

# Biliary peritonitis following percutaneous nephrolithotomy: Minimally invasive management

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## ABSTRACT

Percutaneous nephrolithotomy (PCNL) is a standard procedure for large renal calculi but has potential for complications. Rarely, biliary tract injury can occur during PCNL that can lead to biliary peritonitis with sepsis. Such cases are usually managed by emergent cholecystectomy. We present a case of biliary peritonitis resulting from gall bladder injury during PCNL, managed minimally invasively with an abdominal drain and endoscopic retrograde cholangiography with common bile duct stenting.

**Key words:** Biliary injury, common bile duct stenting, minimal invasive, percutaneous nephrolithotomy

## INTRODUCTION

Percutaneous nephrolithotomy (PCNL) is an established procedure for large (>2 cm) renal calculi with acceptable morbidity. It is generally considered a safe procedure, but life-threatening complications such as bleeding, pleural or splenic injury and colonic or duodenal perforation have been described. Injury to the biliary tract is a rare and potentially life-threatening complication, with only a handful of cases reported in the English literature. Gall bladder injury by percutaneous access needle results in biliary peritonitis, and these cases are usually managed by emergent cholecystectomy.<sup>[1]</sup> Recently, conservative or minimally invasive treatment with tube cholecystostomy have been reported.<sup>[2,3]</sup> We report a case of biliary peritonitis following PCNL due to puncture of the gall bladder with access needle, managed minimally invasively by ultrasound-guided abdominal drain placement and endoscopic retrograde

cholangiography (ERCP) with common bile duct (CBD) stenting.

## CASE REPORT

A 22-year-old female presented with dull aching right flank pain of 2 years duration. On evaluation, she was found to have a 3 cm × 2.5 cm right renal pelvic calculus with two small inferior calyceal calculi (1 cm each), with gross hydronephrosis and delayed excretion [Figure 1]. She was planned for right PCNL in the prone position under general anesthesia. After placement of the uretric access catheter and retrograde pyelogram, a supracostal superior calyceal puncture with a 18 G needle using bull's eye technique under fluoroscopic guidance was made. After removal of the stilette, bile was aspirated and the needle was withdrawn and a second puncture was made. The procedure was completed using a supracostal superior calyceal access achieving complete stone clearance and a nephrostomy tube and DJ stent were left in place. In the post-operative period, she was afebrile with normal total leukocyte counts but complained of pain in the right hypochondrium, which was tender. Ultrasound abdomen revealed moderate, free fluid in the right hypochondrium, right paracolic gutter and pelvis, which was bilious on aspiration. Contrast-enhanced computed tomogram scan with oral contrast revealed large fluid collection in the same areas and ruled out duodenal and colonic injury. Subsequently, under ultrasonographic guidance, a pigtail abdominal drain was inserted in the right subhepatic region and 600 mL of bile was drained immediately. The drain output was 1 L over the next 24 h; thus, magnetic resonance cholangiopancreatography (MRCP) and hydroxy iminodiacetic acid (HIDA) scan were performed.

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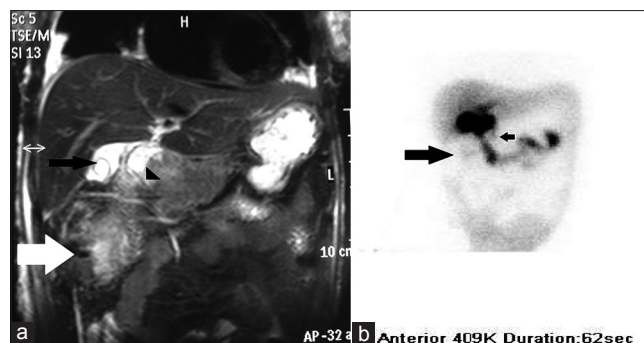
**Figure 1:** Scout film and delayed films of intravenous pyelography showing right renal pelvic and inferior calyceal calculi

Both investigations revealed a patent hepatobiliary enteric pathway with pooling of radiotracer in the region of the lower third of the CBD [Figure 2]. Suspecting CBD injury, ERCP was performed. On ERCP, CBD was normal and site of injury could not be localized, but leakage of contrast in the drain could be seen, suggesting possibility of gall bladder injury. Thus, papillotomy was made and stent was placed in CBD. Post CBD stenting, drain output reduced and it was removed on the 5<sup>th</sup> day when the output was nil for 24 h and ultrasonography showed minimal subhepatic collection. The next day, nephrostomy was also removed. The patient was discharged in a stable condition and the CBD stent was removed 3 weeks later on outpatient basis.

## DISCUSSION

Biliary peritonitis in a post PCNL setting usually results from puncture of a distended gall bladder by medial right sided-percutaneous access under fluoroscopic guidance.<sup>[1]</sup> Although rare with only a handful of reports, this is a potentially life-threatening complication, especially if not aggressively managed.<sup>[4,5]</sup> Gall bladder perforation leads to intraperitoneal accumulation of bile and, if not treated early, can cause sepsis that will need emergency laparotomy and cholecystectomy.

Initial calyceal puncture under combined ultrasonography and fluoroscopy guidance can possibly avoid inadvertent gall bladder puncture and bile spillage. More commonly, punctures are made under only fluoroscopy guidance and early recognition of biliary tract injury is key for appropriate management. Aspiration of greenish fluid from the puncture needle is a clue to biliary tract injury, but may be absent; thus, such injuries should be suspected in any patient who complains of abdominal pain or has peritoneal signs in the post-operative period. Close observation of clinical signs along with ultrasonography performed in the early post-operative period helps in early diagnosis and timely intervention before sepsis sets in.<sup>[2]</sup>



**Figure 2:** Magnetic resonance cholangiopancreatography (MRCP) and hydroxy iminodiacetic acid (HIDA) scan images depicting normal hepatobiliary pathway with unidentified site of leak. (a) Coronal MRCP image of the hepatobiliary system showing fluid collection in the subhepatic region (white arrow), gall bladder with pericholecystic fluid (black arrow) and duodenal cap (arrow head). (b) HIDA scan showing some leak in the subhepatic region (large arrow) with normal hepatobiliary pathway (small arrow)

Most patients with biliary tract injury during PCNL have been managed with cholecystectomy, either open<sup>[5]</sup> or laparoscopic.<sup>[1]</sup> Patil *et al.* described a case wherein, after intraoperative aspiration of bile, the procedure was completed and the patient was managed conservatively with Ryles' tube aspiration, antibiotics and intravenous fluids. The patient was discharged on the 5<sup>th</sup> day in a stable condition.<sup>[2]</sup> Rahnemai-Azar *et al.* reported another such case wherein after aspiration of bile from access needle, the procedure was abandoned. The patient had signs of sepsis in the post-operative period; thus, the subhepatic collection was drained and a percutaneous cholecystostomy tube was placed. She improved after 3 days and was discharged on a cholecystostomy tube that was subsequently removed after 17 days. Kidney stones were managed at a later date with staged ureteroscopy.<sup>[3]</sup>

In the present case, PCNL was completed and the patient was closely observed. As the drain output was high over the next 24 h, suggesting ongoing bile leakage, a thorough search for site of injury with MRCP and HIDA scan was undertaken, but both were inconclusive. ERCP was carried out, which suggested gall bladder injury and thus a CBD stent was placed to divert the bile away from the gall bladder. The patient recovered well without the need of laparotomy/laparoscopy and cholecystectomy and their associated complications.

## CONCLUSION

Biliary tract injury during PCNL is a rare complication. If suspected, close observation and ultrasonography in the early post-operative period is essential for timely diagnosis. Minimally invasive management by ERCP with CBD stenting is effective and can avoid cholecystectomy.

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