

Bladder rapture as commonly misdiagnosed pathology - case report

Maciej Putowski¹, Marta Podgórnjak¹, Michał Zarobkiewicz¹, Nikolos Dzagnidze²

¹ Medical University of Lublin, Poland

² First University Clinic of Tbilisi State Medical University, Georgia

Keywords

spontaneous bladder rapture, prostate cancer, bladder perforation, acute renal failure

Abstract

The non-traumatic urine bladder rapture is a very rare life-threatening condition. The diagnosis of this pathology provides many difficulties as the signs and symptoms are not specific and the role of some diagnostic methods is insufficient. We describe the case of 77-year-old male patient admitted to the Emergency Department due to dyspnea, breathing difficulties, urinary difficulties and significantly distended abdomen. The patient had numerous cardiovascular diseases, moreover the interview disclosed recently diagnosed stage III prostate cancer. The laboratory tests results suggested an acute kidney failure. Due to severe condition patient was transferred to the Intensive Care Unit (ICU), where intravenous treatment with ceftriaxone and metronidazole was done for the first 2 days. Afterwards therapy was modified by introducing tienam and vancomycin. On the 4th day of hospitalization the sudden deterioration in the patient's condition occurred and the abdominal US revealed free fluid in peritoneal cavity, which was not visible in previous examinations. The CT-cystography revealed connection between the bladder and the retroperitoneal space in the right part of anterior wall. Despite the urgent laparotomy, the patient died due to multiple organ dysfunction syndrome in the course of neoplastic process as cause.

Introduction

Spontaneous rupture of the urinary bladder is a rare condition associated with risk factors such as radiotherapy for pelvic malignancies, neuropathic bladder, trauma, alcoholism, continuous bladder irrigation, the postpartum period and bladder diverticulum (1). It often presents with non-specific clinical features, therefore, diagnosis may be missed until applying advanced techniques, for example computer tomography (CT) (2). We herein describe a patient with spontaneous rupture, initially diagnosed with acute renal failure.

Case report

A 77-year-old male patient was admitted to the Emergency Department of the First University Clinic of Tbilisi State Medical University in August 2015. His main complaints were dyspnea, breathing difficulties, urinary difficulties and significantly distended abdomen. The patient's interview disclosed recently diagnosed stage III prostate cancer (T3bN0M0), permanent atrial fibrillation, chronic heart failure NYHA III, arterial hypertension (2nd grade) and diabetes type II. The medical examination revealed symptoms of an urinary tract infection, which was confirmed by the urine analysis (table 1). As the laboratory tests revealed the high level of creatinine (486 $\mu\text{mol/l}$), urea (34 mmol/l) and metabolic acidosis, the patient was suspected to have an acute kidney failure. The laboratory tests indicated also other abnormalities, see table 2 and 3. The chest X-ray showed signs of pulmonary edema. Four hours after the admission, the closer examination of the abdominal wall revealed outlines of bowel loops, therefore a surgical consultation was ordered. The latter unveiled pain on palpation, slightly positive Blumberg sign and empty ampule in the rectal examination. The bowel obstruction was suspected and therefore the abdominal X-ray was performed. It showed distended bowel loops but no free air-fluid levels. Further the abdominal ultrasound revealed no more abnormalities.

Due to severe condition patient was transferred to the Intensive Care Unit (ICU), where intravenous (IV) treatment with ceftriaxone and metronidazole was done for the first 2 days. Afterwards therapy was modified by introducing tienam and vancomycin. Thanks to the pharmacotherapy the condition of the patient was gradually improving that was monitored by everyday laboratory tests and ultrasound (US). On the 4th day of hospitalization the sudden deterioration in the patient's condition occurred. The abdominal US revealed free fluid in peritoneal cavity, which was not visible in previous examinations. The abdominal CT scan with IV contrast was performed for further diagnostics. The CT visualized the infiltrated locus between the bladder and the caecum with air density bubbles inside and the same air-containing infiltrating structures in the retroperitoneal fatty tissue. In the contrast excretion phase the contrast fluid was noticed outside the bladder in the retroperitoneal space. After contrast administration to the bladder the existence of a connection between the bladder and the retroperitoneal space was revealed in the right part of anterior wall. The small bowel loops were distended with free-air fluid levels and small amount of free fluid in pelvis and peritoneal cavity.

The patient was transferred to the operation tract, where the urgent laparotomy was performed during which bladder was exposed, ruptured site resected and the drainage of perivesical space established. During an early postoperative period, the condition of the patient was critical with unstable hemodynamics. Twelve hours after the operation the heart arrest occurred. The cardiopulmonary resuscitation was carried on for one hour with no results and therefore the biological death was diagnosed with multiple organ dysfunction syndrome in the course of neoplastic process as cause.

Discussion

The spontaneous bladder rupture is a rare clinical condition and provides numerous diagnostic difficulties. The early biochemical results, showing high creatinine and urea blood levels, can imitate acute renal failure as both substances are easily absorbed from urine extravasated into peritoneal cavity. In the same mechanism hyperkalemia, hyponatremia and acidosis can occur. The signs and symptoms are also not specific, that is lower abdominal pain with sudden onset, impaired micturition and other common symptoms such as nausea, vomiting, rigidity or tenderness (3,4). In order to properly diagnose the bladder rupture, various radiological methods are required. The role of ultrasound is limited because of the low sensitivity (5) as in our patient, who had three abdominal US before the leakage was revealed. CT is also an insufficient method and only CT-cystography with retrograde installation of contrast is adequate and allows to diagnose the pathology with almost 100% certainty (6). In patient with ascites results of peritoneal cavity fluid analysis can be helpful in making the proper diagnosis as the ratio of creatinine level in before mentioned fluid and serum creatinine level above 1.0 indicate urinary leakage. Also, improvement after Foley's catheter placement with pain relief and ascites reduction further confirms the diagnosis. Due to all mentioned difficulties, patients are often misdiagnosed (7). An accurate preoperative diagnoses of urinary bladder rupture are made only in two out of fifteen case reports (8). Usually the proper diagnoses are made during the surgical operation. However, in our case the pathology was revealed preoperative as the rupture was suspected and therefore CT-cystography was performed. It is vitally important for the proper diagnosis to remember about the spontaneous bladder rupture and suspect it in complicated cases.

Pathophysiological processes leading to non-traumatic bladder perforation are increased intravesical pressure and weakening of the bladder wall. The increased risk of this pathology occurs in patients with alcohol intoxication because of a large volume of urine produced by the diuresis effect of alcohol and an increased intra-abdominal pressure due to nausea and vomiting associated with alcohol poisoning (9). The most common site of rupture is the dome, that is the weakest point of the bladder (7). In our case the most probable factors were the high intravesical pressure caused by the blockage of the urinal outflow because of the neoplastic prostate hyperplasia and the thinning of the infiltrated bladder wall.

Spontaneous urinary bladder perforation is a rare condition, which requires immediate medical help due to its extremely high morbidity and mortality (10). Overall, the prognosis of spontaneous bladder rupture is very poor with a mortality rate of up to 80% (11).

The general consensus in terms of bladder rupture's treatment is a surgical approach in case of intraperitoneal leakage and conservative treatment with Foley catheter and antibiotics for extraperitoneal (9,12). Still the before mentioned conservative approach can have a good outcome also in the intraperitoneal perforation as long as it prevents further leakage (9,13,14).

Conclusions

In conclusion, despite the spontaneous bladder rupture is a rare condition, it should not be ignored during the diagnostic process and should be seen as an option in all suspicious cases of ascites and acute renal failure, especially when the patient has had any urological surgeries on the bladder before or has any oncological history involving the urinary tract or bladder. The patients with this pathology are often misdiagnosed as the proper diagnosis is usually made during the surgical operation. The surgical intervention seems to be the appropriate approach, however in some cases the conservative treatment is sufficient.

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Table 1. Results of urine analysis

Parameter	Result	Reference
Color	yellow	yellow
Clarity	cloudy	clear
Specific gravity	1005	1015-1025
pH	5.5	5.0-6.5
Leukocytes	+++	negative
Nitrites	negative	negative
Protein	300 mg/dl	<30mg/dl
Glucose	negative	negative
Ketones	5 mg/dl	Negative
Urobilinogen	0.2	0.2 EU/dl
Bilirubin	++	Negative
Blood	+++	Negative

Table 2. Biochemical blood parameters. Parameters within norms both times are not shown.

Test	Value on admission	Value prior to death	Norms
Creatinine	486 µmol/l	200.5 µmol/l	<104 µmol/l
Urea	34 mmol/l	29.57 mmol/l	1.7-8.3 mmol/l
Bilirubine - total	19.2 µmol/l	27.3 µmol/l	2-21 µmol/l
Bilirubine - direct	3.1 µmol/l	9.9 µmol/l	<3.42 µmol/l
Albumine	35.4 g/l	24.2 g/l	38-56 g/l
Fibrynogen	10.5 g/l	7.05 g/l	2-4 g/l
APTT	46.9"	54.3"	28-43"
PT	35.4"	34.2"	13-18"
TT	22.4"	29.2"	15-22"
INR	2.6	2.5	1-1.3

Table 3. Complete blood count. Parameters within norms both times are not shown.

Test	Value on admission	Value prior to death	Norms
WBC	$6.8 * 10^9 /L$	$18.5 * 10^9 /L$	$4-10 * 10^9 /L$
LYMPH	11.4%	4.5%	25-50%
GRAN	68.4%	84.9%	45-70%
MON	19.4%	8.5%	2-10%
RBC	$3.36 * 10^{12} /L$	$2.32 * 10^{12} /L$	$4.5-5.8 * 10^{12} /L$
HGB	9.7 g/L	6.8 g/L	13.5 - 17.0 g/L
HCT	29.2	19.8	40-50
PLT	$363 * 10^3 /\mu L$	$171 * 10^3 /\mu L$	$200-380 * 10^3 /\mu L$