Imaging in emphysematous epididymo-orchitis: A rare cause of acute scrotum

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Abstract

Emphysematous epididymo-orchitis is an uncommon, acute inflammatory process of epididymis and testis characterized by the presence of air within the tissue. Patient presents with fever, acute pain, swelling and tenderness in the scrotum. Imaging is needed for rapid accurate diagnosis and to differentiate it from other causes of acute scrotum such as testicular torsion. We report a case of emphysematous epididymo-orchitis with imaging findings on plain radiography, ultrasound, CT and MRI and a brief review of the literature.

Key words: Acute scrotum, computed tomography; emphysematous epididymo-orchitis; magnetic resonance imaging; ultrasound

Introduction

Emphysematous epididymo-orchitis is defined as an inflammation of epididymis and testis characterized by the presence of air within the tissue. This condition presents clinically as an acute scrotum and is a surgical emergency requiring immediate diagnosis and treatment.[1] A literature search revealed only a few cases reported as emphysematous epididymo-orchitis.[1,2] In this case report, we report imaging findings of emphysematous epididymo-orchitis on plain radiography, ultrasound (USG), computed tomography (CT) and magnetic resonance imaging (MRI).

Case Report

A 51 year old male presented to the emergency department with acute pain, redness, and swelling of the scrotum and fever of eight days duration. The pain and swelling were progressively increasing. There was no history of pyuria or dysuria. He was recently diagnosed with diabetes mellitus.

General physical examination demonstrated an elevated temperature of 101°F and tachycardia. Blood pressure and other vital signs were normal. Initial investigations revealed a random blood sugar of 155 mg/dl, glycosylated hemoglobin of 7.4, leucocyte (WBC) count of 14,800, and a normal serum urea, creatinine and electrolytes. Blood and urine cultures were negative. Clinical examination showed enlarged, inflamed scrotum with erythema of skin overlying the scrotum. Palpation revealed an enlarged, tender right testis and the epididymis was not separately palpable. An abdominal USG (My-LabTM 60 (Esaote, Genoa, Italy) was normal. USG of the scrotum revealed enlarged, ill-defined, hypoechoic right testis and epididymis with multiple linear and punctate bright, highly reflective hyperechoic foci suggestive of gas shadows [Figure 1]. The wall of the scrotal sac also showed linear highly reflective hyperechoic gas shadows on the right side. Left testis was normal and colour Doppler of right testis showed absence of normal testicular parenchymal vascularity [Figure 2]. A plain radiograph of the scrotum showed pockets of radiolucent areas within the soft tissues of the scrotum [Figure 3]. CT

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(Siemens SOMATOM Definition, Germany) and MRI (GE Signa HDx 1.5T MRI, USA) of the abdomen/pelvis and scrotum were obtained to confirm the diagnosis, see the extent of involvement and exclude Fournier's gangrene. CT demonstrated a multi-loculated collection of gas with thin septa in the right testis and epididymis with air fluid levels in the scrotal wall [Figure 4]. MRI of the pelvis and scrotum revealed intraparenchymal air that was hypointense on all sequences in the testis, epididymis and scrotal wall along with the hyperintense septa in right testis, peritesticular collection and thickened scrotal wall [Figure 5]. A diagnosis of right emphysematous epididymo-orchitis with cellulitis of scrotal wall was made and the patient was given intravenous antibiotics and taken up for surgery. Right orchidectomy was performed with surgical debridement and the patient made an uneventful postoperative recovery.

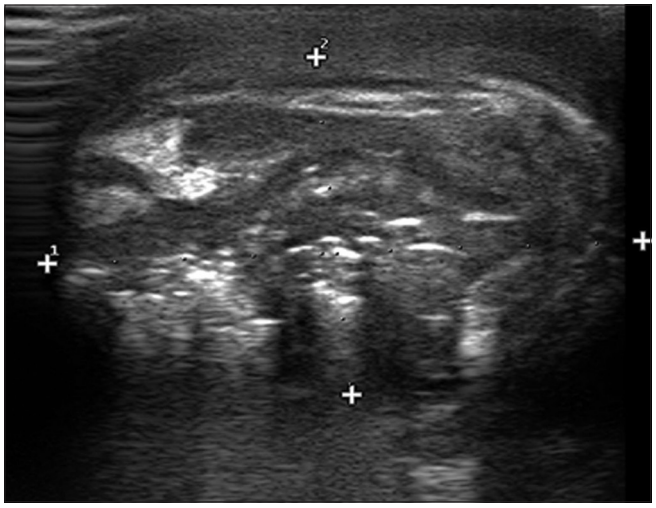

Figure 1: Transverse USG image shows enlarged, ill-defined right testis with multiple linear and punctate bright, highly reflective hyperechoic foci suggestive of intratesticular air

Figure 3: Radiograph of scrotum shows pockets of radiolucent areas (suggesting presence of air) within the soft tissues of scrotum

Discussion

Epididymitis is the most common inflammatory process in the scrotum. The process usually begins in the tail of the epididymis, spreads to the body and head of the epididymis and to the testis.[3] Approximately 20-40% of cases of epididymitis are associated with orchitis, which is thought

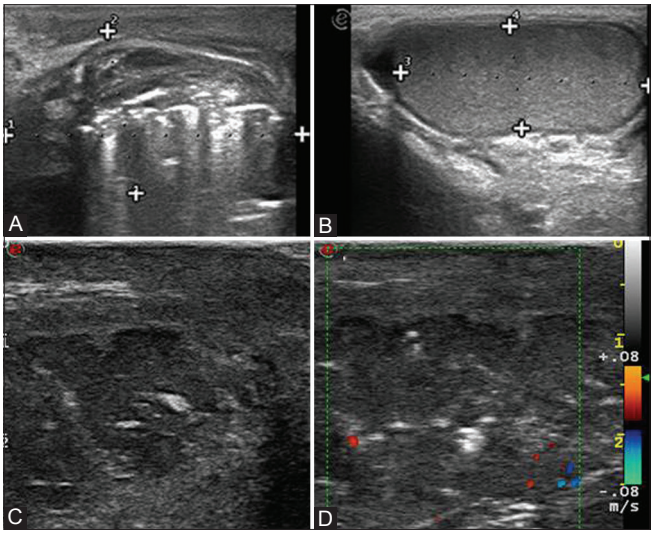

Figure 2 (A-D): (A,C) Transverse USG images shows loss of normal testicular architecture. (B): Normal left testis. (D): USG with color Doppler shows absence of normal testicular parenchymal vascularity

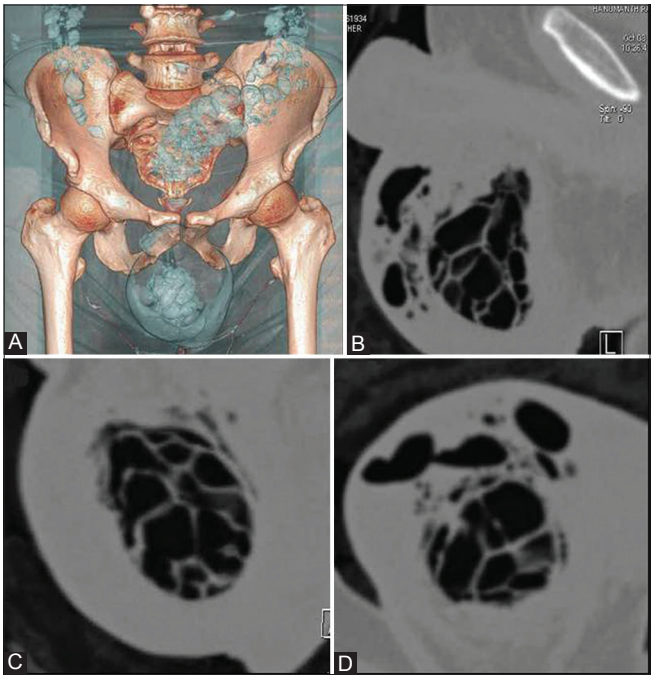

Figure 4 (A-D): Abdominal and scrotal CT MIP reconstruction image shows multiloculated intrascrotal collection of gas identical to that of abdominal bowel gas. (B,C,D): Sagittal and axial scrotal CT images shows multiloculated collection of gas with thin septa in the right testis and epididymis with air fluid levels in scrotal wall

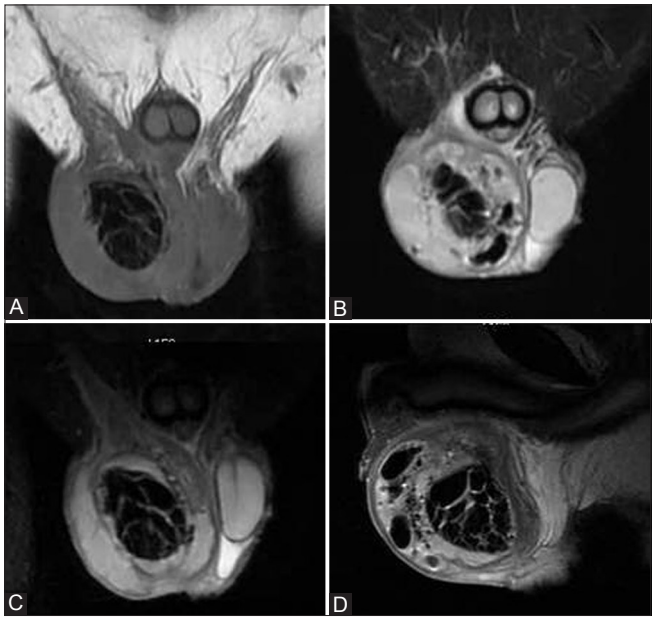

Figure 5 (A-D): Coronal T1W, coronal fat suppressed (STIR), coronal T2W and sagittal T2W MRI images show air in the right testis, epididymis and scrotal wall that is hypointense on all sequences. The hyperintense septa in right testis, peritesticular collection, thickened scrotal wall and normal left testis are also visualised

to be due to direct extension of infection into the testicular parenchyma.[4] Emphysematous epididymo-orchitis is characterized by the presence of air within the tissue. The precise etiology and pathogenesis of this entity is unclear and the incidence reported for this entity in literature consists of only two case reports.[1,2] Review of previous case reports has shown that it may be associated with diabetes mellitus and fulminant infections seen in patients with AIDS.[1,5] The incidence of non-clostridial gas-forming infections in diabetes is more as the presence of high tissue glucose level combined with impaired circulation favour anerobic metabolism by bacteria resulting in gas production in the infected tissue. The most common pathogens sited as possible agents of gas-forming infections are *E. coli*, Klebsiella, Pseudomonas, Streptococci, Staphylococci and bacteriodes, either singularly or in combination and in the majority of cases, mixed organisms were implicated.[6-8]

The most common clinical presentation of emphysematous epididymo-orchitis is that of acute pain, swelling and tenderness in the scrotum associated with fever. Rarely, it may also be associated with dysuria, or pyuria with urethral discharge.

The most commonly used examination to detect and characterize scrotal and intrascrotal anatomy and pathology is ultrasound.[9] USG may show enlargement and/or altered echotexture of the testis and epididymis. Intraparenchymal air seen as focal bright hyperechoic areas with distal acoustic shadowing that can be moved or displaced by transducer pressure suggest the diagnosis of emphysematous epididymo-orchitis.[10] The other differential diagnosis of focal bright hyperechoic areas on USG of the testis includes testicular shrapnel, testicular germ cell neoplasms with calcifications and testicular microlithiasis.[10] Radiography of the scrotum is used very rarely as a first-line imaging technique, but it may be used to demonstrate calcification from old hematomas and tumors.[9] We have noticed that plain radiography is also useful in demonstrating the intrascrotal air in case of emphysematous epididymo-orchitis. CT is a highly sensitive modality to detect the presence of air and confirming the diagnosis in emphysematous epididymo orchitis. A bowel containing scrotal hernia can be differentiated from emphysematous epididymo-orchitis by observing its continuation with the intra abdominal bowel loops apart from displacement of the scrotal structures and bilateral normal appearing testes. CT may not be preferred in young patients because of radiation exposure to gonads and in such cases, MRI can be done. MRI, with its excellent soft tissue resolution can reveal high quality images of the scrotum and it's contents. MRI is also very useful in detecting complications of emphysematous epididymo-orchitis that involve the soft tissues of perineum.

The infection in emphysematous epididymo-orchitis may extend to the skin and superficial layers of the scrotum leading to complications that include cellulitis, which in turn can predispose to the rare and fatal fulminant necrotizing fasciitis of the penis, scrotum and perineum known as Fournier's gangrene.

The differential diagnosis in the initial presentation of acute emphysematous epididymo-orchitis include acute torsion of testis and rarely, a testicular tumor.[1,10] Distinguishing between acute epididymitis and testicular torsion is important because their treatments differ significantly.[11,12]

Early diagnosis, vigorous antibiotic therapy, and prompt orchidectomy with surgical debridement will rapidly relieve the symptoms and prevent complications.

In summary, emphysematous epididymo-orchitis should be considered among the differential diagnoses in patients with acute scrotum having intratesticular focal bright hyperechoic areas with distal acoustic shadowing on USG. It may be followed by CT and/or MRI to confirm the diagnosis and to rule out complications like cellulitis and Fournier's gangrene.

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