

## Bladder A-lines as a sonographic clue to emphysematous cystitis

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### **Introduction:**

Emphysematous cystitis is a potentially fatal complication of acute urinary tract infection, with a reported mortality rate of 7%-10%. It predominantly affects elderly patients with poorly controlled diabetes and can progress to emphysematous pyelonephritis or require surgical intervention. Early recognition and initiation of antibiotics are crucial for favorable outcomes.

### **Case Presentation:**

A 79-year-old woman with a history of poorly controlled type 2 diabetes mellitus (HbA1c 79 mmol/mol), chronic kidney disease (stage 4), hypertension, and left ventricular systolic dysfunction (EF 37%) presented with fever, dysuria, lower abdominal pain, and vomiting for three days. She was febrile, tachycardic (100 bpm), hypotensive (BP 100/50 mmHg), and had suprapubic tenderness. Initial venous blood gas revealed a lactate of 3 mmol/l and a base excess of -4.

Point-of-care ultrasound performed in the emergency department revealed A-lines within the bladder wall, loss of well-defined bladder borders, and sedimentation. These findings raised concern for emphysematous cystitis, which was subsequently confirmed on CT scan, showing intramural gas locules. The patient was managed according to sepsis guidelines with intravenous antibiotics and fluids, leading to hemodynamic stabilization and admission under the urology team.

### **Conclusion:**

This is one of the first case reports from an emergency department that has demonstrated A-lines in the bladder wall, in a confirmed case of emphysematous cystitis.

A-lines were originally described in thoracic ultrasound literature as horizontal, equidistant air reverberation artefacts. Previously, abdominal A-lines have been used to diagnose pneumoperitoneum.

In this rare case, localized A-lines in the bladder wall with dirty shadowing artefact of bladder wall on point-of-care ultrasonography, with associated sonographic (such as sedimentation and debris within the bladder) and clinical signs of cystitis raised the suspicion of emphysematous cystitis. This led to prompt treatment with antibiotics and early definitive imaging.