Reminder of important clinical lesson

Urosepsis complicated by a spontaneous bladder perforation

Nancy Lutwak,¹ Curt Dill²¹Department of Emergency Services, VA New York Harbor Healthcare Center, New York, United States;²Department of Emergency Medicine, VA New York Harbor Healthcare Center, NYU School of Medicine, New York, United States

Correspondence to Dr Nancy Lutwak, nancy.lutwak@gmail.com

Summary

The authors present a case of a 72-year-old diabetic male s/p pelvic irradiation for prostate carcinoma who arrived in the emergency department with complaints of shaking chills. After admission for urosepsis, he developed severe abdominal pain and examination revealed a diffusely tender abdomen. The patient was diagnosed with spontaneous urinary bladder perforation and underwent surgery. After several weeks of intravenous antibiotics, he was discharged with multiple drains in place and bilateral nephrostomy tubes.

BACKGROUND

Although rare, patients with urological carcinoma, pelvic irradiation, recurrent urinary tract infections, or diabetes may develop spontaneous bladder rupture. Undiagnosed urinary bladder perforation results in high mortality particularly in the older population. Most common initial presentation is abdominal pain.

CASE PRESENTATION

The patient was a 72-year-old insulin-dependent diabetic male presenting to the emergency department with shaking chills. Medical history was significant for hypertension, congestive heart failure, renal insufficiency, gout, hyperlipidemia, anaemia and insulin-dependent diabetes mellitus.

The patient was treated at another hospital for prostate carcinoma resulting in radiation cystitis with a small, overactive necrotic bladder. The sequelae of multiple episodes of urinary bladder outlet obstruction, urinary tract infections, renal insufficiency and hyperkalemia ultimately led to ureteral stent and nephrostomy tube placement. Follow-up in urology clinic subsequently revealed urine cytology positive for malignant cells. After MRI demonstrated a thickened bladder wall, the

patient underwent bladder resection. He was found to have high grade poorly differentiated urothelial carcinoma extending through the bladder wall with perineural and lymphovascular invasion.

One month after the resection, the patient presented to the emergency department with shaking chills which began earlier in the day. In the emergency department, the rigors continued. The patient had noted the urine draining from the nephrostomy tube was cloudy and foul-smelling. He denied back pain, abdominal pain, dysuria, vomiting, diarrhoea and constipation.

Medications included amlodipine besylate 10 mg q day, metoprolol succinate 200 mg q day, omeprazole 20 mg q day and glargine insulin, five units subcutaneously q h sleep, as well as aspart insulin, dose based on a sliding scale before meals.

The patient was alert, awake and in no distress but had rigors. He was ill and toxic appearing.

Pulse was 153, temperature was 100.9°F and blood pressure was 170/92. The respiratory rate was 28 and unlaboured. Mucous membranes were dry. His lungs had decreased bibasilar breath sounds without wheezes, rales or rhonchi. Heart sounds were rapid but regular. Abdomen was non-tender, soft, non-distended with normal bowel sounds. Lower extremities had no oedema and were warm. The pedal pulses were bounding. The right-sided nephrostomy tube contained thick, purulent urine. The remainder of the physical examination was negative.

The patient complained of lower abdominal pain several hours after admission. Physical examination was remarkable for a diffusely tender abdomen with involuntary guarding and distention. White blood cell count had increased from 6.0 to 19.1 K/cmm (reference range 4.5–11). The CT scan revealed pneumoperitoneum. After the scan, the patient became hypotensive with change in mental status. An exploratory laparotomy revealed perforation of the urinary bladder which could not be repaired.

INVESTIGATIONS

Initial laboratory results revealed haemoglobin of 8.4 g/dl (13–18 reference range), glucose of 48 mg/dl (reference range 65–115), blood urea nitrogen of 41 mg/dl (reference range 6–22), creatinine of 2.7 mg/dl (reference range 41.2), bicarbonate of 17 mmol/l (reference range 24–32), lactate of 5.1 mmol/l (reference range 0.5–1.5), urinalysis of innumerable white blood cells. ECG was sinus tachycardia at 149. Chest x-ray was negative for pneumoperitoneum. Blood and urine cultures were positive for extended spectrum β lactamase *Escherichia coli*.

TREATMENT

An exploratory laparotomy revealed perforation of the urinary bladder which could not be repaired. Intravenous meropenem was continued for 20 days

OUTCOME AND FOLLOW-UP

The patient was followed in genitourinary clinic but succumbed several weeks after the surgery.

DISCUSSION

Multiple publications have documented cases of spontaneous rupture of the intraperitoneal urinary bladder, with patients presenting with abdominal pain or discomfort. The aetiology can be secondary to inflammation, acute or chronic, neoplastic lesions or bladder outlet obstruction.^{1–12}

Diabetics with decreased bladder sensitivity leading to chronic urinary retention and recurrent urinary tract infections may also have increased incidence of bladder rupture.² Many of the documented cases involve diabetic patients.^{2,3,9} Alcoholism is also implicated in spontaneous bladder rupture due to altered sensitivity.²

Acute inflammation may result from candida cystitis leading to bladder perforation.³ Chronic inflammation of the bladder wall can be caused by radiotherapy, schistosomiasis, or tuberculosis.

Several cases of pelvic irradiation for treatment of prostate adenocarcinoma, uterine carcinoma and cervical carcinoma leading to spontaneous bladder rupture have been reported.^{1,2,4–7}

Histological changes following radiation treatment may cause bladder wall weakness.¹ Neoplasms, for example, transitional cell and squamous cell carcinomas may also lead to bladder rupture from tumour necrosis and ulceration.^{8–10,13} Intravesicular bladder neck obstruction from calculi or papillomas may cause increased pressure and spontaneous rupture.¹²

An additional aetiology for bladder rupture is extravascular bladder outlet obstruction from prostatic hypertrophy, uterine tumours or pregnancy.¹² Patients presenting with abdominal pain and signs of peritonitis are commonly thought to have perforation of a peptic or duodenal ulcer.⁹ Spontaneous bladder rupture is relatively uncommon, but the diagnosis should be suspected in patients with previous history of pelvic irradiation, enterocystoplasty or bladder tumour.^{2,9} There is a published case of a diabetic patient with recurrent urinary tract infections and urinary incontinence presenting with abdominal pain and found to have rupture of the peritoneal bladder.²

Most commonly, the diagnosis of spontaneous urinary bladder rupture is made definitively with exploratory laparotomy.^{2,3,8–11} Chest and abdominal x-rays may not reveal pneumoperitoneum or intestinal obstruction.¹⁰ Cystogram has been useful to prove the diagnosis but may be falsely negative if the perforation has sealed with surrounding tissues for example, omentum or blood clots.^{1,2,5,7,10,11} Ultrasound may show fluid collections in the abdomen. Computed axial tomography (CAT) scan may be helpful in diagnosing spontaneous urinary bladder rupture.^{2,4,8,9,11} Findings have included free intraperitoneal fluid, free air under the diaphragm, thickened bladder wall, abscess, bowel obstruction and thick-walled bowel in the pelvis.^{2,8,9,11}

In summary, patients who present with abdominal pain and progress to peritonitis with previous history of pelvic irradiation, recurrent urinary tract infections, bladder tumours, bladder outlet obstruction, diabetes, alcoholism or neurogenic urinary bladders may have spontaneous

urinary bladder perforation.^{1–13} CAT scan may be diagnostic or reveal significant clues to the cause of the abdominal pain, such as free fluid in the pelvis, thickened loops of bowel near the bladder, bladder wall thickening, abscess, or pneumoperitoneum.^{2,8,9,11} The patient should be urgently evaluated by urological and general surgeons and aggressively resuscitated. Early diagnosis and awareness of this entity may prevent poor clinical outcome.

Learning points

- Patients who present with abdominal pain and progress to peritonitis with previous history of pelvic irradiation, recurrent urinary tract infections, bladder tumours, bladder outlet obstruction, diabetes, alcoholism or neurogenic urinary bladders may have spontaneous urinary bladder perforation.
- CAT scan may be diagnostic or reveal significant clues to the cause of the abdominal pain, such as free fluid in the pelvis, thickened loops of bowel near the bladder, bladder wall thickening, abscess, or pneumoperitoneum.
- The patient should be urgently evaluated by urological and general surgeons and aggressively resuscitated. Early diagnosis and awareness of this entity may prevent poor clinical outcome.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. Basiri A, Radfar MH. Conservative management of early bladder rupture after postoperative radiotherapy for prostate cancer. *Urol J* 2008;**5**:269–71.
2. Gomes CA, de Figueiredo AA, Soares Júnior C, et al. Acute abdomen: spontaneous bladder rupture as an important differential diagnosis. *Rev Col Bras Cir* 2009;**36**:364–5.
3. Mardani M, Shahzadi M, Rakhshani N, et al. Spontaneous perforation of urinary bladder secondary to Candida cystitis: acute abdomen of urologic origin. *Surg Infect (Larchmt)* 2008;**9**:525–7.
4. Ueda T, Ukimura S, Sato N, et al. A case of spontaneous rupture of the urinary bladder followed by pneumomediastinum. *Hinyokika Kyo* 2002;**48**:363–5.
5. Ishii T, Kadowaki T, Sugiyama T. Intraperitoneal spontaneous rupture of the bladder Subsequent to irradiation of the uterus: a case report. *Hinyokika Kyo* 1988;**34**:2185–8.
6. Amano T, Miwa S, Takashima H, et al. Four cases of spontaneous rupture of the urinary bladder. *Hinyokika Kyo* 2002;**48**:243–5.
7. Hagiwara N, Nishida Y, Fufimoto Y, et al. Recurrent spontaneous bladder rupture cured by conservative therapy: a case report. *Hinyokika Kyo* 2002;**48**:367–70.
8. Jayathillake A, Robinson R, Al-Samari A, et al. Spontaneous rupture of bladder presenting as peritonitis. *N Z Med J* 2002;**115**:U222.
9. Chitale S, Debbarma M, Wilson P, et al. Urological pathology causing free air under the diaphragm? *Ann R Coll Surg Engl* 2008;**90**:688–90.
10. Ahmed J, Mallick IH, Ahmad SM. Rupture of urinary bladder: a case report and review of literature. *Cases J* 2009;**2**:7004.
11. Rogers CJ, Barber DB, Wade WH. Spontaneous bladder perforation in paraplegia as a late complication of augmentation enterocystoplasty: case report. *Arch Phys Med Rehabil* 1996;**77**:1198–200.
12. Jenkinson LR. Spontaneous intraperitoneal rupture of the urinary bladder. *Postgrad Med J* 1981;**57**:269–70.
13. Budd JS. Spontaneous intraperitoneal rupture of the bladder in association with transitional cell carcinoma. *Postgrad Med J* 1988;**64**:165–6.

This pdf has been created automatically from the final edited text and images.

Copyright 2011 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.

BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Lutwak N, Dill C. Urosepsis complicated by a spontaneous bladder perforation. *BMJ Case Reports* 2011;10.1136/bcr.08.2011.4609, date of publication

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow