CASE REPORT

Emphysematous cystitis-gas in bladder: a rare urological emergency

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SUMMARY

Emphysematous cystitis is an unusual inflammatory condition characterised by the presence of air within the bladder wall and lumen. It is usually seen in patients with diabetes, and in those with long-term catheterisation or of immunocompromised status. Its presentation varies from asymptomatic to frank urosepsis. It is diagnosed after radiological studies. Treatment requires establishment of prompt urinary drainage, antibiotic coverage and correction of offending factors, if any. We report a case of 41-year-old, non-diabetic, otherwise healthy woman presenting with lower urinary tract symptoms with pneumaturia, which was managed conservatively. A review of the recent literature is also presented.

BACKGROUND

Emphysematous cystitis is an entity described as diffuse inflammation of bladder wall with presence of intramural air, with or without intraluminal air, primarily caused by gas from bacteria.¹ Half of the cases are associated with diabetes. It is less fatal initially as compared to emphysematous pyelitis or pyelonephritis, however, it may progress rapidly to later conditions, increasing the morbidity.² The presentation may be atypical and contrary to the degree of inflammation, and patients may present with subtle clinical findings. Diagnosis is suspected after radiological work up. Early diagnosis and treatment renders the condition under control.

CASE PRESENTATION

A 41-year-old woman presented with a 10-day history of fever, dysuria, pneumaturia and increasing haematuria. She was otherwise normal with no history of previous episodes, diabetes, recent instrumentation, voiding difficulties or altered bowel habits. She was initially treated with oral antibiotics on an outpatient basis, with only modest relief and was subsequently admitted to hospital.

INVESTIGATIONS

Routine investigations showed raised total leucocyte count and normal creatinine and sugar level. Ultrasonography of the abdomen showed hyperechoic bladder wall with thickness of 6.5 mm, with no evidence of calculi or hydronephrosis (figure 1). Contrast-enhanced CT (CECT) of the abdomen and pelvis revealed presence of both intraluminal and intramural air with diffuse bladder wall thickening, with preserved upper tracts (figure 2). Copious amounts of pus cells and bacteria were

Figure 1 Ultrasound showing high echogenicity along the bladder wall.

found on urine microscopy. Growth of *Escherichia coli* was demonstrated on urine culture.

DIFFERENTIAL DIAGNOSIS

Enterovesical fistula; however, features were not demonstrated on CECT of the abdomen.

TREATMENT

The patient was catheterised periurethrally and put on intravenous antibiotics, which were altered in accordance with the culture report. Strict glycaemic control was ensured and renal functions were observed. The catheter was removed after 7 days and the patient was switched to oral antibiotics for two more weeks.

OUTCOME AND FOLLOW-UP

The patient responded well to treatment with resolution of symptoms after 4 days. After 3 weeks,

Figure 2 Contrast-enhanced CT of the abdomen showing presence of intramural as well as intraluminal air.

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urine culture was sterile and follow-up ultrasound showed resolution of bladder wall changes, including thickness of 4.5 mm. No recurrence of symptoms was found during a 6-month follow-up period.

DISCUSSION

Emphysematous cystitis is a rare condition characterised by the presence of air within the bladder wall and lumen. It is mostly of infectious origin, however, a few reports of incidence following chemical cystitis have also been described.³ Causative organisms include gram negative uropathogens such as *E. coli* in around 50–60% case and *Klebsiella* in about 20%, other less often found organisms are proteus and *Staphylococcus*.¹ The pathogenesis of the condition is not well defined. Gases present in the bladder are generally carbon dioxide, nitrogen, hydrogen and methane. Risk factors for disease are diabetes, chronic illness, prolonged catheterisation, neurogenic bladder, bladder outlet obstruction and an immunocompromised state.⁴ However, in our case, the patient was a non-diabetic middle-aged woman with none of the risk factors mentioned above, and overall good health status and prior normal voiding, which is a rare finding.

The disease affects women more often than men in a ratio of 2:1. The median age is around 66 years.⁵ Presentation varies from fever, vague abdominal pain and diarrhoea, to frank urinary symptoms such as dysuria, burning micturition, haematuria and, less often, pneumaturia, rarely leading to urosepsis. In our case, the patient had a history of pneumaturia and developed urosepsis. A high index of suspicion is required for diagnosis. Ultrasound is usually the initial investigation performed; diffuse bladder wall thickening with high echogenicity can be seen along the bladder wall. Air in the bladder can be detected on plain X-ray film as a rim of radiolucency in the pelvis. CECT is the investigation of choice, which can clearly demonstrate intramural and intraluminal gas with bladder thickening, and can also rule other pathologies such as enterovesical fistula.⁴ Recently, fluorodeoxyglucose positron emission tomography CT has also been shown to detect the gas within the bladder wall effectively.⁶

Treatment includes adequate bladder drainage, broad spectrum antibiotic coverage as per culture and sensitivity, strict glycaemic control and management of precipitating factors and comorbid conditions.⁷ In most cases, recovery is good and no

long term effects on bladder function are noticed. In severe refractory cases, surgical exploration with bladder wall debridement, and partial or total cystectomy, may be required. Past literature reports requirement of surgery in 10% of cases, however, current studies favour conservative management for successful outcome.

Learning points

- Emphysematous cystitis is a rare infectious condition with presence of air in bladder wall and lumen.
- Risk factors include diabetes, neurogenic bladder, instrumentation and an immunosuppressed state.
- It usually presents in old age, with a female predominance of 2:1.
- Contrast-enhanced CT is the investigation of choice.
- Early diagnosis and treatment are key for a good outcome, and care includes adequate bladder drainage, antibiotics and strict glycaemic control.

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