

## Emphysematous cystitis: A singular case enriching medical literature

Reda Mdafar \*, Rhyan alami, Mohammed Amine malki, Mustapha ahsaini, Soufiane Mellas, Jalal Eddine ammari, Mohamed Fadl Tazi, Mohammed Jamal El Fassi and Moulay Hassan Farih

*Hassan II university hospital, Department of Urology, Fès, Morocco.*

World Journal of Advanced Research and Reviews, 2024, 21(03), 1684–1687

Publication history: Received on 27 January 2024; revised on 09 March 2024; accepted on 11 March 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.21.3.0751>

### Abstract

Emphysematous cystitis, a rare entity within the spectrum of urinary tract infections, poses a crucial diagnostic challenge, particularly when it occurs in diabetic patients [1]. Here, we present the case of a 74-year-old man with type 2 diabetes and chronic tobacco use, who was admitted to the emergency room for right lower back pain associated with dysuria in a febrile context. This condition, characterized by the presence of gas in the bladder and/or its wall, is often associated with aero-anaerobic microbial fermentation, placing diabetic patients in a high-risk category.

The physiopathological complexity of emphysematous cystitis underscores the importance of understanding the underlying mechanisms of this condition, particularly in individuals with risk factors such as diabetes and smoking. In the current clinical context, where the prevalence of diabetes is constantly rising, the rapid recognition of these atypical manifestations becomes imperative for appropriate management.

This specific case, though uncommon, highlights the necessity of increased vigilance among diabetic patients presenting with urinary symptoms, thus emphasizing the importance of a proactive clinical approach. A thorough examination of this case provides an opportunity to explore the links between diabetes, smoking, and emphysematous cystitis, enriching our understanding of the risk factors and physiopathological mechanisms associated with this rare clinical entity.

**Keywords:** Emphysematous cystitis; Uretero-hydronephrosis; Pyelonephritis; Diabetes

### 1. Introduction

Emphysematous cystitis, a rare entity within the spectrum of urinary tract infections, poses a crucial diagnostic challenge, particularly when it occurs in diabetic patients [1]. Here, we present the case of a 74-year-old man with type 2 diabetes and chronic tobacco use, who was admitted to the emergency room for right lower back pain associated with dysuria in a febrile context. This condition, characterized by the presence of gas in the bladder and/or its wall, is often associated with aero-anaerobic microbial fermentation, placing diabetic patients in a high-risk category.

### 2. Presentation of the Case

The patient, stable hemodynamically and respiratorily, presented with right-sided flank pain accompanied by dysuria and a fever of 38.5°C. Clinical examination revealed hypogastric tenderness upon palpation of the right flank. Digital rectal examination showed a 40g prostate, which was supple and not painful. Laboratory results indicated a hemoglobin level of 12, a white blood cell count of 12200, a CRP level of 145, with normal renal function. Abdominal CT scan revealed right-sided ureterohydronephrosis and features of pneumobladder.

\* Corresponding author: Reda Mdafar



**Figure 1** Axial CT scan through the pelvic level in spontaneous contrast, revealing a bladder with spontaneously dense hematogenous content. A urinary catheter is present within, and the bladder wall shows multiple air bubbles, indicative of emphysematous cystitis



**Figure 2** Coronal CT scan through the pelvic level in spontaneous contrast, revealing a bladder with spontaneously dense hematogenous content. A urinary catheter is present within, and the bladder wall shows multiple air bubbles, indicative of emphysematous cystitis.



**Figure 2** Axial CT scan through the abdominal region in spontaneous contrast, demonstrating right-sided pyelocalyceal dilatation.

### 2.1. Recommended Course of Action

Faced with these results, the decision was made to start antibiotic treatment and carry out a bladder catheterization. The patient showed clinical and biological improvement under this treatment.

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## 3. Discussion

Emphysematous cystitis, although uncommon, holds significant clinical importance, especially in diabetic patients [2]. The pathophysiology of this condition is associated with anaerobic microbial fermentation, typically induced by bacteria such as *Escherichia coli* [3,4]. The production of gas within the bladder lumen and/or wall leads to the characteristic pneumaturia observed in these cases.

The coexistence of type 2 diabetes and chronic smoking in our patient raises questions about the potential role of these factors in the development of emphysematous cystitis. Previous studies have established an association between poorly controlled diabetes and bladder neuropathy, thereby creating a favorable environment for bacterial proliferation. Additionally, smoking may compromise immune function, thereby increasing the risk of urinary infections and potentially complications such as emphysematous cystitis.

Literature review suggests that emphysematous cystitis is more common in diabetic women, with an average age of incidence around 70 years. Although our patient is male, this unusual presentation underscores the need for particular attention to individual risk factors.

The prompt treatment instituted, combining appropriate antibiotic therapy and bladder drainage, has demonstrated its efficacy in the clinical and biological improvement of the patient. The positive outcomes underscore the crucial importance of early management to avoid potential complications associated with emphysematous cystitis [5].

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## 4. Conclusion

In conclusion, this case of emphysematous cystitis in a 74-year-old diabetic patient highlights the importance of considering this rare condition in the diagnostic approach to atypical urinary infections. The complex pathophysiology, often associated with comorbidities such as diabetes and smoking, requires a multidisciplinary approach to ensure accurate diagnosis and appropriate management. The encouraging outcomes of this case reinforce the crucial importance of prompt intervention, involving targeted antibiotics and bladder drainage, to ensure a favorable patient outcome.

## **Compliance with ethical standards**

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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