarized in Table 1. However, to our knowledge, this is the first report of the ruptured thread of the pigtail, presumably from recent hepatic abscess drainage.

Several hypotheses have been proposed for patients whose previous procedures included anastomosis: excessive suture tension promotes chronic persistent erosion¹²; delayed anastomotic site healing as a result of diabetes and underlying chronic renal disease¹⁴; erosion that takes place in conjunction with the body's extreme stress.¹⁵ Similarly, In our case, it may be due to erosion, especially multiple interventions with the infection process, which will make the surrounding tissue more fragile.

Additionally, the presence of comorbidities such as chronic kidney disease and diabetes will affect the healing process.

Timing and clinical presentation vary; Patients may show symptoms or stay asymptomatic for years. Patients may exhibit renal colic, recurrent infections, abscess development, or, in rare cases, a foreign substance in the kidney may seem to be a renal tumor.¹⁶ In severe cases, patients can present with hydronephrosis and urosepsis.¹⁶ In our case, the patient complained of mild flank pain and intermittent hematuria.

The radiological appearance of CT or MRI cannot reliably distinguish the retained foreign body from tumors or stones.¹⁷ However, imaging will be more helpful in planning surgical retrieval, either RIRS or percutaneous nephrolithotomy.

Like stone removal, management can be challenging depending on many factors, including the foreign body's size, shape, and location.^{3,4} Retrograde intrarenal surgery and flexible ureteroscopy are possible methods.¹⁸ Since PCNL is the gold standard for stones larger than 2cm, it is a viable option for removing similarly sized foreign bodies.

Careful inspection of the instruments before and after the procedure is essential and will reduce such undesirable complications.¹⁹ It is also advised to check the integrity of the intraoperative instruments to minimize the risk of complications and reassure the patient.¹³ Prevention of retained foreign bodies is always better than treating adverse events. Therefore, strict protective measures are required to prevent

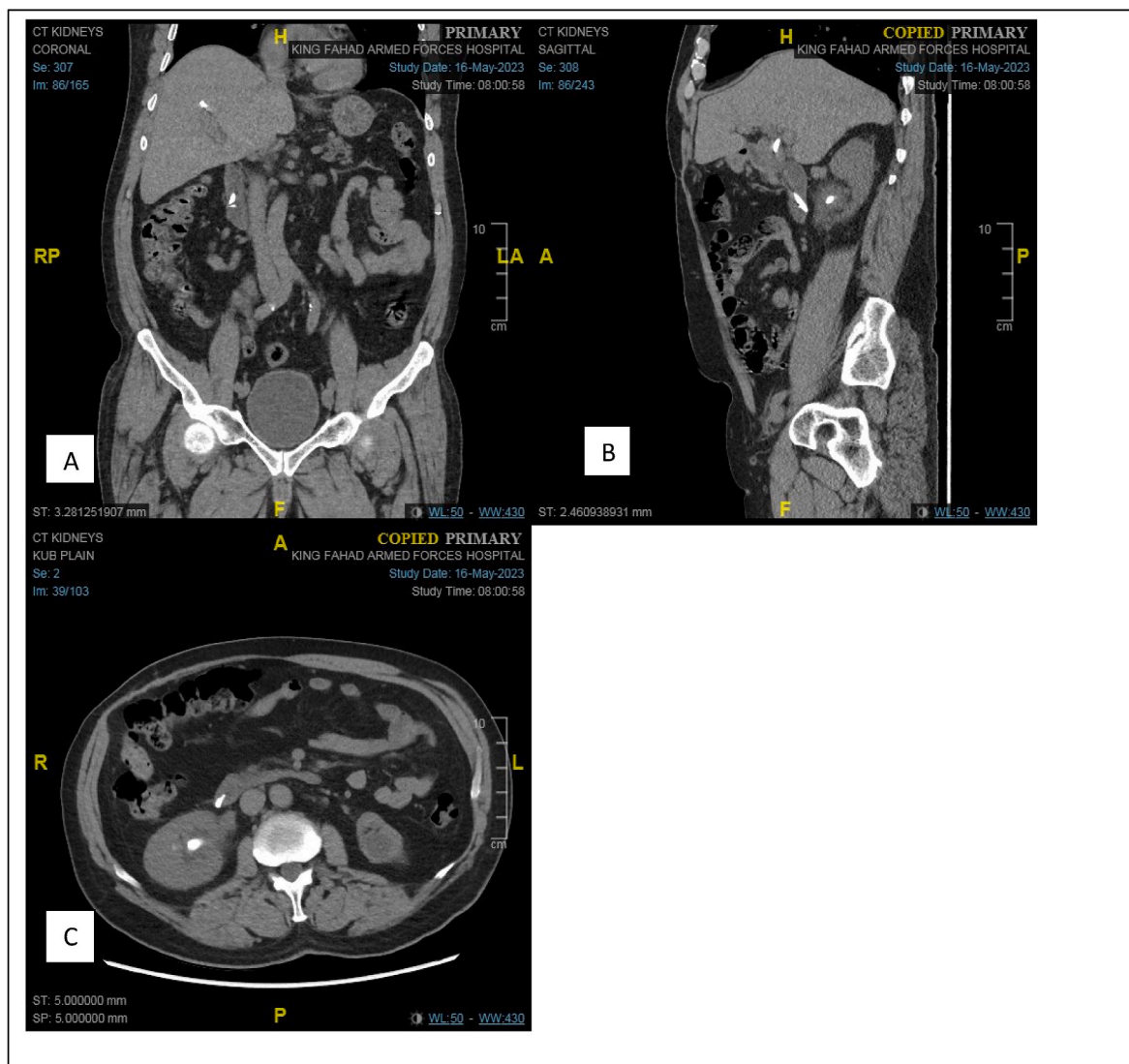


Figure 1. (A, B& C): Preoperative Kidney stone and Biliary stent.

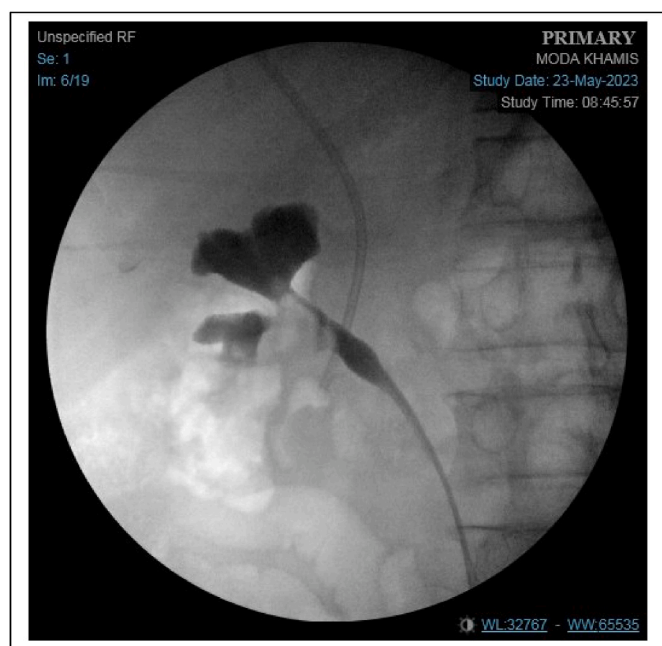


Fig. 2. Intraoperative retrograde pyelography.



Fig. 3. (A&B): Intrarenal foreign body.

such incidents.

4. Conclusions:

A history of invasive interventions should be obtained before managing renal stones. The presentation of intrarenal foreign bodies could mimic nephrolithiasis or urinary tract infections, hydronephrosis, and urosepsis. There is no standard treatment protocol for retrieval of an intrarenal foreign body. Treatment can be challenging by retrograde intrarenal surgery and PCNL.



Fig. 4. Post percutaneous nephrolithotomy with antegrade double J stent.

Financial agreement

The authors whose names are listed immediately below aware that they are responsible for all manuscript page charges if their submission is accepted for publication.

CRediT authorship contribution statement

Omar Safar: Writing – review & editing, Writing – original draft, Conceptualization. **Adel Elatreisy:** Writing – review & editing, Writing – original draft. **Saad Thamer:** Writing – original draft, Methodology, Investigation. **Saeed A. Asiri:** Writing – original draft, Methodology, Investigation. **Mahmoud Z. El Madawie:** Investigation, Data curation, Conceptualization. **Abdulrahman Al-Aown:** Writing – review & editing, Supervision, Project administration, Conceptualization.

Institutional review board statement:

The study was conducted according to the Declaration of Helsinki and approved by the Armed Forces Hospital Southern Region Ethics Committee (protocol code: AFHSRMREC/2024/UROLOGY/734, date of approval June 9, 2024).

Consent for publications

The patient signed a written informed consent form for publication.

Conflict of interest and authorship conformation

The authors whose names are listed immediately below certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria, educational grants, participation in speakers' bureaus, membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

Table 1
Summary of previously similar studies.

Author	Year	Title	Age (Year)	Gender	Management method	Conclusion
Bissas et al. ⁶	2005	Percutaneous Nephrolithotomy to Remove a Cartridge Detonating Cap Mimicking a Renal Pelvic Stone 12 Years after Renal Trauma	21	Male	The patient underwent two unsuccessful shockwave lithotripsy sessions. A percutaneous nephrolithotripsy followed, during which stone disintegration using either the ultrasonic or the ballistic lithotripter proved to be difficult. Following breakdown of the peripheral part of the stone, rigid forceps were used, and the stone was removed intact through the nephrostomy port. The “calculus” was revealed to be a calcified plastic detonating cap	They described a case of a cartridge’s plastic detonating cap retained in the renal pelvis. Renal colic was the cause of admission. This missile’s part was mimicking a renal stone on both an intravenous urogram and a CT scan. The nature of the “stone” was identified during a percutaneous nephrolithotomy procedure during which the foreign body was removed.
Coelho et al. ⁷	2007	Intrarenal foreign body presenting as a renal calculus.	45	Female	PNCL was performed and surprisingly after an initial pelvic stone fragmentation with the ultrasound device progression stopped and the possibility of a calcified surgical gauze was considered. A 5mm laparoscopic scissor was introduced through the working channel of nephroscope and the gauze was progressively cut and removed in small pieces. The gauze had no radiopaque markers	Preventing retained surgical sponges and gauzes is better than treating complications. Strict safeguards include using compresses on forceps, exploring the abdominal cavity, counting appliances and sponges, using radiopaque filament sponges, and taking plain X-ray films before surgery.
Dasgupta et al. ⁸	2008	Percutaneous Nephrolithotomy for a Stone on a Hem-o-Lok® Clip	41	Male	PCNL was uneventful except for discovery that the kernel of the stone was actually a Hem-o-lok clip. The stone was fragmented using intracorporeal ultrasound, and both the clip and stone fragments were removed successfully.	During PCNL, the stone was discovered to have formed around a Hem-o-lok® clip, retained from a previous surgical procedure. As with other surgical foreign bodies, the Hem-o-lok acts as a nidus for stone formation if in prolonged contact with urine. It is radiolucent and therefore crucial to apply with caution in proximity to the urinary tract.
Açıkgöz et al. ⁹	2014	Successful removal of secondary renal stone formations and foreign body in collecting system with percutaneous nephrolithotomy: Case report.	52	Female	Under spinal anesthesia, in a prone position, percutaneous access was performed following a contrast media injection via an ureteral catheter which was placed transurethrally prior to the renal access. Safety guide wires were inserted after successful middle pole posterior calix access. Tract dilations were performed by Amplatz fascial dilators until 30 Fr and Amplatz sheath was placed. A standard 26 Ch nephroscope was used. The stone in the renal pelvis was fragmented using an intracorporeal pneumatic lithotripter and the fragments were removed, then the renal stone which had formed around a forceps fragment was found in the posterior lower pole calyx and was removed successfully.	This rare complication of a broken forceps fragment in the kidney and its acting as a nidus for stone formation, and which may also then lead to recurrent urinary tract infections should be recognized.
Jamil et al. ¹⁰	2020	Foreign Body in Kidney Presenting as Renal Stone	18	Female	After thorough discussion with the patient regarding available options, she opted for right PCNL. After an extensive search and fluoroscopic guidance, a foreign body was found embedded in the mucosa of the lower pole calyx. This was approximately 1.5cm in size and removed with forceps in pieces with great difficulty. Percutaneous nephrostomy tube (PCN) was placed at the end of the procedure.	Renal foreign bodies are a rare entity. A high index of suspicion is needed to diagnose them as even radiologists can easily miss the diagnosis.
Samet et al. ¹¹	2021	Intrarenal foreign body after PCNL procedure: A rare complication	40	Female	Under general anesthesia, in the supine position, a rigid ureteroscopy was attempted after mounting hydrophilic guide wire under fluoroscopic control. A percutaneous nephrolithotomy was planned for this patient. Under general anesthesia, in prone position, a 22Fr access was established under the guidance of ultrasound. With a 20Fr nephroscope, the stone was visualized. Via the working channel of nephroscope, using an ultrasound probe, lithotripsy was performed. After some fragmentation, a HOLC was found in the kernel of the stone	NLPC has its own complications. Urologists have to know how to anticipate these complications and study them well in order to manage them better.
Zhou et al. ¹²	2022	Hem-o-Lok clip migration into renal pelvis and stone formation as a long-term complication following laparoscopic pyelolithotomy: a case report and literature review.	51	Male	A percutaneous nephrolithotomy was planned for this patient. Under general anesthesia, in prone position, a 22Fr access was established under the guidance of ultrasound. With a 20Fr nephroscope, the stone was visualized. Via the working channel of nephroscope, using an ultrasound probe, lithotripsy was performed. After some fragmentation, a HOLC was found in the kernel of the stone	Due to an increase in the report of this rare complication, stabilisation of the suture near the renal pelvis using HOLCs should be avoided. If necessary, such as in minimal access partial nephrectomy, excessive tension on renorrhaphy sutures should be averted to prevent HOLC migration. Instead, in minimal invasive pyelolithotomy or pyeloplasty, knotting should be a better choice.

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Table 1 (continued)

Author	Year	Title	Age (Year)	Gender	Management method	Conclusion
Xiong et al. ¹³	2023	Incidental Finding of Intrarenal Foreign Guidewire During PCNL: A Case Report and Literature Review	54	Male	Under general anesthesia, the patient was placed in a prone position. Under ultrasound guidance a vertical incision was made into the kidney's lower pole, and multiple calculi were found. The calculi were fragmented and extracted using stone forceps.	Intrarenal foreign bodies require preoperative assessment, renal function assessment, and a thorough history of past urological interventions. Extraction can be done using a minimally invasive approach, and surgeons must check instrument integrity for complication risk reduction.

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Competing interests

The authors declare no competing interest.

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