A rare complication of percutaneous nephrolithotomy: Jejunal perforation and its management

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ABSTRACT

A 55-year-old healthy lady underwent left side PCNL for a 1.5cm upper ureteric stone. The surgery was straightforward, and the stone was removed by pneumatic lithotripsy. We diagnosed bowel perforation while we were withdrawing the scope at the end of the procedure. Subsequently, she underwent exploratory laparotomy and jejunal perforation was identified, which was repaired primarily. To our knowledge, there were few similar case scenarios in the English literature, therefore we are sharing our experience on diagnosis and management of bowel perforation during PCNLs.

1. Introduction

Percutaneous nephrolithotomy (PCNL) is one of the standard treatment options for renal and upper ureteric stones. Complications of this procedure vary from small peri-renal hematoma up to severe complications like bowel injuries despite its advanced techniques, instruments, and operator experience. Bowel perforation accounts for less than 1% of major complications following PCNL.1 Colonic perforation happens more commoner than small intestinal perforation. The jejunal perforation during PCNL is rare, and only less than ten cases were reported in the English literature.2,3 Therefore, we are willing to share our experience in diagnosing and managing jejunal injury during PCNL.

2. Case presentation

A 55-year-old lady was referred to urology to manage the 1.5 cm left side upper ureteric calculus (Fig. 1). She was planned for elective Ureteroscopy and laser lithotripsy, and she did not have any medical commodities or abdominal surgical interventions. We did a semirigid ureteroscopy examination of the left ureter, the stone was found in the upper ureter just below the pelvic ureteric junction, and it was retro pulsed while attempting laser lithotripsy. So, we planned to go ahead with prone PCNL.

The lower calyx was punctured by triangulation technique and straightforward dilatation with Alcon metal dilators up to 30 Fr (Fig. 2a). We did not feel any signs of bowel perforation that we experienced previously in our series, like air purge and bump feeling when we dilated the part of the bowel.

The stone was broken into two pieces by pneumatic lithotripsy and removed. We observed bowel mucosa at the track while removing the access sheath as we have a habit of looking at the way under direct vision. We kept a ureteric catheter and came out without a nephrostomy. We decided to do an exploratory laparotomy, and the patient was turned to a supine position. First, we stented the left side ureter using the ureteric catheter under fluoroscopy (C-Arm). Then, we did an upper midline laparotomy with the help of a gastroenterological surgeon; splenic flexure and descending colon were mobilized and examined, but no perforation was found. Later, we looked at the small intestine from the duodenum, and the perforation was located at 20 cm from the duodenal-jejunal flexure (Fig. 2b). It was repaired primarily with a 3 O absorbable suture, and an abdominal drain was kept.

Immediate Postoperative X-ray (Fig. 3) shows the complete clearance of stone and correct position of DJ stent. She recovered quickly without any postoperative morbidities, and the abdominal drain and catheter were removed on day two, and she was discharged on day three.

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3. Discussion

The major complications rate following PCNL varies between 1.1% and 7%, and it’s a challenge despite the development of new techniques in this procedure, such as mini-micro PCNL, supine PCNL, and laparoscopically assisted PCNL.

Bowel injuries during PCNL are infrequent, accounting for 0.2% to 0.8% of the cases. There are various risk factors for bowel injury during PCNL such as retro-renal colon, horseshoe kidney, jejunoileal bypass, elderly, underweight female patients, mobile kidney, kyphoscoliosis, and anterior calyceal access. Usually, small intestines are away from the path of renal tract dilatation during PCNL, therefore seldom injuries unless an intraabdominal entry is sustained. Additionally, the second and third portions of the duodenum lying anteromedially to the right kidney can be damaged during right-sided surgeries if a needle is advanced too profoundly. Routine use of non-contrast CT helps to detect any anatomical abnormalities of kidneys, find the relationship between bowel and kidney, assess the stone burden, and plan the proper percutaneous access. Unfortunately, we could not perform this CT in our hospital as routine for all the cases because of economic and organizational difficulties.

The diagnosis of minor intestinal injuries can be made at

![Fig. 1. The preoperative X-ray Kidney ureter Bladder (KUB) shows the radio-opaque left side upper ureteric stone.](image1)

![Fig. 2. (a) lower pole puncture site marked by the yellow arrow (14 cm from the posterior midline) at the level of 12 rip tip. (b) Intraoperative image shows through and through a perforation at the jejunum. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)](image2)

![Fig. 3. The postoperative abdominal X-ray shows the stone clearance, position of Double J stent, nasogastric tube, and abdominal drain.](image3)
intraoperative and postoperative periods. The direct visualization of intestinal mucosa or contents and demonstration of communication on pyelogram during the procedure diagnoses the minor bowel injury. We found only five bowel perforations among 1000 PCNLs in our center over eight years. We experienced the following signs through our series, which are also helpful in suspecting a bowel perforation, a bumpy or bouncy feeling during puncture, and sensation of sudden giveaway or same bouncy feeling during dilatation bubbling of air during removal of stone fragments.

Sometimes, it may be missed, and patients develop the features of abdominal sepsis such as abdominal pain, nausea, vomiting, and fever during the post-operative period. In such circumstances, a renal-intestinal fistula may be observed on the pyelogram, or a contrast computed tomogram of the abdomen. Almost all the reported cases of minor intestinal injuries during PCNL were diagnosed during the post-op period except for one point diagnosed intra-operatively and managed conservatively. We also diagnosed the injury while withdrawing the Amplatz sheath as the surgeon’s habit of observing the tract under direct vision by the nephroscope.

Management of small intestinal perforation during PCNL depends on the time of diagnosis, nature of the injury, and general clinical conditions of the patients. The treatment options vary from a conservative approach to explorative laparotomy and repair. According to the reported case reports, most parts of the small intestine are intraperitoneal, and therefore, exploration and rehabilitation are needed. In the account by Al-Assiri and associates, jejunum injury was managed with conservative methods. During the procedure, they were diagnosed with a double j stent inside the pelvis and placed a nephrostomy tube inside the small intestine. Santigo et al. analyzed jejunal and splenic injury after four days of percutaneous renal surgery. They have done explorative laparotomy with splenectomy and small bowel resection as they failed the initial conservative approach.

4. Conclusion

Bowel injuries are the rarest complication of percutaneous nephrolithotomy, and most of the time, these injuries were missed intra-operatively and diagnosed during the postoperative period. We want to stress that suspicion of bowel perforation from the signs mentioned above and having a look at the track before finishing the procedure is a good way of diagnosing these injuries and preventing significant post-operative morbidities to the patient.

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