Colon perforation after PCNL in reverse rotation anomalous kidney: A very rare case report and literature review

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ABSTRACT

PCNL is the gold standard method for large kidney stones currently. It offers high success and low complication rates. In recent times, miniaturized PCNL methods are used to further reduce the complication rates. Still major hemorrhage, mediastinum, spleen, liver and colon injuries are encountered at rates of 1–3%. Colon injuries occur in 0.3–0.8%. Thin patients, horseshoe kidney, retrorenal colon, previous intestinal surgeries, and access from posterior axillary line increase the risk of colon perforations. Treatment is mostly conservative approaches while sometimes major surgeries like colostomy and/or colon resection are required. The patient in our case report benefitted from conservative treatment.

Introduction

PCNL is the gold standard treatment method for kidney stones above 2 cm currently. Generally, subcostal lower pole calyx access is chosen due to even lower complication rates. With moderate level learning curve and promising high success rates, PCNL causes mainly minor but rarely abundant/major hemorrhage and neighboring organ injuries to lungs-intestines. One of these major complications is colon perforation, reported at rates of 0.3–0.8% in the literature. Conservative treatment may be sufficient for retroperitoneal perforations without septic tableau and with early diagnosis; however, major surgeries like colostomy and/or colectomy may be required in patients with septic tableau, who are unstable or with intraperitoneal contamination.

Case report

A 56-year old male patient attended the clinic with right flank and back pain. Noncontrast computerized tomography (NCCT) identified the right kidney was fully reversed, with the renal hilum facing lateral and 45 × 32 stones in the renal pelvis and lower calyx. Firstly, PCNL was planned. With the patient in supine position, a 6 F ureter catheter was inserted into the right kidney and the patient was turned to prone position. It appeared only upper calyx access was suitable; however, the upper calyx extended parallel to the long axis of the kidney longitudinally and it was necessary to enter above the 10th level. We did not wish to deal with thoracic complications, so direct access was provided for the renal pelvis with 18 G needle and a guidewire was sent into the upper calyx. Then dilatation was performed until a 20 F metallic sheath was inserted; however, when a 16 F mininephroscope was placed in the sheath, we noticed we were not in the renal pelvis. At this point the patient was turned to right decubitus position and subcostal pyelolithotomy surgery was performed to clear the patient’s stones. A JJ stent was inserted ascending in the ureter. For drainage around the kidney a 20 F silicone drain was inserted. At the end of open pyelolithotomy, 20 F silicone drainage was placed retroperitoneally around the kidney for drainage. For the first 3 days the patient’s general status was good, with oral intake and gas, stool and spontaneous urine output normal. On the 3rd day a sudden septic tableau was seen with fever of 40 °C and intestinal content began to come from the drain. There was no vomiting, diarrhea, bloody stools or abdominal pain. Standing radiography identified free air above the liver and above the stomach-spleen (Fig. 1). Oral contrast computerized tomography (OCCT) identified inflammation-thickening around the ascending colon on the right, contrast material within the drain and free air (Fig. 2). WBC (10³/mm³), CRP (>300 mg/L), ESR (1st hour 51 mm), creatinine (0.72 mg/dl), ALT (20 U/L), AST (38 U/L), Na (138.7 mmol/L), K+ (3.1 mmol/L), Ca (7.7 mg/dl), urine culture (nonbacterial agents), and blood culture (gram-pathogen proliferation) tests were performed.

The patient began conservative treatment. Conservative treatment included cessation of oral intake, beginning metronidazole and tienam and TPN administration. Over time, the patient’s vital signs including fever stabilized. The silicon drain in the paracolic region of the kidney had mean daily 100–150 cc intestinal content discharge in the first days, which reduced with time and the patient began oral food on the 14th...
day. In the following days, there was no discharge from the drain and when the patient had no fever the drain was removed and the patient discharged. In the 6th week, the JJ stent was removed accompanied by cystoscopy.

Discussion

For large kidney stones (>2 cm), PCNL is currently the gold standard treatment method, with high stone free success after surgery.\(^1\) The PCNL methods involve mostly minor complications with 1–3% rates for major complications like major hemorrhage, mediastinum-liver-spleen and colon injury.\(^2\) Colon injuries are reported at 0.3–0.8% rates in broad series studies in the literature. They are observed more on the left side. Colon injuries were reported more often with previous surgery, small and mobile kidneys, horseshoe kidney, access on posterior axillary line, anterior calyx access, supine PCNL, irritable bowel patients, previous intestinal surgeries, patients with low intraabdominal fat and distended colon.\(^3\) In our case, we blame the cause of colon perforation as the patient being thin and access being on the posterior axillary line.

It is very difficult to diagnose colon perforations intraoperatively, generally there is benefit to suspicion with increased fever with no cause postoperatively. After suspicion, as in our case, there is benefit in taking standing radiography to confirm the presence of free gas in the abdomen. Then it is useful to image the suspected colon, surroundings and free fluid content density within the abdomen with oral contrast computerized tomography.\(^4\) In our case we did not see fluid content within the abdomen on tomography and with contrast and gas output from the drain near the kidney (even with free gas), we continued our patient’s treatment with conservative treatment.

We encountered a range of ideas about treatment in the literature. It was reported that for cases without septic tableau, with nephrostomy catheter removed from the kidney and placed in the kidney area or colon, and urine drainage kept away from the colon with JJ stent, patients improved within mean 10–14 days with conservative treatment. Contrary to this, continuing septic tableau, intraperitoneal contamination with colon material, and patients with peritonitis tableau are recommended to have immediate surgery with colostomy.\(^5\)

In conclusion, colon perforation may occur in people who are thin, have irritable bowel disease and low fat around the kidney and colon, with retrorenal colon and especially with lower pole calyx access. Sudden increased fever without cause on the 3rd day postoperative after PCNL and septic tableau led to consideration of colon complications and immediate action is required to diagnose and manage these complications.

Informed consent and patient details

Informed consent and patient details were obtained from the patient by the author.

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Declaration of competing interest

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