
“Bubbles in My Urine” – A Presentation After Blunt Trauma

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Abstract: Fistulae forming between the alimentary tract and kidney after trauma are an anomaly. In contrast to general vesico-alimentary communication, a colonephric fistula almost invariably results secondary to an initial pathological process in the kidney. A primary infectious cause has by far been the most common renal pathology implicated in its formation. The diagnosis of this condition is suggested by pneumaturia but almost entirely based on radiological examination. Even though conservative strategies have been attempted, surgical resection is the treatment of choice and should be pursued if all else fails. We report a case of a subacute presentation of a colonephric fistula following blunt trauma with a documented injury to the kidney associated with a possible concomitant injury to the large bowel. However, the inciting event could also have been a primary occult colon injury overlying the renal injury, eventually culminating in a fistula between the two organs resulting in pneumaturia and signs of sepsis. A review of the literature on colonephric fistulae and their appropriate management strategies are reported and briefly discussed. It is important to be familiar with its clinical symptoms so that the diagnosis can be suspected, and adequate investigative and therapeutic approaches can be implemented.

Keywords: Colonephric, Renocolic, Fistula, Pneumaturia, Blunt Trauma

1. Introduction

Colonephric fistulae after trauma are rare [1]. There is a paucity of information regarding the incidence, pathophysiology, and definitive management strategies available to diagnose and treat this injury. With the advent of computerized tomography (CT) scans, the diagnosis has become easier [2]. Surgical resection appears to be the mainstay of management for this complex problem.

2. Case Presentation

The patient is a 58-year-old male who was admitted to the Hartford Hospital Emergency Department following a motor vehicle crash in which he was unrestrained riding on the back of a truck at high speed when the truck hit a barrier. On primary assessment and ultrasound evaluation of the chest, he was found to have a left-sided pneumothorax requiring a chest tube. Further workup with CT scanning revealed left-sided rib fractures (ribs #1, #5-11), a Grade IV left kidney

laceration with active extravasation (Figure 1), a Grade II splenic laceration, a Grade II liver laceration adjacent to the gallbladder, a left scapular fracture, a left-sided occipital condylar fracture, a left-sided mandibular fracture, an L1 endplate compression fracture and left-sided L3 and four transverse process fractures.

He was initially hypotensive on presentation but appeared to respond to resuscitation with crystalloid and blood products. As mentioned above, CT scan of the abdomen and pelvis revealed an area of contrast extravasation suspicious for active bleeding from the left kidney. The kidney also appeared to have extensive damage to the lower pole, with enhancement only in the upper pole and lateral aspect of the kidney. The patient subsequently underwent an abdominal aortogram and superselective left renal arteriogram with microcoil embolization of four avulsed branches of the left main renal artery (Figure 2). The spinal fractures were managed conservatively, and he underwent an open reduction and internal fixation of his mandibular fracture on hospital day 5.

On hospital day 8, he was transferred to the surgical

intensive care unit for closer monitoring after he developed hypertension, tachycardia, tachypnea, and fever. Earlier that day, the patient had reported feeling dyspneic and had also complained of pneumaturia. The Foley catheter had been removed the day before this complaint occurred. A CTA of the chest was obtained for a presumed diagnosis of pulmonary embolism; this was negative. A CT of the abdomen and pelvis was also obtained to rule out an intra-abdominal source of the fever. The radiological imaging demonstrated an ill-defined collection of heterogeneous soft tissue/fluid density and air in place of the inferior pole of the left kidney concerning for an adjacent perforation of the descending colon (Figure 3). He was taken emergently to the operating room for an exploratory laparotomy.

Intraoperatively, he was found to have a >75% circumferential defect in the mid-descending colon with feculent spillage into the abdomen and a large associated left retroperitoneal abscess. He also had a mid-body pancreatic contusion without laceration and a partially avulsed gallbladder. A communication between the colon and the left kidney was identified during mobilization of the left colon. The inferior pole of the left kidney was ischemic with a deep laceration through >75% of the parenchyma. He underwent a left colon resection and was left in discontinuity due to his vasopressor requirements throughout the case. He also underwent a concomitant left nephrectomy and drainage of the abscess with a temporary abdominal closure. He eventually had his colonic re-anastomosis performed on hospital day 10 (48 hours after the initial colonic resection) and abdominal closure on day 12. The remainder of his hospitalization was complicated by demand myocardial ischemia, delirium, and intra-abdominal abscesses requiring placement of drainage catheters by interventional radiology. He was discharged to a short-term rehab facility on hospital day 38 with two drainage catheters in place and a Dobhoff feeding tube. Following discharge, he has developed a controlled minimal output colocutaneous fistula that was successfully managed non-operatively.

3. Discussion

Colonephric fistulae are anomalous connections between the genitourinary system and the colon. They were first described by Hippocrates in the 5th century B. C. as a complication of an intrinsic renal abscess involving the colon [3]. A review by Bissada *et al.* of 92 patients with nephro-alimentary fistulae revealed that most occur between the kidney and colon (59), followed by the duodenum (22), stomach (7), small bowel (5), appendix (2) and rectum (1) [4].

The primary pathology is usually thought to arise from the kidney [2]. Fistulae may occur spontaneously or after an inciting traumatic event. Primary inflammatory or infectious etiologies are common causes for spontaneous fistulae, mostly resulting from chronic infections within the kidneys or bowel, kidney stones, and renal tumors [5, 6]. Unusual causes have included renal tuberculosis and urinary bilharziasis [7, 8]. Documented colonephric fistulae have

also occurred after trauma. Typically, the cause is iatrogenic, often following an open or percutaneous procedure. They can also occur after placement of a nephrostomy tube for nephrolithiasis or following ablative therapy for renal cell carcinoma [9, 10]. Fistulae arising after blunt or penetrating trauma are a rarity [1]. Herbert *et al.* report of a delayed diagnosis of a colonephric fistula occurring in a 23-year-old female six weeks after a gunshot wound complicated by a perinephric abscess [7]. Lee *et al.* describe a colonephric fistula diagnosed four months after a Grade IV/V renal injury with a perirenal hematoma when the 36-year-old male patient experienced pneumaturia [11].

Our patient is the first documentation, to our knowledge, of a subacute presentation of a colonephric fistula after trauma. It is likely that the inciting event was a missed occult bowel injury from the initial traumatic event. One could envision an acute or delayed micro-perforation of the descending colon that went on and caused an abnormal connection to the adjacent damaged and partially ischemic left kidney. However, the primary pathology could also have been due to the renal injury causing a local abscess in the left perirenal space, which then caused a local inflammatory response in the descending colon. We believe the former scenario is more likely as review of the initial abdominal CT scans does demonstrate an area of colonic thickening in the descending colon consistent with colonic contusion and damage (Figure 4). Over time, this full-thickness colonic wall injury perforated and was contained against the devascularized lower pole of the left kidney resulting in the communication between the two organs, then manifesting as pneumaturia and intraabdominal sepsis.

Patients with nephrocolic fistulae may generally present with pneumaturia, flank pain, pyuria, and occasionally faecaluria [2]. Gastrointestinal symptoms include diarrhea, tenesmus, weight loss, and bowel obstruction [6]. Barium enemas and retrograde pyelography have traditionally been the ideal radiographic modalities used for diagnosis of the fistulae. However, CT scan can also be used; the presence of air bubbles on a cystoscopy and a complex collection with gas in the kidney is highly suggestive of the diagnosis [8].

4. Conclusion

Colonephric fistulae are managed by treating the underlying cause. Yu *et al.* reported on a patient requiring a urinary diversion with a percutaneous nephrostomy tube for the acute setting and operative intervention involving a nephrectomy and removal of the fistulous tract for chronic conditions to prevent abscesses or neoplasia [2]. Karamchandani *et al.* proposed, in addition, a partial resection of the diseased colon or primary repair of the fistula [8]. Conservative management methods have included ureteral stent placement with resolution of a fistula after percutaneous renal cryoablation and percutaneous drainage with intravenous antibiotics [9].

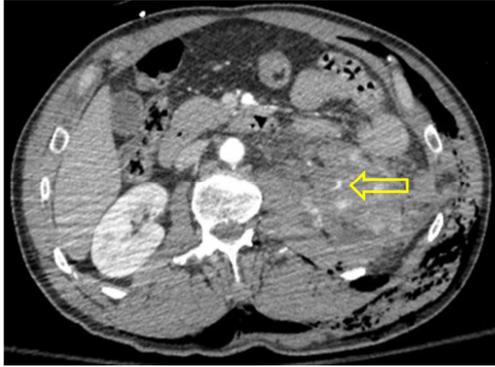


Figure 1. Abdominal CT showing Grade IV left-sided kidney laceration with arrow showing focus of active extravasation.

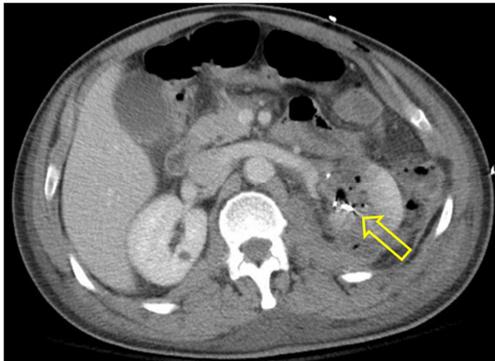


Figure 2. Abdominal CT with arrow showing micro-coil embolization of branches of the left renal artery.



Figure 3. Abdominal CT with arrow showing ill-defined heterogeneous collection at the lower pole of kidney concerning for colon perforation.

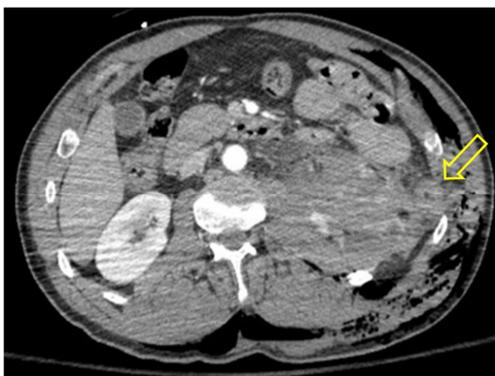


Figure 4. Abdominal CT with arrow showing area of thickened colon adjacent to renal injury.

Our patient presented subacutely with sepsis from the underlying colon perforation and fistula formation and underwent an emergent colon resection and nephrectomy which removed the fistula. A nephrocolic fistula is an uncommon entity and it is important to adopt the appropriate diagnostic approach with therapeutic intervention to deal definitively with the underlying primary etiology.

Informed Consent

Consent was not obtained as the patient remained untraceable at the time of submission of this article. The patient is anonymized according to the International Committee of Medical Journal Editors guidelines (<http://www.icmje.org/recommendations/browse/roles-and-responsibilities/protection-of-research-participants.html>) and JG* from Hartford Hospital will act as guarantor of the case report.

Conflicts of Interest

The authors declare that they have no competing interests.

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