Classical Case of Tuberculous Epididymo-orchitis and How to Rule out Differentials on Sonography

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ABSTRACT

Tuberculous infection of the scrotum is rare and occurs in approximately 7% of patients with tuberculosis. With the rise in the human immunodeficiency virus pandemic, the incidence of opportunistic extrapulmonary tuberculosis has correspondingly increased, the genitourinary system being the most common affected site. We present a classical case of tuberculous epididymo-orchitis with clinical, sonographic and histopathological (macro and microscopic) findings as well as the precise management plan incorporated. The sonographic imaging overlap with bacterial epididymo-orchitis, malignant testicular lesions and testicular torsion is discussed. Adequate knowledge of this entity is of utmost importance to ensure a meticulous diagnosis and treatment.

Key words: Anti-tuberculous drug therapy; tuberculous epididymo-orchitis; ultrasonography

Introduction

In the years since the HIV epidemic, reported cases of tuberculosis infection have increased. Extrapulmonary tuberculosis still presents a diagnostic and therapeutic challenge.[1] Clinically, tuberculosis of the scrotum often cannot be distinguished from lesions such as tumor or infarction. Accurate differentiation is, however, important for proper treatment. High-resolution sonography is currently the best technique for imaging the scrotum and its contents.[2]

Case Report

A 64-year-old male patient presented with swelling in right scrotum and mild fever with evening rise for 1-month. He had cough with whitish expectoration for 15 days. On clinical examination, mild tenderness was noted in right scrotal region. Patient was a chronic alcoholic and appeared debilitated. On scrotal sonography, bilateral testis and epididymis appeared diffusely enlarged and heterogeneous in echotexture [Figures 1 and 2]. A 20 mm × 10 mm hypoechoic lesion was noted in the head of right testis [Figures 2b and 3a]. A linear hypoechoic 10 mm band was noted along the line of mediastinum in left testis [Figure 3b]. There was no evidence of hydrocele. As an infective etiology was likely, ultrasonography (USG) thorax was done which showed evidence of left sided syn-pneumonic effusion [Figure 4]. Chest X-ray posteroanterior view showed left sided mild pleural effusion with left upper zone tuberculous infiltrates [Figure 5]. Patient was further diagnosed with sputum positive for tuberculosis, started on anti-tuberculous drug therapy and high inguinal orchidectomy was done. Gross specimen showed chronic granulomatous inflammation with caseous necrosis [Figure 6]. Spermatic cord showed no significant pathology. Histopathology sections [Figure 7a] with hematoxylin and eosin stain showed granulomatous inflammation with caseous necrosis surrounded by epithelioid cells and lymphocytes. Microscopically [Figure 7b], Langhans' giant cells surrounded by lymphocytes and fibroblasts were also noted.

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Discussion

Tuberculous epididymo-orchitis occurs in approximately 7% of patients with tuberculosis.[3] Tuberculosis has become a common opportunistic infection because of the rise in human immunodeficiency virus infection.[4] The incidence of extrapulmonary tuberculosis has correspondingly increased, with the genitourinary system being the most commonly affected site. In male patients, epididymitis is the most common symptom of genitourinary tuberculosis.[5,6] Whether

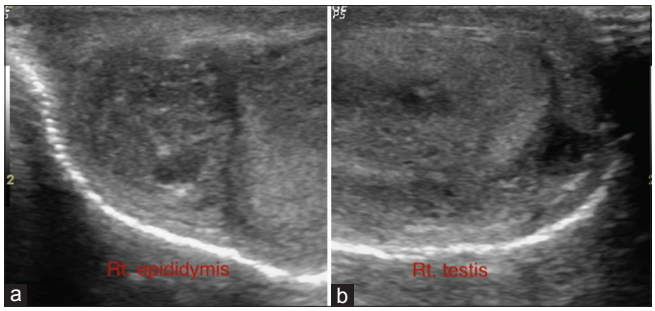

Figure 1: Ultrasonography scrotum: Right epididymis (a) and right testis (b) show enlarged size with heterogeneous echotexture. A hypoechoic ill-defined lesion is noted in the body of the testis. Possibility of infective etiology likely

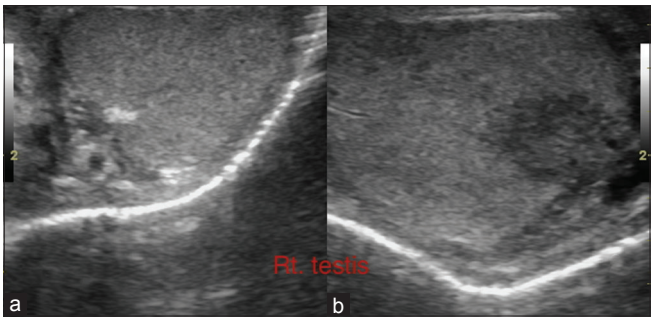

Figure 2: Ultrasonography scrotum: Right testis, oblique (a) and axial (b) sections show heterogeneously enlarged testis with a hypoechoic lesion in the head containing septa. Possibility of infective pathology likely

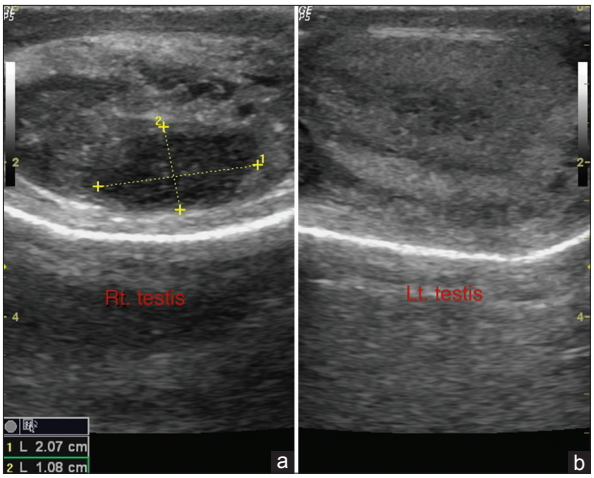

Figure 3: Ultrasonography scrotum: (a) Right testis shows a 20 mm × 10 mm hypoechoic lesion noted in the head. (b) Left testis shows a linear hypoechoic 10 mm band noted along the line of mediastinum. Infective etiology, tuberculosis likely

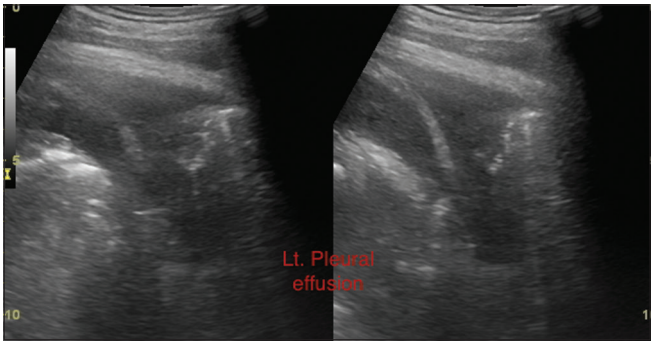

Figure 4: Ultrasonography thorax shows left sided pleural effusion

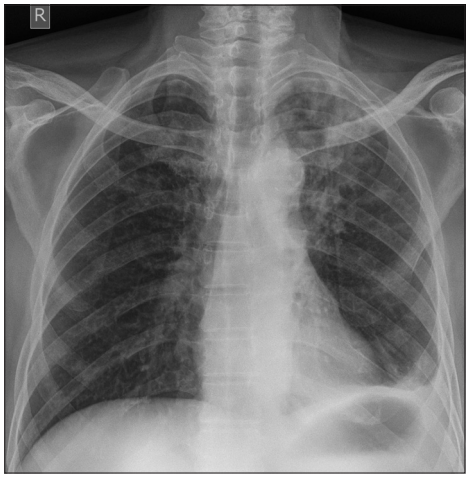

Figure 5: Chest X-ray posteroanterior view shows evidence of left sided mild pleural effusion with left upper thorax tuberculous infiltrates

Figure 6: Gross pathological specimen (a) Ventral surface and (b) dorsal surface of right testis and cord showing chronic granulomatous inflammation with caseous necrosis consistent with tuberculosis. Spermatic cord showed no significant pathology

this type of infection results from the hematogeneous dissemination or direct spread from the prostate and seminal vesicles remains a point of contention.[6,7] Prevalence of an associated history of previous tuberculous infection ranges from 0% to 70% of cases.[7]

At the initial stage of infection, the epididymis alone is usually involved. The infection then spreads to the ipsilateral testis, particularly if appropriate anti-tuberculous treatment is not administered promptly. The occurrence of isolated testicular tuberculous is rare.[6-8] Pathologically, the earliest lesions are

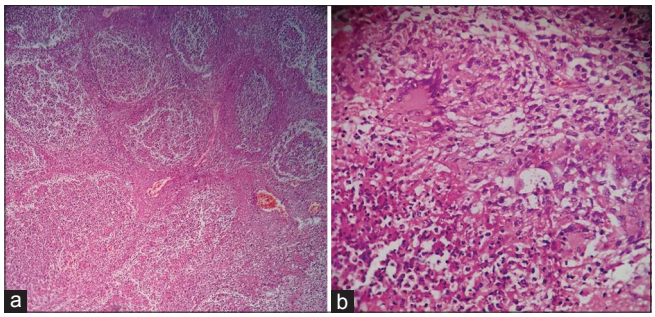

Figure 7: Histopathology sections with H and E stain (a) (×100) showed granulomatous inflammation with caseous necrosis surrounded by epithelioid cells and lymphocytes. (b) Microscopically (×400), Langhans' giant cells surrounded by lymphocytes and fibroblasts were also noted. Findings confirm tuberculous etiology

seen as discrete or conglomerate yellowish necrotic areas in the tail of the epididymis. This inflammatory process then involves the rest of the epididymis or heals, often with calcifications. Tuberculous orchitis is considered a later stage of the disease process that extends from the epididymis.

Clinically, scrotal tuberculosis often cannot be distinguished from lesions such as testicular tumor and infarction and may even mimic testicular torsion. Men aged 20–50 years are affected most commonly.[7,8] Patients may present with painful or painless enlargement of the scrotum. USG is currently the best technique for imaging the scrotum and its contents, and it can be used to differentiate reliably between extra- and intra-testicular lesions. The addition of color Doppler USG enhances diagnostic accuracy.[8]

The following USG patterns of tuberculous epididymitis have been described: (a) Diffusely enlarged heterogeneously hypoechoic tuberculous epididymitis, (b) diffusely enlarged homogeneously hypoechoic tuberculous epididymitis, and (c) nodular-enlarged heterogeneously hypoechoic tuberculous epididymitis.[8,9] Calcifications may be present, and they may be a useful differentiating feature. The heterogeneous appearance of the epididymis is thought to be caused by the various stages of the disease process, such as caseation necrosis, granuloma formation, and fibrosis.[5,6,7,9]

Ultrasonography patterns of tuberculous orchitis are as follows: (a) Diffusely enlarged heterogeneously hypoechoic testis, (b) diffusely enlarged homogeneously hypoechoic testis, (c) nodular-enlarged heterogeneously hypoechoic testis, (d) presence of multiple small hypoechoic nodules in an enlarged testis and (e) multiple small calcifications in the testis as well as outside the testis. The miliary USG appearance is characteristic of tuberculous orchitis. Other USG features of scrotal tuberculosis include scrotal skin thickening, scrotal abscesses, and scrotal sinus tract. Tuberculous abscesses are thick-walled with a hypoechoic avascular center due to caseation necrosis. The wall may and surrounding inflamed structures may show vascularity on color Doppler. Bilateral symmetrical involvement of the epididymis, seen in about 25% of patients, and coarse amorphous calcifications favor the diagnosis of a chronic granulomatous tuberculosis.[7-9]

The sensitivity of color Doppler US imaging in detecting scrotal inflammation is nearly 100%. In acute epididymitis, there is increased number and concentration of identifiable vessels with hyperemia, resulting in a high-flow, low resistance pattern. In more than 50% patients with epididymo-orchitis, the resistive index is <0.5. Peak systolic velocity threshold of 15 cm/s results in a diagnostic accuracy of 90% for orchitis and 93% for epididymitis.[10]

The major clinical differential diagnoses of tuberculous epididymo-orchitis are testicular mass, testicular torsion and bacterial epididymo-orchitis. At USG, testicular tumors usually appear as discrete masses, or the entire testis may be involved. They may be diffusely or heterogeneously hypoechoic. Seminomas and lymphomas tend to be homogeneous, while nonseminomatous tumors tend to be heterogeneous. The presence of epididymal enlargement in conjunction with a testicular lesion is suggestive of an infection rather than a neoplastic etiology. Furthermore, the edges of the hypoechoic lesion are characteristically smooth and no well-defined thick edges as note din tuberculous abscess. Tumor may only partially involve the epididymis in the advanced stage. Color Doppler is a useful addition for differentiation, especially in choriocarcinoma, that shows microvascular invasion. Hence, the lesion unlike in tuberculosis shows vascularity. Lung and brain metastases are noted. Lymph nodal enlargement is matted and shows hypoechoic avascular center due to caseous necrosis. In malignancies, lymph nodes are enlarged >2 cm, are discrete and show vascularity. AFP, LDH and β-human chorionic gonadotropin levels are raised.[11]

Intra-testicular infarction is seen as sharply defined hypoechoic space occupying lesion on sonography. Irregularities of testicular contour and hypo or hyperechoic heterogeneous areas suggest testicular rupture. Sometimes a distinct fracture line may also be identified. Hematocele (fluid with internal echoes) usually accompany testicular rupture. Associated scrotal hematoma between the layers of scrotal wall is seen as nonspecific soft-tissue thickening or as onion peel appearance. Doppler USG shows increased vascularity in the inflamed structures due to active tuberculosis and helps to differentiate infection from infarction.[12]

The USG appearances of testicular torsion are variable, and they depend on the duration of torsion. In the acute phase, the testis is enlarged and diffusely hypoechoic. Later, the testis may appear heterogeneous; due to hemorrhage and necrosis. Reactive hydrocele and skin thickening may also occur. In such circumstances, color Doppler is useful, as incomplete or complete ischemia is noted, whereas blood flow is increased in an inflamed testis. Even the position of the testis will be altered from normal vertical orientation.[13]

Differentiation of bacterial epididymo-orchitis from tuberculous epididymo-orchitis may be problematic if there is insufficient clinical information. In cases of bacterial infection, patients typically present with fever, dysuria, and severe and acute scrotal pain. On palpation, the affected scrotum is usually hot, swollen, and tender. These patients usually respond well to conventional antibiotics. Although both bacterial and tuberculous infections may involve both the epididymis and the testes, finding a heterogeneously hypoechoic pattern of epididymal enlargement favors a diagnosis of tuberculosis. Color Doppler USG may be useful, as a diffuse increased blood flow pattern is seen in subjects with bacterial epididymitis, whereas focal linear or spotty blood flow signals are seen in the peripheral zone of the affected epididymis in subjects with tuberculosis. In patients with an epididymal abscess, color Doppler flow imaging demonstrates a lower degree of blood flow in the peripheral portion of a large abscess, which is suggestive of tuberculous infection. Lymph nodes are more likely involved in tuberculous etiology. Hydrocele may show septations and fine echoes in tuberculosis as opposed to pyogenic infections that elicit clear fluid.[14]

Patients with tuberculous epididymitis or epididymo-orchitis usually respond to anti-tuberculous therapy. However, surgery may be required in severe cases. In summary, the diagnosis of tuberculous epididymo-orchitis should be considered in patients who present with scrotal swelling if USG images show both epididymal and testicular lesions. Additional useful information for differentiation includes intrascrotal calcifications and sinus tract, clinical evidence of tuberculosis elsewhere in the body, immunocompromise, and failure to respond to conventional antibiotics.

Conclusion

In a patient presenting with scrotal swelling, the USG detection of epididymal abormalities, skin thickening, and hydrocele, in addition to a heterogeneously enlarged testis, suggests that this swelling is caused by an infection rather than a testicular tumor. Late features like discharging scrotal sinus tracts and abscesses are very specific for tuberculosis. Color Doppler is an important addition for disease characterization. A hypoechoic avascular nodule with surrounding vascularity in the inflamed structures is characteristic of active tuberculosis. The presence of miliary nodularity of the testis, calcifications and evidence of tuberculosis elsewhere should alert the radiologist to the possible diagnosis of tuberculous epididymo-orchitis. Lack of response to conventional antibiotics and resolution of lesions after administration of anti-tuberculous drugs (i.e. isoniazid, rifampicin, parazinamide, ethambutol for 2 months, followed isoniazid and rifampicin for an additional 4 months), further supports this diagnosis. Although traditionally diagnosis is confirmed on histopathological examination following surgery, songraphic appearance can guide the clinician toward the necessitated treatment. Sonography is also helpful during follow-up of treatment.

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