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CASE REPORT

Emphysematous cystitis in an elderly female patient after surgery

Cistite enfisematosa em paciente idosa após cirurgia

Cistitis enfisematosa en paciente anciana después de una cirugía

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ABSTRACT

Objectives: To report the case of a non-diabetic patient with emphysematous cystitis. **Case description:** The following description was approved by the REC from UNIPAMPA registered under the n° 3.459.252. Non-diabetic, 82 year-old female patient, who had undergone a surgical procedure. Findings in image tests associated with culture and laboratory tests directed her diagnosis to emphysematous cystitis. Conservative management was carried out and the patient was discharged after seven days of antibiotic therapy. **Conclusion:** Emphysematous cystitis is a differential diagnosis that requires a high level of clinical suspicion in non-diabetic patients and the use of imaging methods is essential for its achievement.

Keywords: *Cystitis; Urinary Tract Infection; Klebsiella pneumoniae; Diabetes Mellitus.*

RESUMO

Objetivo: Relatar o caso de uma paciente não diabética com cistite enfisematosa. **Descrição do caso:** A seguinte descrição foi aprovada pelo CEP da UNIPAMPA conforme parecer n° 3.459.252. Paciente feminina, 82 anos, não diabética, que havia realizado procedimento cirúrgico. Achados em exames de imagem associados à cultura e exames laboratoriais direcionaram o diagnóstico para cistite enfisematosa. Foi realizado manejo conservador com antibioticoterapia com boa evolução. **Conclusão:** A cistite enfisematosa é um diagnóstico diferencial que requer alto nível de suspeição em pacientes não diabéticos, sendo o uso de métodos de imagem essencial para a sua realização.

Descritores: *Cistite; Infecção do Trato Urinário; Klebsiella pneumonia; Diabetes Mellitus;*

RESUMEN

Objetivos: Reportar el caso de una paciente no diabética con cistitis enfisematosa. **Descripción del caso:**

La siguiente descripción fue aprobada por el CEI de la UNIPAMPA según parecer n° 3.459.252. Paciente femenina de ochenta y dos años, no diabética, que había realizado un procedimiento quirúrgico. Evidencias encontradas en los exámenes de imagen asociados a cultivos y exámenes de laboratorio direccionaron el diagnóstico a Cistitis enfisematosa. Fue realizado el manejo conservador con antibioticoterapia con buena evolución. **Conclusión:** Cistitis enfisematosa es un diagnóstico diferencial que requiere un alto nivel de sospecha clínica en pacientes no diabéticos, siendo el uso de métodos de imagen esencial para su realización.

Palabras clave: *Cistitis; Infecciones Urinarias; Klebsiella pneumoniae; Diabetes Mellitus.*

INTRODUCTION

Emphysematous cystitis (EC) is a rare differential diagnosis to urinary tract infections (UTI) that is caused by gas-producing bacteria, especially *E. coli* e *K. pneumoniae*.[1-,3] Often times, the disease has unspecific clinical features, sometimes can develop with abdominal pain, hematuria and fever.[1-4] The progression to death is a rare outcome, however, it can move to the upper urinary tract, which increases mortality[1-4] It is a disease that commonly affects patients with diabetes mellitus (DM), and it is less common in patients lacking this comorbidity. [1,2,4]

This study reports the case of a non-diabetic patient with EC, whose diagnosis was only possible due to a high level of suspicion from the clinical team together with the use of imaging tests.

CASE REPORT

The description of the following case was approved by the Research Ethics Committee from the *Universidade Federal do Pampa*, registered under the number 3.459.252. It is a descriptive study in which successive anamneses were carried out with the patient, in addition to a retrospective search of the disease's history using existing records in the hospital files.

In January 2019, an 82 year-old female patient, with hypertension and previous use of methyldopa, hydrochlorothiazide, acetylsalicylic acid, simvastatin and nimodipine was assisted at the *Hospital Regional Terezinha Gaio Basso* in São Miguel do Oeste, Santa Catarina State, Brazil. She reported recent regular use of benzodiazepine as well as recurrent use of anti-inflammatory and opioids due to chronic pain.

The patient had previously been admitted to the hospital for the treatment of adynamic ileus caused by acute kidney insufficiency. She returned complaining of constipation and abdominal pain. On that occasion, she was admitted for an evaluation and later submitted to an exploratory laparotomy, in which strangulated hernias and a large amount of inflammatory liquid were found in the abdominal cavity. She was discharged from the hospital after three days of admission and was advised to return after seven days for an evaluation. She returned earlier than scheduled due to complaints of diarrhea, dysuria and hematuria. Physical examination revealed lack of fever, eupneic breathing, normal skin color, vital signs not altered and the patient denied any other symptoms.

Due to the recent laparotomy, the patient was subjected to a computerized tomography (CT) scan of the abdomen, which revealed the presence of gas outlining the urinary bladder walls (Figure 1), raising a suspicion of a possible EC. Samples were collected for a urine culture test and an empirical treatment with meropenem was initiated, in addition to relief urinary catheterization every four hours.

Figure 1. Gas outlining vesicle walls.

The laboratory tests evidenced normal values of K^+, Na^+ e Cl^-, leukocytosis of 14,000/mm³ without the presence of banded neutrophils and a regular urine test showing 49 leukocytes/field, > 100 red cells/field, intense bacteriuria and was negative for nitrites. The urine culture test was positive for *Klebsiella pneumoniae* with an antibiogram profile showing resistance to ampicillin/sulbactam, ampicillin, levofloxacin, norfloxacin, sulfamethoxazole/trimethoprim, nitrofurantoin, cephalothin and cefoxitin. After completing a seven-day antibiotic treatment with meropenem, a control CT scan was performed and it showed resolution of the clinical condition with a gradual improvement.

DISCUSSION

EC mostly affects female patients (2:1) in the age group 60-70 years.[4,5] DM seems to have a crucial role in the disease development in most of the cases. However, the disease is also associated with obstructions that predispose individuals to urinary stasis, neurogenic bladder and recurrent UTI.[4,6,7]

EC clinical presentation can be quite diverse. Patients can be asymptomatic or present a myriad of symp-

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toms such as abdominal pain (80% of patients), hematuria (60%), acute cystitis symptoms (50%), pneumaturia (26.7%) and urinary retention (10%).[1-4] Fever is a symptom suggestive of disease evolution towards a pyelonephritis, although 30 to 50% of the patients can present a fever without having evolved to severe conditions.[4]

Gas formation can be derived from multiple factors. It is known that the high availability of glucose in the tissues provides a favorable environment for carbon dioxide production by fermenting organisms.[2,5] On the other hand, in non-diabetic patients, microorganisms can use either albumin or lactose to carry out the fermentation process.[2,3,5] The most accepted theory is that an increase in glycemia, associated to a reduced tissue perfusion induce the anaerobic metabolism of bacteria, leading to glucose fermentation and gas production.[10,11]

Many organisms can cause EC, especially *E. coli*, which may be responsible for up to 60% of the cases and *K. pneumoniae* that is identified in 10-20% of them.[2,4,7] Other pathogens that can be involved in EC are: *Proteus mirabilis*, *Enterobacter*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and fungi such as *Candida* and *Aspergillus fumigatus*.[4,8]

Due to unspecific or non-existing symptoms, the use of radiology resources may be necessary for the diagnosis of EC.[4,9] Abdominal radiography is the most commonly used method in the diagnosis of EC, but the CT scan is more sensitive and allows a better assessment of the severity of the infectious process and the presence of other sources of gas in the pelvis.[4,5,9] The performance of a urine culture test and antimicrobial susceptibility testing is paramount for the identification of the pathogen causing the disease and the appropriate antibiotic therapy selection. In addition to this, a hemoculture test should also be performed because up to 50% of the patients present bacteremia.[2,4]

The treatment recommended for EC is variable and it depends on the severity level of impairment. It is usually based on the tripod of parenteral antibiotic therapy, relief urinary catheterization and rigorous glycemia control and precipitating factors.[4,8,9] Patients not responding to the initial care or those who present severe necrotic infections need surgical interventions, which will depend on the severity of the disease spectrum.[4,5,7,8]

CONCLUSION

EC is a disease that requires a high level of clinical suspicion in order to be diagnosed correctly, being considered an important differential diagnosis. Cases such as the one reported in the present study demonstrate that factors other than DM can be responsible for the presence of this kind of complicated UTI and should lead to the consideration of a possible EC in patients with urinary symptoms that have recently been hospitalized. Although complicated cases present a higher mortality rate, early detection and intervention allow a better prognosis of the pathology.

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AUTHORS' CONTRIBUTIONS

Guilherme Luiz Domeneghini e Priscila Rodrigues Garrido Bratkowski participated in study conception and drafted the manuscript;

Luciana de Souza Nunes e **Débora Nunes Mário Saraçol** participated in study design and planning, review and approval of the final version of the manuscript; All authors reviewed the results and approved the final version of the manuscript and are responsible for all aspects of the study, and agreed to be accountable for its accuracy and integrity.