



Trauma and reconstruction

A possible novel approach to small iatrogenic colonic perforation during nephrostomy placement

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ABSTRACT

Placement of a percutaneous nephrostomy (PCN), to drain and preserve renal function, is a common urologic procedure in the setting of high urinary obstruction. Colonic perforation is a rare complication, with an incidence of 0.2–0.5%. In these situations, literature advises the withdrawal of the PCN into the colon, ureteral stenting, zero-diet, broad spectrum antibiotics and only to remove the catheter days after. Here we describe the case of a patient in whom a PCN was placed transversing the colon, in whom it was retrieved under endoscopic control, with use of endoclips to control the hemorrhage and close the perforation.

1. Introduction

Percutaneous nephrostomy (PCN) placement is a common urologic procedure, many times in an emergency setting, either for an infectious or obstructive cause, with imperative decompression of the collecting system. Common complications include hematuria or hemorrhage from the puncture site. An iatrogenic colonic injury when placing a PCN or during nephrolithotomy is rare (incidence of 0.2–0.5%)^{1–3} and should be suspected when there is intestinal bleeding in the immediate intra or post-op period (hematochezia), discharge of fecal content through the PCN tube or route of access or signs of peritoneal irritation. The risk factors for colonic injury include anatomical retro-renal colon, supine position or antero-lateral access, complex kidney anatomy (example horseshoe kidney), decreased retroperitoneal fat, kyphoscoliosis or previous colonic surgery.^{1–3}

When diagnosed, it implies control of the perforation site, sometimes diverting the bowel and urinary tracts. When placing PCN with iatrogenic colonic perforation, literature advises the withdrawal of the nephrostomy tube into the colon, ureteral stenting and to place the patient on a zero-diet and broad spectrum antibiotics, only proceeding to remove the catheter days after.^{1–3}

2. Case presentation

Here we present the case of a 77 years old male, with an history of laparoscopic anterior rectal resection for high rectal cancer. One year after the surgery, during surveillance on an ambulatory setting, Computerized Tomography (CT) scan showed a probable relapse of the tumour at the anastomotic site and he was waiting for a colonoscopy. It also showed *de novo* moderate bilateral hydronephrosis (HN), (Fig. 1A), but with preserved renal function and diuresis, that was not addressed initially.

3 months following the exam, the patient presented to the Public Emergency Department, anuric and with an altered renal function, already with ionic imbalances.

Emergency ultrasound (US) revealed a bilateral HN, an empty bladder and the patient was proposed for placement of bilateral PCN. Having already done a previous CT scan on an ambulatory setting, the report to which we were given access, not the images, Radiology dismissed performing another CT, given concerns about contrast administration.

Both PCN were placed by Urology, as standard, under ultrasound (US) guidance, in a modified lateral supine position, with descending pyelography confirming its right placement.

In the immediate post-op period, the patient had an abundant

Abbreviations: PCN, Percutaneous nephrostomy; CT, Computerized Tomography; HN, Hydronephrosis; US, Ultrasound.

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hematochezia with blood clots. The digital rectal exam revealed no abnormal masses and the patient was proposed for a colonoscopy.

Colonoscopy revealed tumour relapse at the anastomotic site (Fig. 1A) and an iatrogenic perforation of the left colon by the PCN (Fig. 1B), with an active bleeding. Having already drained two liters of urine on the left side, and given the correct placement of the right PCN, it was decided to remove the left catheter under endoscopic visualization, with clipping of the hemorrhage and perforated bowel segment (Fig. 1C and D). Afterwards, the patient was placed on a zero diet, with parenteral feeding.

Reviewing the first CT scan done on ambulatory (Fig. 2A), to which we were only given access after the initial PCN procedure, the colon was dislocated to a retro-renal position after the first surgery, explaining the perforation.

The CT scan performed the day after the PCN placement, revealed some air bubbles between the posteriorly dislocated left colon and the kidney, with the hemostatic clip on the bowel wall, with no signs of active bleeding and only small bubbles of gas in the retroperitoneum (Fig. 2B).

On the third day, and with normal debits on the right PCN, ureteral stenting was attempted but not possible due to non-progression of the catheter. It was agreed with Radiology to place the left PCN guided by CT (Fig. 2C and D), which was only possible on the fifth day of post-op period, after sufficient dilation of the renal pelvis was achieved to safely puncture it.

At sixth day, abdominal palpation revealed no signs of peritoneal irritation, no elevation of inflammatory parameters and the patient was allowed to initiate liquid diet.

After completing 14 days of antibiotic, already on a general diet and with normal bowel function, the patient was discharged.

3. Discussion

On this case, the previous colonic surgery, with splenic angle mobilization of the colon, placed the colon in a retro-renal position that was missed when placing the US-guided PCN. A CT scan must always be performed in the setting of previous colonic surgery, so to prevent

iatrogenic injury to internal viscera. The consequences of missing such complication could result in the development of reno-colonic fistula or other chronic events that imply a worst prognosis for the patient. Whenever there is a confirmation of bowel perforation during percutaneous kidney surgery, there are two mainly recognized approaches, either derivation of the fecal content with a temporary colostomy - many times excising the affected bowel segment - and watchful waiting after withdrawal of the PCN into the colon, ureteral stenting, zero-diet and broad spectrum antibiotics, only proceeding to remove the PCN days after.¹⁻³ The prompt and innovative response in this case, with endoscopic guided PCN withdrawal and bowel clipping, prevented fecal contamination and allowed for conservative management with good outcomes.

4. Conclusion

From our review of the literature, this is the first case when a PCN was completely removed immediately after colonic perforation under endoscopic surveillance, with control of the hemorrhage and perforated colon site. We believe that the placement of the metal clip on the perforation site influenced the recovery, preventing colonic material to pass to the retroperitoneum, something that can only be accomplished with low endoscopic video-assisted removal of the PCN when there is a small colonic perforation. In cases of previous complex surgeries, a CT scan, if necessary without contrast administration, must always be done before PCN placement in order to better understand the anatomy of the patient pre-operatively. A CT-guided PCN placement should be considered at first-hand when there are significant risks of bowel perforation if the US-guided approach is used.

Consent

The patient gave its written informed consent for publication of this case report and accompanying images.

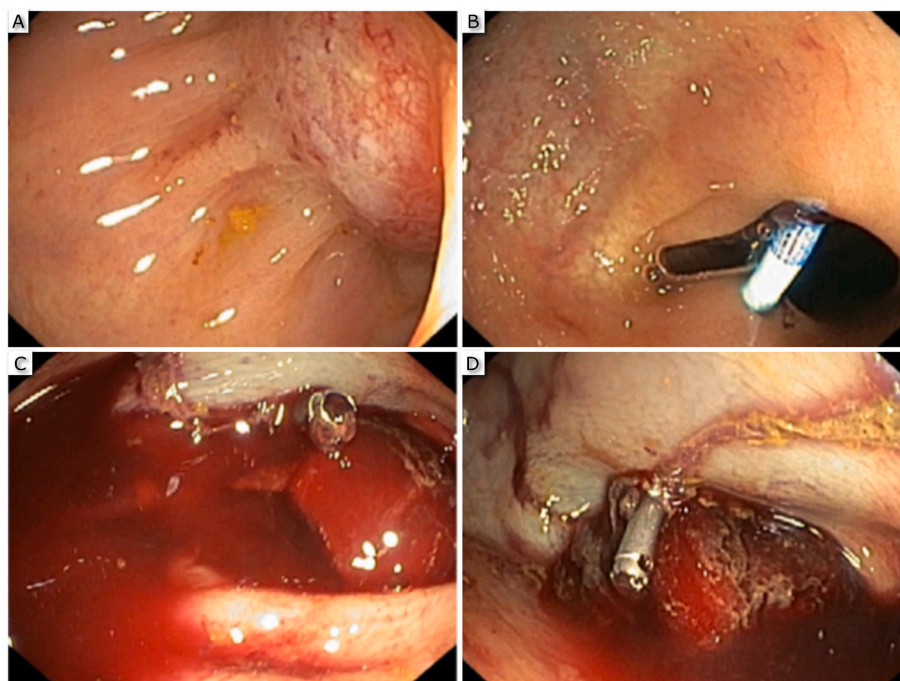


Fig. 1. A - Anastomotic relapsing lesion; B - PCN catheter crossing the colonic wall when entering the kidney; C - Hemorrhage after PCN was removed; D - Endoscopic control of the hemorrhage and perforated site with metal clips.

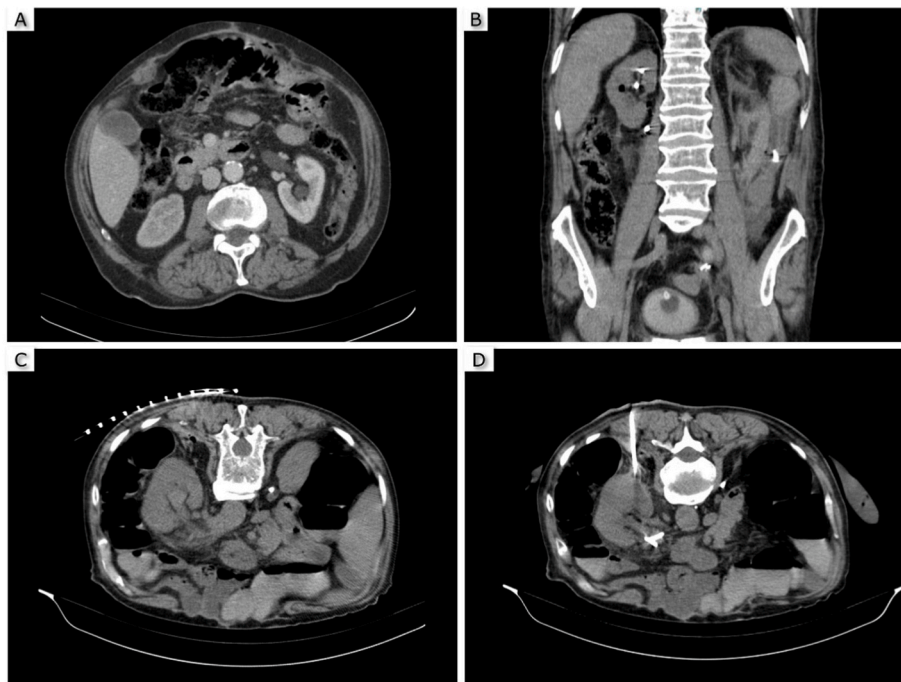


Fig. 2. A – First CT scan performed on ambulatory; B – Immediate post-op CT scan showing the correct positioning of the right PCN and colonic clips at the perforation site on the left; C – CT image of the layout for CT-guided nephrostomy placement; D – Left PCN in situ, after CT-guided placement.

Declaration of competing interest

The authors have no conflict of interests to report.

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