CASE REPORT

A rare case of persistent nephropleural fistula following percutaneous nephrolithotomy

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SUMMARY

Nephropleural fistula following percutaneous nephrolithotomy (PCNL) is a very rare complication and there are only a few case reports available in the literature. We present a case of a 65-year-old male patient with a right staghorn renal calculus and a left upper ureteric calculus who developed a right nephropleural fistula following right-sided PCNL. The patient required intercostal tube drainage. The cause of the fistula was identified to be a superior calyceal infundibular obstruction due to tiny residual stone fragments and oedema, which was endoscopically dilated, and the fistula subsequently healed. Urinary diversion using chest drainage and percutaneous nephrostomy followed by infundibular dilation and removal of secondary stones allowed the successful closure of the nephropleural fistula in our case.

BACKGROUND

Nephropleural fistula following percutaneous nephrolithotomy (PCNL) is a very rare complication and there are only a few case reports available in the literature. Most cases of nephropleural fistula are managed conservatively with intercostal drainage and percutaneous nephrostomy.¹ We present here

a case of a persistent post-PCNL nephropleural fistula requiring operative intervention.

CASE PRESENTATION

A 65-year-old male patient presented with complaints of right flank pain of 5 months' duration. On evaluation, he was found to have a right staghorn renal calculus and a left upper ureteric calculus (figure 1) with poorly functioning left kidney (differential function 10%). His baseline serum creatinine was in the range of 1.4–1.7 mg/dL. General and systemic examination at admission was within normal limits. He underwent right PCNL via a supracostal (supra 12th rib), superior calyceal puncture. Intraoperatively a large staghorn calculus occupying the renal pelvis and superior and inferior calyces with multiple secondary calculi were identified and complete endoscopic and fluoroscopic stone clearance was achieved and a double J stent and a nephrostomy tube were placed. Percutaneous nephrostomy was removed on the second postoperative day. The catheter was removed on postoperative day 3. After removal of the catheter, the patient developed right pleural effusion (figure 2) for which an intercostal drainage tube was placed which drained around 600–700 mL clear fluid every day.

INVESTIGATIONS

Pleural fluid creatinine was found to be 45.4 mg/dL with a pleural fluid to serum creatinine ratio of >1, confirming the diagnosis of nephropleural fistula. Non-contrast computed tomography (NCCT) of the urinary tract was done to rule out any distal obstruction. NCCT showed few small calculi in the superior calyx with upper pole caliectasis (figure 3).

DIFFERENTIAL DIAGNOSIS

Migrated stone fragments in the ureter were causing obstruction. Infundibular blockade due to oedema or impacted residual stone fragments.

TREATMENT

Percutaneous nephrostomy was placed in the upper renal calyx. Following superior calyceal nephrostomy, the ICD output reduced to nil. A nephrostogram through the superior calyceal nephrostomy showed a complete block at the infundibulum of the superior calyx (figure 4). The patient was then taken up for right retrograde pyelography (RGP) with ureteroscopy and retrograde intrarenal surgery. Intraoperatively, RGP showed opacification

Figure 1 Preoperative X-ray KUB. KUB, kidney, ureter and bladder.

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Figure 2 Loculated right pleural effusion following removal of percutaneous nephrostomy.

of the right lower and middle calyces. However, the upper zone calyx could not be opacified. Flexible ureteroscopy showed a narrow superior calyceal infundibulum with two small stones in the superior calyx along with some debris. A diagnosis of infundibular stenosis due to postoperative oedema with residual superior calyceal calculi was made and the superior calyceal infundibulum was dilated with the flexible ureteroscope. The stones were removed and a double J stent was positioned in the superior calyx.

OUTCOME AND FOLLOW-UP

Postoperatively, the chest drain continued to have no output and was removed on day 2. The perurethral catheter was removed on the postoperative day 3 and superior calyceal nephrostomy was clamped. Follow-up chest X-ray did not show any evidence of recurrent pleural effusion (figure 5) and the patient was discharged in stable condition with the clamped superior calyceal PCN in situ. The double J stent was removed after 6 weeks. The patient underwent a nephrostogram after stent removal, which showed an unobstructed passage of contrast into the bladder. Nephrostomy was removed thereafter. The patient was asymptomatic on the last follow-up visit.

DISCUSSION

Intrathoracic complications after PCNL are common, especially after supracostal access. Nephropleural fistula, defined as a direct and persistent communication between the intrathoracic cavity and the pelvicalyceal system, is an uncommon and often unrecognised complication after percutaneous stone surgery. Decompression of the collecting system using a ureteric stent

Figure 3 Right superior calyceal calculi with caliectasis.

Figure 4 A nephrostogram done through upper polar nephrostomy showing complete blockade of the superior calyx.

and a perurethral catheter and drainage of the pleural cavity are essential to the management of such fistulae, along with identification and correction of any distal urinary obstruction, if present.² Trauma resulting from percutaneous renal access has been described in some cases as a cause of nephropleural fistula.³ However, we could find only a single study citing infundibular stenosis as the underlying cause of urinary obstruction.⁴ Diagnosis of nephropleural fistula can be made with contrast

Figure 5 Expanded lung fields on follow-up chest X-ray.

studies, renal scintigraphy or biochemically, as was done in our case.⁵ Urinary diversion using chest drainage and percutaneous nephrostomy followed by infundibular dilation and removal of secondary stones allowed the successful closure of the nephropleural fistula in our case.

Learning points

- ▶ Nephropleural fistula following percutaneous nephrolithotomy is a rare complication.
- ▶ Most such cases are managed conservatively, however, few cases may require a surgical intervention.
- ▶ Use of relevant investigation and prompt management of this complication leads to a favourable patient outcome.
- ▶ Non-contrast computed tomography of kidney, ureter and bladder should be done to rule out any distal obstruction in the form of a stone fragment obstructing the infundibulum, ureter and so.

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