

Spontaneous Bladder Wall Rupture Due to Emphysematous Cystitis in a Diabetic Patient: A Case Report

H. Loukili^{1*}, M. Jaouaher¹, Y. Bouktib¹, A El Hajjami¹, B. Boutakioute¹, M. Ouali Idrissi¹, N. Cherif Idrissi El Ganouni¹

¹Radiology Department, Er-razi Hospital, Mohammed VI University Hospital, FMPM, Cadi Ayyad University, Marrakech, Morocco

DOI: [10.36347/sjmc.2024.v12i05.019](https://doi.org/10.36347/sjmc.2024.v12i05.019)

| Received: 03.04.2024 | Accepted: 07.05.2024 | Published: 11.05.2024

*Corresponding author: H. Loukili

Radiology Department, Er-razi Hospital, Mohammed VI University Hospital, FMPM, Cadi Ayyad University, Marrakech, Morocco

Abstract

Case Report

Spontaneous rupture of the urinary bladder (SRUB) secondary to emphysematous cystitis (EC) in diabetic patients is extremely rare. Emphysematous cystitis is a relatively rare disease entity characterized by intramural and/or intraluminal bladder gas best depicted by cross-sectional imaging. Its disease mechanism is not well understood. **Case report:** A 61-year-old diabetic woman presented to the emergency department with diffuse abdominal pain and hematuria of three hours duration. Physical examination revealed generalized abdominal tenderness. Multi-slice abdominal and pelvic CT scans showed parietal pneumatosis of bladder and communicating continuity solutions with a pre-vesical collection (extravasation of PDC into the collection). After proper resuscitation, the patient was transferred to the operating room for exploratory laparotomy. A thickness bladder rupture was noted, which was repaired. **Conclusions:** SRUB in patients with poorly controlled diabetes and EC is highlighted in this case study. Urinary bladder rupture secondary to EC should be considered when a diabetic patient with a history of urinary symptoms presents with an acute onset of abdominal pain. Uneventful recovery from SRUB is dependent on early diagnosis and treatment.

Keywords: Emphysematous Cystitis, Spontaneous rupture, urinary bladder, Diabetic.

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Spontaneous rupture of the urinary bladder (SRUB) is extremely rare. Although the cause of SRUB is unclear, in most cases, a predisposing factor makes a patient prone to bladder rupture [1]. Emphysematous cystitis (EC) is a severe form of urinary tract infection presenting with free air within the bladder wall [5]. It is a relatively rare disease entity characterized by urinary tract infection associated with intramural and/or intraluminal bladder gas. The exact incidence and prevalence of this condition are not well-described in the current literature. Through aerobic glycolysis, gram-negative microorganisms (eg, *Escherichia coli* and *Klebsiella pneumoniae*) produce gas within the vesical lumen and muscular layer of the bladder [5]. The most common presenting complaint is abdominal pain, found in 80% of patients. Other common symptoms include pneumaturia (70%), dysuria (50%), urinary frequency (50%), and urinary urgency (50%). Diabetes mellitus is the most common predisposing risk factor, present in up to 50% of patients with emphysematous cystitis [8].

The presence of intramural gas is pathognomonic for emphysematous cystitis and presence of intraluminal gas, in the absence of recent history of

bladder instrumentation, is highly suggestive of the condition. The diagnosis is typically made via CT imaging, but can also be established by plain radiographs or ultrasound [8].

CASE REPORT

61-year-old, female, her past medical history was significant for type 2 diabetes mellitus, presented to the emergency department due to two days of worsening diffuse abdominal pain and multiple episodes of non-bloody, non-bilious vomiting.

Initial physical examination revealed generalized abdominal tenderness. The exam was otherwise unremarkable. Examination reveals a febrile patient T: 39°, HR: 90 bpm, FR:30cycles/min.,

Pertinent laboratory results on presentation included GB: 17000, CRP 215, blood glucose of 360 mg/dL, a urinalysis with 6–10 white blood cells, but negative leukocyte esterase and negative nitrates.

A CT scan of the abdomen and pelvis with contrast was obtained and revealing a bladder with irregular circumferential parietal thickening in places

Citation: H. Loukili, M. Jaouaher, Y. Bouktib, A El Hajjami, B. Boutakioute, M. Ouali Idrissi, N. Cherif Idrissi El Ganouni. Spontaneous Bladder Wall Rupture Due to Emphysematous Cystitis in a Diabetic Patient: A Case Report. Sch J Med Case Rep, 2024 May 12(5): 648-651.

with parietal pneumatosis and continuity solutions communicating with a pre-vesical collection (extravasation of PDC into the collection) measuring

87x36x99 mm fairly well limited, spontaneously hypodense, peripherally enhanced by PDC and seat of air bubbles (**Fig.1 and 2**).

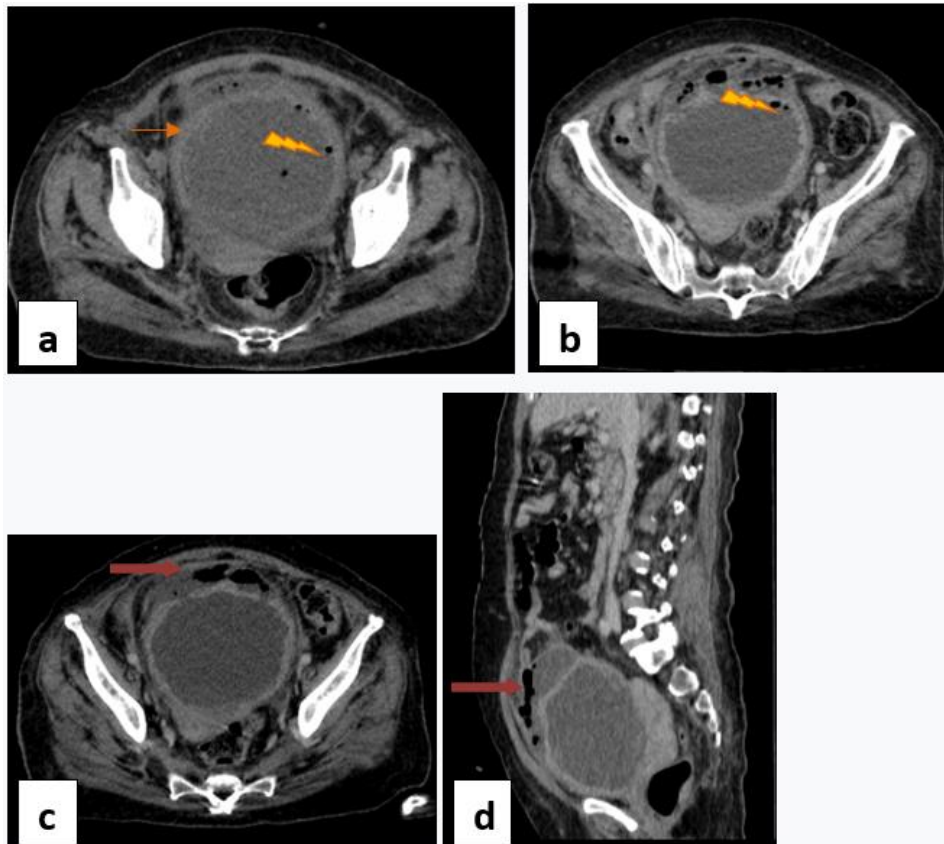


Fig. 1: Axial (a, b, c) and sagittal (d) CT images of the Pelvic image showed a diffuse thickening of the bladder wall → and gas in the wall and intraluminal of bladder ⚡ with extra vesical extension →

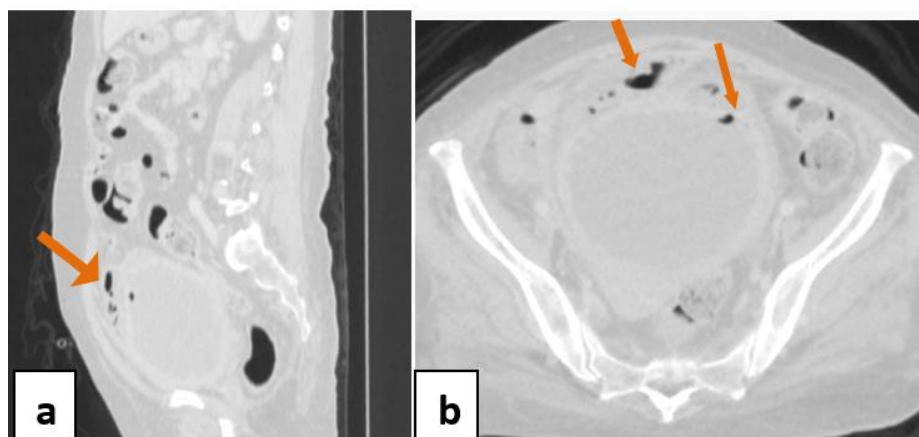


Fig.2: Sagittal (a) and Axial (b) CT images of the bladder (lung windows) demonstrate air extending from the bladder wall into the prevesical spaces

The diagnosis of emphysematous cystitis complicated by bladder rupture was made on the basis of gas outlining the bladder contour, which is virtually

pathognomonic for the disease and extravasation of PDC in late time (**Fig.3**).

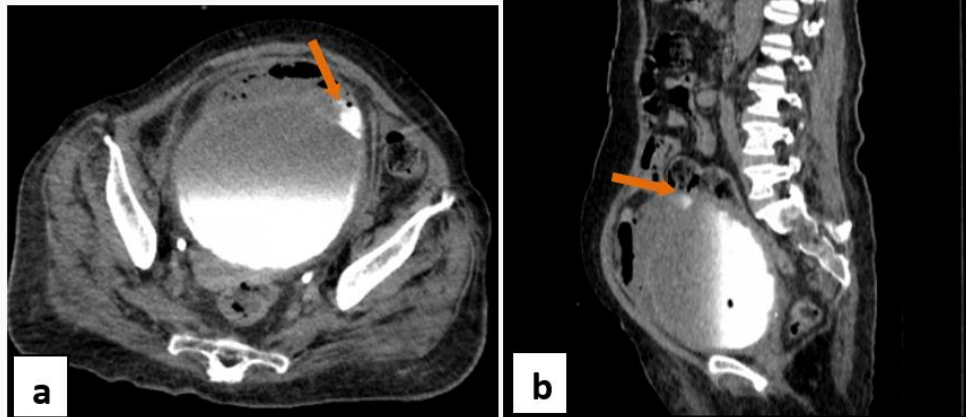


Fig. 3: Axial (a) and sagittal (b) sections of a late abdomino-pelvic CT scan showing extravesical extravasation of contrast product →

After proper resuscitation, the patient was transferred to the operating room for exploratory laparotomy. A thickness bladder rupture was noted, which was repaired.

DISCUSSION

Emphysematous cystitis is rare, but potentially fatal if not treated properly. It presents similar to uncomplicated cystitis, which is characterized by dysuria, hematuria, abdominal pain, and urinary urgency and frequency with a pathogenic exception, but with the unique presence of pneumaturia. Varied presentations exist, such as incidental diagnosis in asymptomatic patients during abdominal imaging, subcutaneous emphysema and/or severe sepsis [7].

The presence of intramural gas is pathognomonic for emphysematous cystitis and presence of intraluminal gas, in the absence of recent history of bladder instrumentation, is highly suggestive of the condition. The diagnosis is typically made via CT imaging, but can also be established by plain radiographs or ultrasound [8].

Spontaneous rupture of the urinary bladder (SRUB) is a rare and potentially life-threatening emergency. The incidence of SRUB is around 1 in 126,000, including less than 1 % of bladder injuries, while external trauma is the most common cause.

The suggested cause of the SRUB is the weakening of the wall of the urinary bladder, primarily due to urine retention. A series of predisposing factors have been seen in patients with SRUB, including but not limited to chronic urinary retention, childbirth, lower urinary tract obstruction, alcohol abuse, bladder dysfunction, bladder surgery, diverticulum, tumors, malignancy, infection, and inflammation. Poorly controlled diabetes can lead to UTI, bladder dysfunction,

and urinary retention, a major predisposing factor for SRUB. Although our patient's diabetic cytopathic presented as an overactive bladder syndrome with urinary frequency in the past [1].

Abdominal pain is the most common sign of SRUB. Other common symptoms are gross hematuria and abdominal tenderness. Abdominal distension, voiding problems, fever, nausea, and vomiting occur less frequently. These non-specific symptoms make the diagnosis of SRUB very challenging, even with the aid of CT imaging. Hence, most patients are misdiagnosed with digestive system inflammatory disorders, acute abdomen, renal failure, and bladder tumor or inflammation [1].

In patient with dysuria or pelvic pain, ultrasound of the bladder may be the first or only imaging exam ordered and prompt recognition of the findings may be life-saving. Sonography of a bladder with intramural gas typically demonstrates highly echogenic reverberation artifact due to the presence of said gas, often with “dirty” shadowing seen in the bladder lumen. Occasionally, highly echogenic foci of gas can be seen to move dependently with the patient's position; this phenomenon has been referred to as the “champagne” or “effervescent” sign previously in reference to emphysematous cholecystitis, but can be seen with emphysematous cystitis as well [8].

The presence of extra-peritoneal air strongly suggests disruption of the bladder serosa.

However, the absence of extra peritoneal urine indicates that the bladder mucosa is intact. This suggests that emphysematous cystitis may share similar pathophysiologic pathways with pneumatosis intestinalis and emphysematous cholecystitis [8].

Retrograde cystography (CT or conventional) has been recommended to evaluate bladder injuries. However, most reported SRUB cases were diagnosed in the operating room during a laparotomy for acute peritonitis. A limited number of reports of abdominal air in CT scans have been reported, which is a classic finding of hollow viscus perforation. This finding and ascites are more common in reports of bladder rupture due to infection and inflammation. Therefore, it is recommended that the bladder be examined later if the intestines were healthy at the time of laparotomy [1].

There is a lack of specific guidelines for the management of SRUB. The American Urology Association (AUA) and the European Association of Urology (EAU) recommend surgical repair for intraperitoneal bladder injuries. The AUA recommends urethral catheter drainage without supra pubic cystostomy after the surgical repair. Conservative management has not been recommended for intra peritoneal bladder injuries. Although, a recent review of the literature found that conservative management could be successful in the absence of severe infection, bleeding, or major injuries. Adequate urination drainage and antibiotics are the cornerstones of conservative treatment [1].

EC can be successfully treated with appropriate antibiotics, bladder drainage and glycemic control, reserving surgical intervention for severe cases [6]. Laparotomy is indicated in complicated EC with peritoneal signs, pneumo-peritoneum, or perivesical abscess [1].

The overall death rate among patients with EC has been reported to be approximately 7%. EC can affect the upper UT in an ascending manner and may subsequently develop into EP (the reported mortality rate of EP is 14-20%). A delayed diagnosis can also result in bladder rupture, overwhelming infection and death. Making an early diagnosis of EC and providing early treatment is essential to achieving a good prognosis [6].

CONCLUSION

SRUB in patients with poorly controlled diabetes and EC is high-lighted in this case study. Spontaneous rupture of the urinary bladder should be considered in diabetic patients with a history of urinary symptoms present with acute onset of abdominal pain. An uneventful recovery from SRUB is dependent on early diagnosis and treatment. EC should also be considered in diabetic patients with poor control of blood sugar, abdominal pain, and symptoms of cystitis. Proper

and prompt antibiotic therapy leads to successful treatment and prevents further complications.

REFERENCES

1. Eghbali, F., Mosavari, H., Madankan, A., Hariri, V., Garakani, K., & Bhaadoust, M. (2022). Generalized peritonitis secondary to spontaneous rupture of the urinary bladder in a diabetic patient: A case report. *International Journal of Surgery Case Reports*, 97, 107458.
2. Tanabe, A., Fujita, Y., & Amagai, T. (2021). A hyperechoic bladder-ring appearance as pathognomonic finding for emphysematous cystitis—A case report and literature review. *Radiology Case Reports*, 16(9), 2457-2459.
3. Choi, J., Choi, S. K., Lee, S. H., & Yoo, K. H. (2021). Clinical outcomes and risk factor analysis of patients presenting with emphysematous cystitis: a 15-year retrospective multicenter study. *Medicina*, 57(6), 531.
4. Hasan, A., Paul, A. S., Goel, G., Panda, S., Singh, G. P., & Hota, D. Emphysematous Cystitis—A rare clinical entity & its outcome from conservative management.
5. Riveros, B. P. P., & Mohseni, M. M. (2023). Emphysematous Cystitis: A Rare Urologic Emergency. *The American Journal of Case Reports*, 24, e941599-1.
6. Amano, M., & Shimizu, T. (2014). Emphysematous cystitis: a review of the literature. *Internal medicine*, 53(2), 79-82.
7. Eken, A., & Alma, E. (2013). Emphysematous cystitis: The role of CT imaging and appropriate treatment. *Canadian Urological Association Journal*, 7(11-12), E754.
8. Wojack, P. R., & Goldman, I. A. (2020). Emphysematous cystitis with extraperitoneal gas: new insights into pathogenesis via novel CT findings. *Clinical Imaging*, 65, 1-4.
9. Roels, P., Decaestecker, K., & De Visschere, P. (2016). Spontaneous bladder wall rupture due to emphysematous cystitis. *Journal of the Belgian Society of Radiology*, 100(1).
10. de Tové, K. M. S., Napon, M., Nikiema, Z., Yèkpè, P., Biaou, O., & Boco, V. (2015). Ultrasound Contribution to the Diagnosis of Emphysematous Cystitis. *Open Journal of Radiology*, 5(3), 170-175.
11. Shimi, A., Boumedian, A., Elbakouri, N., Derkaoui, A., & Khatouf, M. (2015). Une cause rare du choc septique chez le diabétique: la cystite emphysemateuse compliquée d'une rupture vésicale. *The Pan African Medical Journal*, 20.