Emphysematous cystitis
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Section: Uroradiology & genital male imaging
Imaging Technique: Digital radiography
Imaging Technique: CT
Imaging Technique: Digital radiography
Case Type: Clinical Cases
Authors: González F, Ruiz P, Landeras R, Piedra T, Juanco C
Patient: 71 years, female

Clinical History:
Insulin-dependent diabetes mellitus patient referred from emergency room for acute abdominal pain with suspicion for appendicitis.

Imaging Findings:
The patient, with insulin-dependent diabetes mellitus, reported a 3 days history of nausea, vomiting, dysuria, and diffuse abdominal pain. She had no fever, pulse was 81 beats/min, respiratory rate was 22 breaths/min, and blood pressure was 180/70 mm Hg. The abdomen was diffusely tender to palpation, especially in the lower abdomen, with moderate rebound. The suspected diagnosis was acute appendicitis. A plain abdominal film and a CT scan were performed.

Conventional radiography showed curvilinear or mottled areas of increased radiolucency in the region of the urinary bladder, separate from more posterior rectal gas. Based on plain film findings the diagnosis of emphysematous cystitis was considered.

Conventional CT and CT cystography were performed to confirm the diagnosis and to exclude bladder rupture. She was started on intravenous ciprofloxacin on day 1 with close monitoring by medical, urologic, and surgical departments. She showed significant improvement of abdominal and flank pain and all symptoms almost completely resolved after 5 days.

Discussion:
Emphysematous cystitis is a rare form of acute inflammation of the bladder mucosa and underlying musculature. Clinical symptoms of dysuria, increased urinary frequency, and hematuria are common but sometimes it presents as an unspecific acute abdomen. The presence of pneumaturia is a rare, although more specific, clinical finding.

Underlying diabetes mellitus is present in over half of reported cases, with women being affected twice as often as men. Other predisposing conditions include chronic urinary tract infections, bladder outlet obstruction, and a neurogenic bladder.

Frequently isolated gas-producing bacteria include Escherichia Coli and Enterobacter Aerogens, although Clostridia and fungal species are occasionally identified.

Conventional radiography of emphysematous cystitis is nearly pathognomonic, when it shows curvilinear or mottled areas of increased radiolucency in the region of the urinary bladder, separate from more posterior rectal gas.

Intraluminal gas will be seen as an air-fluid level that changes with patient position, and, when adjacent to the nondependent mucosal surface, may have a cobblestone or “beaded necklace” appearance. This finding reflects the irregular thickening produced by submucosal blebs as seen at direct cystoscopy.

Possible non infectious sources of pelvic air should be considered including recent bladder instrumentation,
vesicocolic or vesicovaginal fistulae, trauma, and pneumatosis cystoides intestinalis. Gas gangrene of the uterus and vaginitis emphysematosa may also be seen in the pelvis, and further anatomic localization may be required (3,4).

Ultrasound (US) will commonly demonstrate diffuse bladder wall thickening and increased echogenicity. Focal regions of high-amplitude echoes with posterior 'dirty' acoustic shadowing into the lumen may be seen in extensive cases.

CT is a highly sensitive examination that allows early detection of intraluminal or intramural gas and is a highly sensitive diagnostic method to depict secondary bladder rupture, and to detect intra or retroperitoneal fluid and gas. It is also useful in evaluating other causes of intraluminal gas such as enteric fistula formation from adjacent bowel carcinoma or inflammatory disease.

CT cystography has been shown to compare favorably with barium enema examination or cystoscopy in identifying a vesicocolic fistula. This procedure is easily performed by retrograde filling of the urinary bladder to capacity, via a Foley catheter, with diluted water-soluble iodinated contrast material (2%–3% weight by volume) followed by contiguous axial imaging through the level of the bladder at 5–7-mm intervals. Early diagnosis is usually done based upon plain film findings and it is fundamental to establish an early and adequate treatment.

Differential Diagnosis List: Emphysematous cystitis

Final Diagnosis: Emphysematous cystitis

References:


Description: Digital radiography of pelvis shows curvilinear areas of increased radiolucency in the region of the urinary bladder. Emphysematous cystitis was diagnosed based upon these findings.

Origin:
Description: Helical unenhanced CT confirms the presence of gas dissecting the bladder wall. There was also intraluminal gas with a fluid-level. Origin:

Description: same as 2a. Origin:
Description: same as 2a. Origin:
Figure 3

*Description:* Plain digital film after filling the urinary bladder in a retrograde manner via a Foley catheter with diluted water-soluble iodinated contrast. Iodinated contrast remains into the bladder lumen without evidence of bladder rupture. *Origin:*
Description: After retrograde filling of the bladder with iodinated contrast, CT confirms the presence of gas dissecting the bladder wall. There was no evidence of a bladder rupture. Origin:

Description: same as 4a. Origin:
**Description:** same as 4a. **Origin:**