

Diagnosing spontaneous ileal neobladder perforation: Too often delayed

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Abstract

Spontaneous neobladder perforations are rare, but well-documented; the first cases were reported more than 2 decades ago mostly in urologic journals. However, the diagnosis of these patients is often delayed in the emergency room setting because initial care is given by non-urological medical staff that is too often unaware of this etiology. We present 2 cases and discuss the shift in treatment that has occurred over time.

When the native urinary bladder is afflicted with disease and removed, urine is diverted into either a continent reservoir or to an externalized non-continent conduit. Orthotopic ileal neobladders provide excellent functional and cosmetic results and therefore have become the standard of care for patients after radical cystoprostatectomy. The ileum has been shown to be metabolically safer than other intestinal segments due to less electrolyte absorption. In addition, urinary reservoirs constructed from detubularized ilea have superior urodynamic qualities compared to other intestinal segments.¹ Nevertheless, the orthotopic ileal neobladder, as a non-physiologic, is a compromise and prone to complications. The main long-term complications of ileal neobladders are infections and stone formation, ureteroenteric stricture, voiding dysfunction, metabolic abnormalities, tumours, and perforations. Of these, spontaneous neobladder perforation is an acute life-threatening event.² Although urologists may be aware with this pathology, other medical personnel are not. We present 2 additional cases of spontaneous ileal neobladder perforations and review the literature.

Case 1

A 73-year-old male, with Addison's disease for the past 40 years and on regular steroid therapy, had undergone radical cystoprostatectomy for bladder neck adenocarcinoma in 2003 with the construction of a Studer pouch. In 2005, he underwent artificial urinary sphincter (AMS 800, America Medical Systems) and penile prosthesis implantation for stress incontinence and erectile dysfunction, respectively. He was under regular urologic surveillance with no evidence of disease, voiding at fixed intervals and no significant post-void residual volume and a negative urine culture. Five years after surgery, while on vacation after his first morning void, he experienced acute lower abdominal pain. The pain progressively worsened and he developed a distended abdomen with decreasing voiding volumes. He presented to another hospital and was diagnosed with amoebiasis, for which metronidazole was prescribed. During the next 2 days, his situation deteriorated and his abdominal distension worsened. He suffered from nausea, vomiting, and singletus. After these 2 days, he was flown to our institution. Upon arrival he was conscious in pain and examined by a general surgeon and an internist. He had a normal temperature, blood pressure and pulse. His blood creatinine level, white blood count, C-reactive protein (CRP) and lactic acid levels were 366 µmol/L, $8.5 \times 10^9/L$, 19.41 mg%, 2.0 µmol/L, respectively. Due to severe abdominal distension and signs of peritonitis, he underwent abdominal computer tomography (CT) with oral contrast that revealed no signs of bowel obstruction and a large volume of intraperitoneal fluid collection (Fig. 1).

Subsequently, more than 2.5 L of intraperitoneal fluid were drained via a percutaneous puncture and sent for analysis. Its creatinine content was 990 µmol/L. About 9 hours following his admittance to the emergency room, a urologist was consulted and a CT cystogram was performed. The CT displayed a lateral right neobladder wall perforation (Fig. 2).



Fig. 1. Large intraperitoneal fluid collection.

At laparotomy, a half centimeter perforation was identified at the right neobladder wall. The defect was repaired and his postoperative course was uneventful. A year after surgery, the patient is continent and in good health with a functional prostheses.

Case 2

A 55-year-old otherwise healthy male underwent radical cystoprostatectomy and the construction of an ileal neobladder (Camey II) 4 years before due to invasive bladder cancer (pT2bNoMx). He had been under regular surveillance at our clinic, with no evidence of disease recurrence, completely continent voiding at regular 4-hour intervals with no post-voiding residual. A few hours prior to admission, he developed abdominal pain that progressively worsened. Upon arrival to the emergency room, he was conscious in pain with normal temperature, blood pressure, and pulse. Physical examination by a general surgeon revealed an acute abdomen. White blood count, CRP, lactic acid, blood creatinine, venous gases were $13.3 \times 10^9/L$, 0.1 mg%, 3.24 $\mu\text{mol/L}$, 179 $\mu\text{mol/L}$ and 7.34, respectively. A CT of the abdomen with oral contrast revealed no intestinal obstruction, but a moderate amount of intraperitoneal fluid. A urologist was consulted about 7 hours after admission and a CT cystogram was performed; the CT displayed a neobladder perforation at the dome (Fig. 3).

He was treated conservatively with a 22 Fr, 2-way infection control specialty Foley urethral catheter (Bard Medical, Covington, GA). Symptoms and laboratory parameters



Fig. 2. A computed tomography cystogram showing right neobladder wall perforation.

returned to normal and after 14 days a repeat CT cystogram was carried out that showed no extravasation of contrast (Fig. 4).

The catheter was removed and the patient resumed spontaneous voluntary voiding. Three months following catheter removal, he feels well has no significant residual volume and a negative urine culture.

Discussion

Over the past 2 decades, reports of spontaneous perforations of continent ileal reservoirs have been documented. Most of these reports were published in urological journals and have increased the awareness of urologists to this pathology. Over the last years, treatment has shifted from exploratory laparotomy in all patients to conservative treatment in selected patients. Candidates for conservative treatment include patients who are diagnosed promptly, hemodynamically stable without comorbidities, and with reservoirs well-drained.³ A delay in diagnosis puts a patient at risk of mortality.⁴ In both our patients diagnosis was delayed.

Unlike patients with myelodysplasia, patients undergoing ileal neobladder diversion for bladder cancer are usually neurologically intact and it would seem that decreased sensorium is not the main reason for the delay in diagnosis. "Doctor's delay" has been suggested due to the often vague presenting symptoms in this cohort of patients. False negative results are likely due to the fact that these patients are usually seen first by non-urologists and the cystography was



Fig. 3. A computed tomography cystogram showing perforation of the neobladder dome.

the diagnostic modality of choice.⁵ We suggest that in order to decrease the time to diagnosis, triage nurses and non-urol-ogist physicians should be aware of this pathology and have a high index of suspicion. Moreover, patients with urinary reservoirs presenting to the emergency room with abdominal pain should be examined by an urologist upon arrival. In recent years in many institutions cystography has been abandoned for CT cystograms in patients suspected of hav- ing urinary reservoir perforations. The risk factors for spon- taneous ileal neobladder perforation have been described in the literature. Most factors funnel down to overdisten- sion and total continence.⁶ It is hypothesized that patients with total continence do not retain a “pop-off” mechanism which causes leakage once neobladder pressure exceeds a certain threshold.⁷ Interestingly, both our patients were totally continent with no post-void residual urine. Patient 1 was continent following an artificial sphincter implantation, while patient 2 was continent following surgery alone. The first patient had an artificial urinary sphincter and a penile prosthesis implanted; moreover, he was on chronic steroid therapy due to Addison’s disease. In this patient, a delay of 72 hours occurred. At laparotomy although the sphinc- ter reservoir was seen floating intraperitoneally, it was not explanted. A year following surgery, artificial urinary sphinc- ter was operational and the patient became totally continent.

Conclusion

Spontaneous ileal neobladder perforation is rare, but well- documented. Diagnosis of spontaneous perforation still poses a challenge and is often delayed. Emphasis should be put on increasing the awareness of the non-urological medical staff in the emergency room setting to this pathol- ogy. A urologist should be consulted immediately for all



Fig. 4. A computed tomography cystogram repeated after 14 days of conservative management by an in dwelling catheter showing no perforation.

patients with ileal reservoirs presenting to the emergency room with abdominal pain. Retaining urological prostheses is feasible even in patients with comorbidities and a long delay in diagnosis.

Competing interests: Dr. Rosenberg, Dr. Gofrit, Dr. Hidas, Dr. Landau and Dr. Pode all declare no competing financial or personal interests.

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