CHAPTER

1

False Tract in PCNL Dilatation

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Case Capsule

A 35-year-old gentleman presented with left flank pain and fever accompanied by chills for 15 days. An abdominal ultrasound revealed multiple large calculi in the right kidney involving all calyces, with the largest measuring 23 mm in the upper calyx. The left kidney showed multiple large calculi in dilated calyces, the largest measuring 22 mm in the pelvis, along with moderate hydronephrosis and internal echoes. Additionally, perinephric fat stranding was observed. A CT scan revealed a left renal pelvic calculus causing gross hydronephrosis and marked cortical thinning, indicative of acute pyelonephritis. The right pelvic staghorn calculus caused mild hydronephrosis. A diuretic renogram assessing split kidney function showed the left kidney functioning poorly at 20.61%, while the right kidney demonstrated better function at 79.39%. Blood tests revealed a hemoglobin level of 10.1 gm%, a raised total leukocyte count of 22,000, and normal renal function. Based on the fever with chills and raised leukocyte count, a provisional diagnosis of left pyonephrosis in a poorly functioning kidney was made. A left percutaneous nephrostomy was performed, revealing frank pus. Subsequently, as the percutaneous nephrostomy output was satisfactory and cortical thickness improved, the patient was planned for a left percutaneous nephrolithotomy (PCNL).

Scan for Video

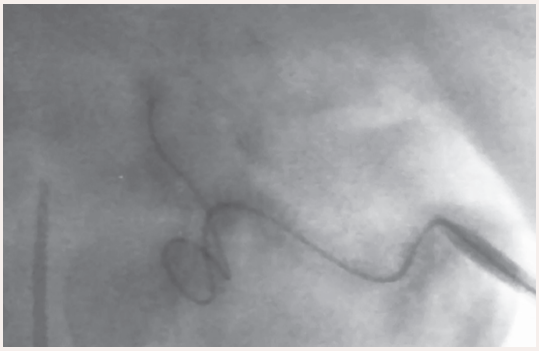

Fig. 1.1: Difficult dilatation: Wobbly tract

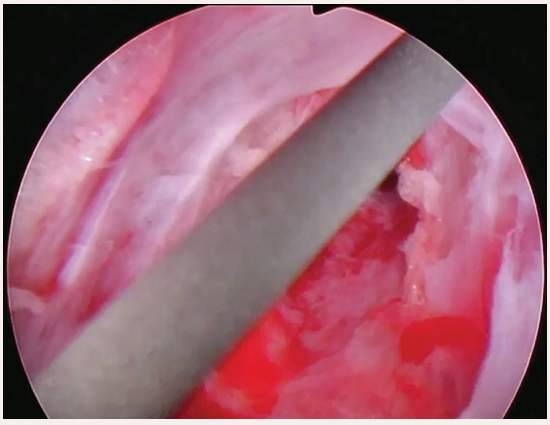

Fig. 1.2: False tract dilated

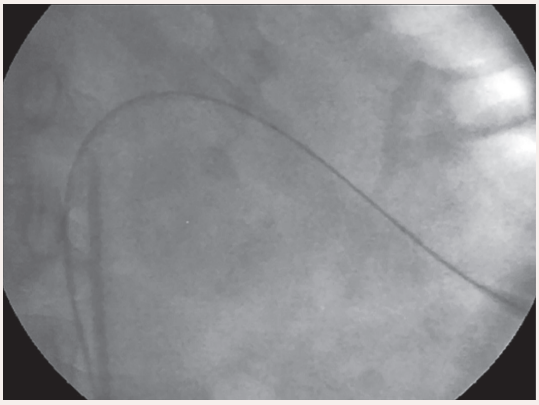

Fig. 1.3: Course correction with GW parked in ureter

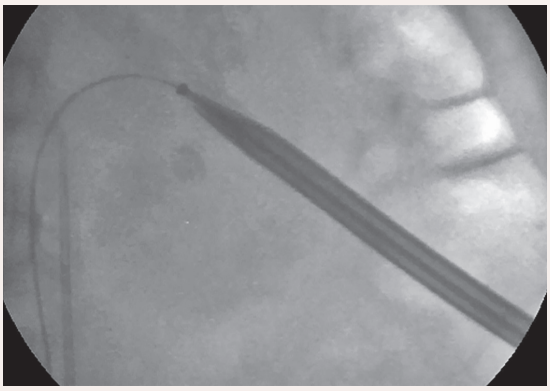

Fig. 1.4: Correct tract dilatation

What exactly happened?

Considering the preplaced tract and dilated system, the patient was planned for a standard 24 Fr tract PCNL in the prone position. The standard PCNL steps, including confirming clear efflux of urine after access and delineating the pelvicalyceal system with contrast, were carried out. However, despite repeated efforts, the guidewire could not be advanced into the distal calyx or ureter. Consequently, the surgeon proceeded with dilatation. The initially created tract during percutaneous nephrolithotomy was not straight, resulting in buckling during dilatation. The dilatation process was zigzag, and the tract was unstable. To stabilize the tract, an Alken guide rod was employed, allowing successful tract dilation up to 24 Fr in a single step.

Upon introducing the nephroscope, fat and torn infundibula were observed. Fragments of calculi were identified in the perinephric space and were fragmented and aspirated using the ShockPulse™ device. However, the guidewire appeared to be in a false position, and continuous bleeding was noted through the tract. Multiple attempts to identify the exact calyx entry point were unsuccessful. Ultimately, the decision was made to abandon the tract and create a fresh puncture. A new access route was established, enabling the guidewire to be successfully advanced into the ureter. The tract was dilated, and the first stage of PCNL was completed.

Postoperatively, the patient experienced a 4 gm% drop in hemoglobin. Following stabilization, a second-stage PCNL was performed, achieving complete stone clearance.

How could this have been prevented?

1. ***Ideal percutaneous tract:*** A short, straight tract traversing the skin, subcutaneous tissue, fascia, and directly into the calyx is critical for a successful outcome.
2. ***Avoid long, winding tracts:*** The common cause of lost tracts is buckling at the thoracolumbar fascia. Resistance at this level can be overcome by sharply incising the fascia with a knife before dilatation.
3. ***Issues with preplaced tracts:*** In cases where a Malecot catheter is used, care must be taken to avoid the guidewire slipping through the side holes of the catheter. This can be prevented by inserting the Malecot introducer and ensuring the guidewire is placed directly into the pelvicalyceal system.
4. ***Proper dilatation technique:*** During tract dilation, the guide rod should be held stable to prevent overshooting into the pelvicalyceal system. Rotational movements should be applied to Amplatz dilators for controlled advancement.
5. ***Stone management:*** Stones that have migrated outside the pelvicalyceal system should not be fragmented with a laser. Instead, efforts should be made to remove them intact or in large fragments.

Take-home Message

- A short, straight, and stable access path through the skin, subcutaneous tissue, fascia, and calyx is vital for success.
- Always confirm guidewire placement into the distal calyx. If uncertain, contrast imaging can verify proper access. Timely corrections should be made if the tract is improperly created.
- Avoid disintegrating calculi that have migrated outside the pelvicalyceal system.

CHAPTER

2

Torrential Bleed after Removal of Nephrostomy in Ward after PCNL

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Case Capsule

A 23-year-old male patient presented with right flank pain persisting for three months. Imaging revealed a 1.5 cm stone in the lower calyx extending into the pelvis. A lower calyx PCNL was successfully performed with complete stone clearance. However, during initial dilatation, the surgeon observed a small infundibular tear. As a precaution, a percutaneous nephrostomy (PCN) tube was placed after the procedure. Following the PCN tube removal, the patient had torrential bleeding from tract site.

Scan for Video

Fig. 2.1: Preoperative imaging

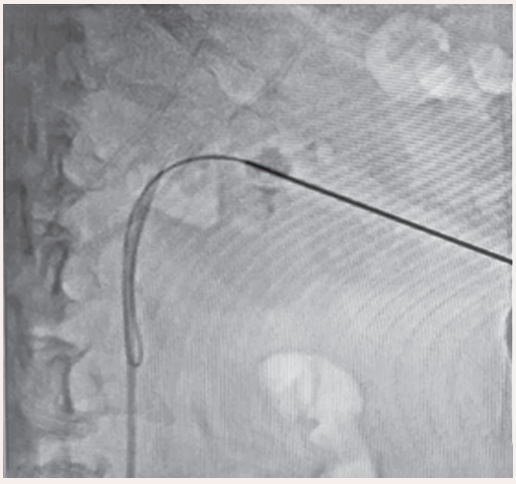

Fig. 2.2: PCNL was uneventful

Fig. 2.3: Torrential bleeding from PCN site in ward

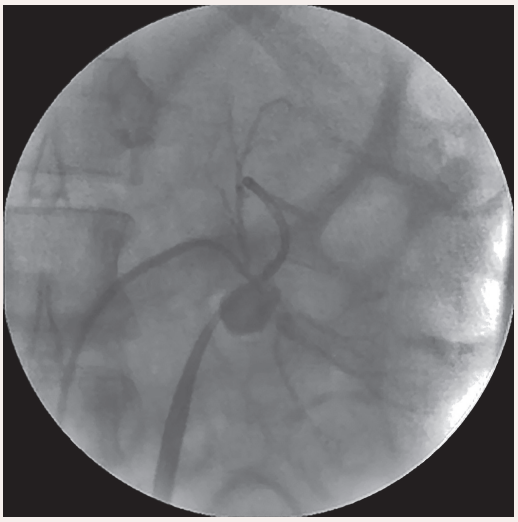

Fig. 2.4: Selective angioembolization

What happened and how was it managed?

On Day 2, the PCN tube was removed in the ward. As shown in the video, torrential bleeding occurred from the nephrostomy site. The attending urologist applied manual compression, as illustrated in the accompanying picture. The color of urine in the per-urethral catheter was slightly red. The patient was stabilized with volume replacement.

When compression failed to stop the bleeding and the patient remained hemodynamically unstable, a decision was made to transfer the patient to the operating room. To prevent further deterioration, angiography was performed, which identified the bleeding site. Super-selective angioembolization of the bleeding vessel was carried out successfully. Postoperatively, the patient recovered well.

Take-home Messages

1. ***Post-PCN tube removal bleeding:***
   - Bleeding following PCN tube removal is a rare but significant complication.
   - In most cases, mild bleeding resolves spontaneously, but monitoring for hematuria and excessive bleeding is essential.
   - Gentle pressure at the nephrostomy site can help control minor bleeding. Temporary packing may also be effective.
   - Severe bleeding may necessitate angiography and embolization for definitive management.

   Preventive measures:
   - Carefully and gently remove the nephrostomy tube to avoid trauma to the kidney or surrounding tissues.
   - Use a PCN introducer to straighten Malecot flanges before removal.
   - Temporarily discontinue anticoagulants before the procedure, if applicable.
2. ***Differentiating the source of bleeding:***
   - *Pelvicalyceal system (PCS) bleed:* Presents as bleeding from the nephrostomy site accompanied by red urine in the per-urethral catheter.
   - *Tract bleed:* Limited to bleeding at the nephrostomy site without red urine in the catheter.
3. ***Arterial vs venous bleeding:***
   - *Arterial bleed:* Characterized by bright red, spurting blood and requires urgent endovascular intervention.
   - *Venous bleed:* Dark red and oozing in nature, typically managed conservative.