

**Case Report****Emphysematous cystitis of the diabetic patient**Affes Nejmeddine<sup>1</sup>, Bahloul Atef<sup>2</sup>, Dammak Youssef<sup>1</sup>, Beyrouti Ramez<sup>1</sup>, Beyrouti Mohamed Issam<sup>1</sup>1Departments of General Surgery, and 2Urologic Surgery  
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**Background:** Emphysematous cystitis is defined by the presence of gas in the urinary bladder wall. It complicates urinary tract infections especially in diabetic patients. **Aims:** We present a case of emphysematous cystitis in a diabetic patient with a poor glycemia control and we discuss diagnostics and treatment items of this uncommon and serious infection. **Methods and Results:** A 45-year-old man was admitted to the emergency department with confusion and abdominal pain. The clinical examination found a septic shock the Ultra-sonography (US) showed a cholecystitis the patient was operated without amelioration. A post operative pelvic computed tomography (CT) demonstrated intramural gas in the urinary bladder, which suggested a diagnosis of emphysematous cystitis. The treatment was based on an antibiotics associated with a bladder drainage. The evolution was in favor. **Conclusion:** Every diabetic patient with a urinary tract infection who seems to be severely ill should have an abdominal X-ray as a minimal screening tool to detect emphysematous complications. (Nejmeddine A, Atef B, Youssef D, Ramez B, Issam BM. Emphysematous cystitis of the diabetic patient. *North Am J Med Sci* 2009; 1: 114-116).

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**Introduction**

Emphysematous cystitis, described for the first time by Keyes in 1882 [1], is an uncommon but severe infection of the bladder characterized by gas within the wall and the lumen of the bladder. The condition is seen most commonly in patients with hyperglycemia, the organism recovered from the urine usually being *Escherichia coli* or *Enterobacter aerogenes*. The diagnosis of emphysematous cystitis is more often radiographic. Early management is essential and includes bladder drainage, intravenous antibiotics and Diabetes stabilization.

**Case Report**

A 45 year old diabetic male patient who has been taking oral antidiabetic medications for 12 years and is followed because of schizophrenia was admitted to the resuscitation department because of septic shock. On examination, the patient was obtunded, the temperature was 39.5°C with tachycardia and a general abdominal tenderness. The laboratory test showed a hyperleucocytosis (23000), glycaemia (44 mmol/l), acetonuria (+), glycosuria (+++), and creatinemia (300 µmol/l). Abdominal echography revealed a slack alithiasic gallbladder with a 5 mm thick laminated wall, a hydatid cyst of the VII segment, 6 cm in diameter and non-complicated type I. The diagnosis of a complicated alithiasic cholecystitis due to the septic shock was retained, and the patient was operated upon. A swollen gall bladder and an enlarged liver were found. The hydatid cyst was of a non-complicated type I. Cholecystectomy was performed and followed by resection of the cyst covering dome.

In spite of the post-operative antibiotic therapy (Cefotaxime and Gentamicin), the patient remained

subfebrile and developed an excessive tenderness in the hypogastrum area and retention of urine. When examining the genitals, crepitants at the base of his penis was found. A CT scan delineated a distended bladder with circumferential intramural air and intravesical air-fluid level (Fig.1).



**Fig. 1** CT shows a hydroaeric level and a pneumo bladder with air bubbles at the level of the vesical wall.

A vesical probe was inserted and the urine obtained was turbid and haematic. We also noted pneumaturia, and the urine cystobiological tests revealed klebsilla pneumonia. The haemaculturs were negative. The patient was treated with imipenem and metronidazole, and had urine drained via a vesical probe. His diabetes was stabilized and the

condition was improved. A CT scan performed after 15 day of antibiotic therapy showed a normal bladder and free of the emphysematous cystitis (Fig.2). The vesicle probe was removed after 21 days. After a decline in 18 months, the patient presented well without recurrence.



**Fig. 2** Computed tomography (CT) of control, (with vesical probes) disappearance of the air images.

## Discussion

Emphysematous cystitis is a rare disease mostly in the patients in their late fifties. It is twice as frequent in women as in men [2]. It occurs mainly in the elderly with poorly controlled diabetes. Other predisposing factors include the presence of a post-micturition residue or chronic retention (neurogenic bladder, diabetic, prostatic or urethral obstacle), presence of renal transplantation, renal infarction, systemic lupus, immunodepression due to long-term corticotherapy or immunosuppressors such as cyclophosphamides well-known for their vesical toxicity [3-6], the occurrence of postoperative emphysematous cystitis following endoscopic urologic procedures or colic surgery have been reported in the literature [5,7].

The culprits are strict anaerobic germs such as *Clostridium Perfringens*, which rarely affect the urinary tract, and therefore, are rarely incriminated in emphysematous cystitis. Emphysematous cystitis often occurs after an infection by aerobic anaerobic optimal germs (*Escherichia Coli*, *Enterobacter ariginosa*, *Klebsiella pneumoniae*, *Proteus Mirabilis*, *Staphylococcus aureus*, *Streptococci*) [3, 4, 8]. *Escherichia coli* are often involved in the emphysematous cystitis. This germ was isolated in 60% to 70% of the cases. Cases with emphysematous cystitis due to candida albicans have already been reported [2, 5]. The anaerobic germ is not found in haemocultures, because bacteriological research does not include a systematic use of anaerobic culture. In our case, the germ was not isolated because the infection was cleaned and because the anaerobic germ culture was difficult. Carbon dioxide (CO<sub>2</sub>) is the gas found in the vesical light and/or the wall. It results from the bacterial glucid fermentation and testifies to bacterial breathing in anaerobiosis. CO<sub>2</sub> producing germs attack not only the glucose that is present in the

urine of the diabetics, which causes air to appear in the bladder cavity, but also the glucose contained in the bladder parietal cells, which causes CO<sub>2</sub> bubbles to appear inside the very vesical wall.

The clinical findings do not always lead to the correct diagnosis, an ordinary cystitis is often suspected especially when treating a female patient. The existence of an anomaly obstacle on the lower tract can generate a tympanic vesical sphere and crepitants on percussion. However, this is not always conclusive especially on a tender hypogastrium. Fever is most often moderate. An exacerbation of the general health and mental confusion can lead to the right diagnosis as in the case ender study. In approximate one third of the cases, pneumaturia shows the presence of air in the vesical cavity. The clinical examination thus remains non-specific in the majority of cases and amounts to a urinary infection with pain on micturition and a supra pubis sensibility or a vesical sphere [4]. In addition to pyuria a haematuria, the urinalysis usually shows glycosuria and/or acetonuria [2]. Laboratory evaluation revealed a clear inflammatory syndrome. Cystoscopy showed an inflammatory or necrotic aspect and air bubbles under the mucous membranes as if the cystoscopy were performed in champagne [5]. Emphysematous cystitises associated with more extended urologic attacks together with the emphysematous ureteritis and emphysematous pyelonephritis or emphysematous prostates have been reported [5].

The diagnosis of emphysematous cystitis is confirmed more often by the radiography. Therefore, radiography remains a cornerstone of positive and specific diagnosis of emphysematous cystitis. In view of the insights gained in a reclining patient, radiography without previous preparation of the abdomen shows a radiotransparent ring on the pelvis area, a pneumo bladder (edge clearly confirmed to the detrusor and dissecting the vesical wall) and a hydroaeric pelvic level [6, 9, 10]. The differential diagnosis is done with primitive pneumaturia defined by the presence of gas in the bladder and with or without passage into the urethra and, particularly, the communication of the bladder with hollow organs. The vesico digestive fistulas (colic or grelic) can be diagnosed using the radiological digestive and vesical opacifications.

Treatment is based on three fundamental therapeutic principles: (1) drainage of the bladder using a transurethral probe or by supra pubic drain which removes the infected urine and gas; (2) taking samples and culturing the urine allows the institution of broad spectrum antibiotic treatment, which will be adapted by the data obtained. Initially the antibiotic therapy will be managed parenterally then replaced by oral medication to consolidate treatment. Occasionally, the haemocultures isolate the same germ whose sensitivity to antibiotics must be tested; (3) diabetes stabilization is necessary both for monitoring the condition and breaking the vicious circle the patient may find himself in. Hyperbasic oxygen treatment is not a standardized therapy attitude in this type of pathology, but it was associated with a clear clinical improvement [2-4].

The prognosis of emphysematous cystitis can be rather serious due to the therapeutic failures which can occur when there is an ignorance of the physiopathological mechanisms of emphysematous cystitis.

Actually, the prognosis in the case of emphysematous cystitis remains good provided that it is diagnosed in time and that an effective treatment is started without any delay. In the event of serious sepsis, the disease can evolve into the complications of emphysematous cystitis such as necrosis cystitis, emphysematous pyelonephritis, and despite antibiotic therapy, resuscitation and urine aspiration [5-7].

In summary, the emphysematous cystitis is a disease often occurring in the patients with poorly controlled diabetes. It most often results from an infection with either aerobic or anaerobic germs. The clinical picture remains non-specific in the majority of cases and amounts to a urinary infection. The diagnosis of emphysematous cystitis is often fortuitous and radiographic. The scanner is the examination of choice. Treatment of emphysematous cystitis is bladder drainage and an individualised antibiotic treatment plan.

## References

- 1 Keyes EL. Pneumatouria. *Med News*. 1882; 14: 675-678.
- 2 Katz DS, Aksoy E, Cunha BA. Clostridium perfringens emphysematous cystitis. *Urology* 1993 ; 41 : 458-460.
- 3 Barkia A, Larbi N, Mnif A, Chebil M, Ayed M. Cystite emphysemateuse: à propos de 2 cas *Prog Urol*. 1997;7:468-470.
- 4 Bracq A, Fourmarier M, Bourgninaud O. Cystite emphysemateuse compliquée de perforation vésicale : diagnostic et traitement d'une observation rare. *Prog Urol*. 2004;14:87-89.
- 5 Van Glabeke E, Obadia E, Dessolle L, Pallot JL, Marc F, Bacques O. Cystite emphysemateuse compliquant une hystérectomie totale non conservatrice pour cancer de l'ovaire. *Prog. Urol*. 2004 ; 14 : 221-223.
- 6 Raschilas F, Pierrot-Deseilligny C, Pouchot J, Sebag A, Vinceneux P. Emphysematous cystitis. *Rev Med Interne*. 2004;25:160-161.
- 7 Ebe T, Oshima H, Takeda N, Matsumoto T. Emphysematous cystitis developed in a patient with an eating disorder and schizophrenia. *J Infect*. 2003; 47:260-261.
- 8 Wayland JS, Kiviat MD. Clostridial cystitis emphysematosa. *Urology*. 1974; 4: 601-602.
- 9 Su YC, Chen CC. Emphysematous cystitis complicating klebsiella pneumoniae liver abscess. *Am J Emerg Med*. 2006; 24:256-257
- 10 O'Connor LA, De Guzman J. Emphysematous cystitis: A radiographic diagnostic. *Am J Emerg Med*. 2001; 19: 211-213.