

Inflammation and infection

Incidental discovery of an interstitial emphysematous cystitis with liver abscess: A report of hematogenous spread of infection

Emad Rajih^{a,**}, Ayman Sayed A^b, Sarah Mahrous^b, Abdullah Alharthi^b,
Abdulrahman Alswaid^b, Abdulaziz Bakhsh^a

^a Urology Department, Taibah University, Madinah, Saudi Arabia

^b Urology Department, King Fahad General Hospital, Madinah, Saudi Arabia

ARTICLE INFO

Keywords:

Emphysematous cystitis
Urinary bladder
Cystitis

ABSTRACT

Emphysematous cystitis is an unusual urological emergency in clinical practice. The disease characteristics are still underreported. It is characterized by the presence of gas in the urinary bladder wall secondary to gas forming organism. We report an incidental finding of emphysematous cystitis in a 35-year-old secondary to a huge liver abscess in a poorly controlled blood sugar. The infection spread hematogenously to the urinary bladder wall that was managed conservatively by urethral catheter drainage and hepatic abscess drainage in adjunct with antimicrobial therapy. The patient had no urinary symptoms. The bladder wall gas disappeared during follow-up in 2 weeks.

Introduction

Emphysematous cystitis (EC) is an unusual complicated urinary tract infection. It is characterized by the presence of gas in the urinary bladder wall based upon radiological findings.¹ The clinical presentation varies from unstable septic condition to a subtle clinical finding.¹⁻³ However, most patients have mild form of the disease with mortality rate of around 7%.¹ It arises commonly from *Escherichia coli* and *Klebsiella pneumoniae* but any gas forming organism can be a causative organism or fungi.¹ In many different series, the hallmark finding is the immunity status of the affected individual and presence of obstructive uropathy. We report an incidental finding of EC with hematogenous spread from a significant liver abscess in a diabetic patient.

Case report

A 39-year-old male presented to the emergency department complaining of right upper quadrant pain, nausea and jaundice. His abdominal pain started 10 days before presentation. The pain was continuous, dull ache in nature, and radiated to the right shoulder that is associated with fever and rigors. He had no lower urinary tract symptoms. His past medical history was significant for uncontrolled non-insulin dependent diabetes mellitus. His past history was unremarkable. He looked ill and drowsy but conscious, and fully oriented.

Physical exam showed a body temperature of 39.8 °C, heart rate of 135 beats per minute, respiratory rate of 19 breaths per minute, blood pressure of 125/90 mm Hg, and oxygen saturation of 98% on room air. The abdomen was severely tender to deep palpation in the right upper quadrant with palpable liver. There was no guarding or rebound tenderness. His bowel sound was positive. The laboratory investigation revealed sodium of 123 mEq/L, blood urea and nitrogen of 5.3 mg/dL, creatinine of 48 μmol/L, glucose of 378 mg/dL, serum PH of 7.42, lactate 4 mmol/L and HCO₃ is 21.8 mEq/L. A complete blood count revealed an elevated white blood cell count of 15 × 10⁹/L, hemoglobin of 8.5 g/dL and platelet of 479 × 10⁹/L. The liver function test was elevated for an Alanine aminotransferase of 171 U/L, Aspartate aminotransferase of 16 U/L, bilirubin of 5 mg/dL, and alkaline phosphatase of 189 U/L. The urine was grossly clear. Urinalysis showed 7 WBC/HPF and 1-3 RBC/HPF. The hemoglobin A1c was 9.9%. Computed tomography (CT) scan showed liver destructive lesion occupying segment VIII and VII with irregular peripheral enhancement. There is an abscess measure 11.5 × 13.5 × 9.8 cm in maximum transverse, anteroposterior and craniocaudal dimensions with air and moderate amount of dependent fluid. No other hepatic lesions. The hepatic vasculatures are patent. There was right pleural effusion and basal lung consolidation (Fig. 1). Urinary bladder shows intramural air with perivesical stranding. No lymphadenopathy. The liver abscess was drained by percutaneous drainage and an indwelling urethral catheter was inserted. Septic

* Corresponding author. Urology Department, Taibah University, Madinah, P.O.Box: 344, 42353, Saudi Arabia.

E-mail address: remad@taibahu.edu.sa (E. Rajih).

<https://doi.org/10.1016/j.eucr.2020.101134>

Received 8 January 2020; Accepted 18 February 2020

2214-4420/© 2020 The Authors. Published by Elsevier Inc.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

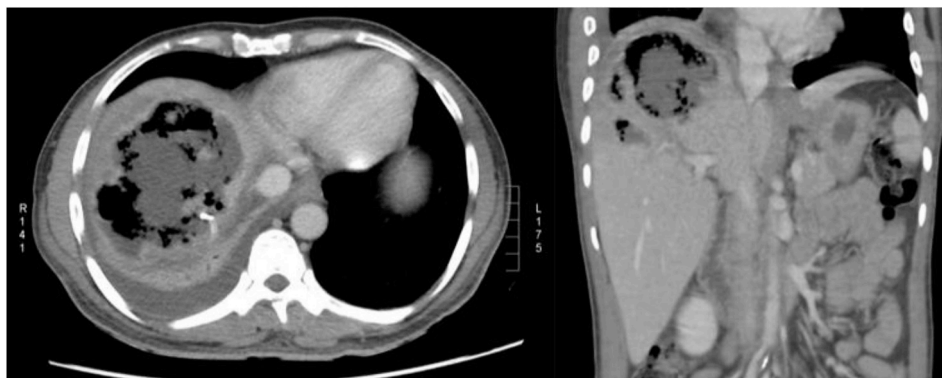


Fig. 1. CT scan of the liver showed the liver abscess.

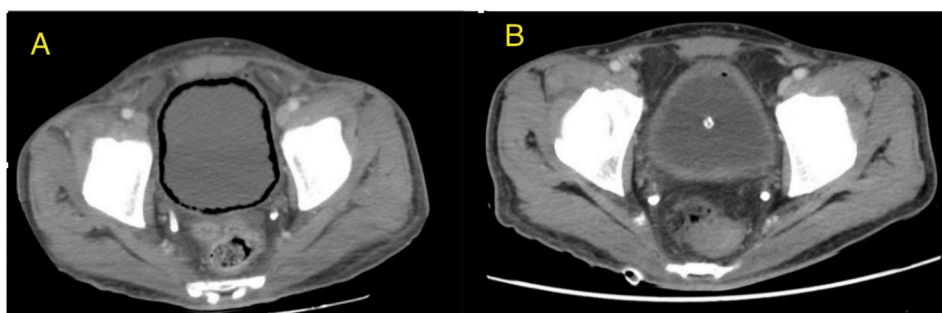


Fig. 2. A. CT scan image demonstrated diffuse air within the bladder wall B. Two weeks follow-up after conservative treatment.

screening including blood, drainage fluid, and urine culture were sent. Inpatient parenteral Ceftazidime 2 g and Metronidazole 500 mg three times a day were started. Hospital course showed improvement with decrease in the amount of drainage fluid over time. The drainage fluid culture revealed a growth of *Klebsiella pneumoniae*. The blood and urine culture revealed no growth. The WBC counts reached $6 \times 10^9/L$ and repeated abdominopelvic CT scan showed resolution of the abscess as well as urinary bladder wall gas in 2 weeks (Fig. 2).

Discussion

EC is an unusual phenomenon that can be identified incidentally based on imaging studies.¹ However, in some occasion can present with sever lower urinary tract symptom and systemic manifestation of infection that require immediate surgical intervention.² Our patient presented to the emergency department with manifestation of sepsis and sever upper abdominal pain that was secondary to massive liver abscess. He was diagnosed incidentally with EC based on abdominopelvic CT scan with significant air in the urinary bladder wall. The current report emphasis the pathogenesis of EC that include hematogenous spread of infection to involve the urinary bladder wall in immunocompromised individual. EC was resolved spontaneously in our patient without any direct surgical intervention to the urinary bladder. We elected to manage his urological condition conservatively with urine drainage.

Basically, if the EC is diagnosed based on clinical assessment and finding on imaging studies then the decision for selection of the appropriate management is based upon clinical judgment and overall patient status. Many cases managed conservatively successfully where systemic manifestations are absent and hemodynamically stable. However, the role of surgical intervention is mandatory when the patient condition is not stable that end usually with simple cystectomy in sever situation and urinary diversion.³

Synchronous systemic infection with EC have been reported anecdotally in the literature. Lai and his group reported a concomitant liver

abscess and symptomatic EC. The patient presented with lower abdominal pain and storage urinary symptoms. He was improved with parenteral antimicrobial therapy and urine drainage by urethral catheter.⁴ Al-Assiri reported similar presentation with acute pancreatitis that was managed conservatively.⁵ Our patient has no urinary symptoms with negative urine culture.

Various forms of emphysematous infection can affect different urogenital organ, but occasionally involve single organ at one time.¹ Rarely, urinary bladder involvement can be a part of systemic infection as described in our report or commonly reported as isolated urinary bladder infection.^{4,5} Although clinical presentations usually cannot be distinguished from other pathologies of the urinary bladder. Our patient is totally asymptomatic and his EC is diagnosed based upon incidental radiological finding. Variable pictures were reported in literature ranging from mild urinary tract symptoms to sever systemic septic condition requiring surgical debridement and urinary diversion. The indication of surgical management of EC has to be individualized based upon clinical presentation and overall condition.

Conclusion

EC is an unusual consequence in patients with distant infectious process. In the setting of no adverse clinical findings after initiation of antibiotic, close observation and indwelling urethral catheter could recover the pathogenic process completely. Although anecdotal reports have been issued, the mechanisms of isolated bladder wall gas forming infection is not well understood.

Funding

None, this research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

All authors have nothing to disclose and there are no conflicts of interest. We declare that all authors have contributed to the creation of this manuscript.

References

1. Thomas AA, Lane BR, Thomas AZ, Remer EM, Campbell SC, Shoskes DA. Emphysematous cystitis: a review of 135 cases. *Br J Urol Int.* 2007;100(1):17–20.
2. Wang PZ, Martin PR, Luke PP. Emphysematous cystitis and necrotizing fasciitis. *Can Urol Assoc J.* 2014;8:498–499.
3. Grupper M, Kravtsov A, Potasman I. Emphysematous cystitis: illustrative case report and review of the literature. *Medicine.* 2007;86(1):47–53.
4. Lai C. Concomitant emphysematous cystitis and liver abscess. *Korean J Intern Med.* 2018;33:839–840.
5. Al-Assiri M, Chan P. Incidental discovery of emphysematous cystitis with rapid resolution in a patient presenting with acute pancreatitis. *Sci World J.* 2004;4: 881–884.