

Testicular Tuberculosis Without Epididymitis Simulating Neoplasm

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We present the case of a 47-year-old man with testicular tuberculosis without epididymal involvement that simulated neoplasm on sonography. The patient also had evidence of contralateral spermatic cord involvement. The diagnosis was made following transinguinal intrascrotal exploration and excisional biopsy of the left spermatic cord mass and right transinguinal radical orchiectomy. Histopathology showed caseating granulomatous inflammation, with positive cultures for *Mycobacterium tuberculosis* and the patient received antituberculous treatment with satisfactory recovery.

Introduction

Genitourinary tuberculosis (TB) is the most common extrapulmonary site of tuberculosis; representing up to 20% of all TB cases. The kidney is the most common affected organ [1]. TB may occur at any age, however, it is more common between the third and fifth decade of life. There is no gender predilection. Tuberculous infection of the scrotum is rare and occurs in approximately 7% of patients with extrapulmonary disease [2]. When

the genital organs are involved, the epididymis is the most frequent site, with epididymo-orchitis as the usual presentation. Orchitis without epididymal involvement is rare [1]. Tuberculous granulomas may develop within the epididymis and testes, but more commonly arise from the epididymal tail. Abscess, sinus tracts and extratesticular calcifications are possible complications [3].

Radiological imaging is important in distinguishing testicular pathology. It is required to differentiate between intra- and extra-testicular locations of disease. Furthermore, it can evaluate internal architecture determining whether cystic, solid, or complex lesions are present, thus guiding clinical versus surgical management. Specific radiographic patterns can help elucidate the presence of testicular tuberculosis.

Citation: Chirindel A, Martinez F, Gagliardi JA, Armm MF. Testicular Tuberculosis Without Epididymitis Simulating Neoplasm. *Radiology Case Reports*. [Online] 2008;3:133.

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Abbreviations: CT, computed tomography

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Published: August 18, 2008

DOI: 10.2484/rcr.v3i3.133

Case Report

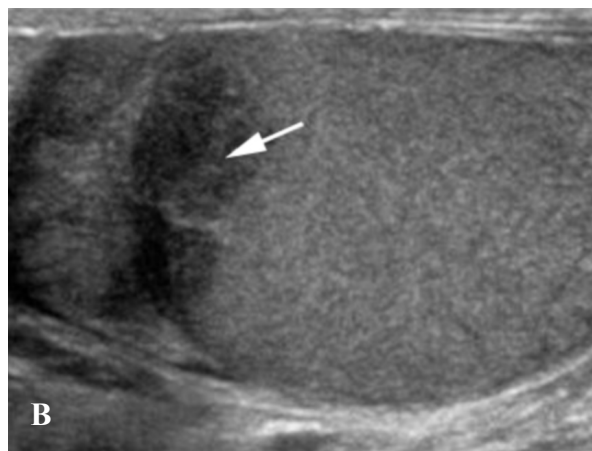
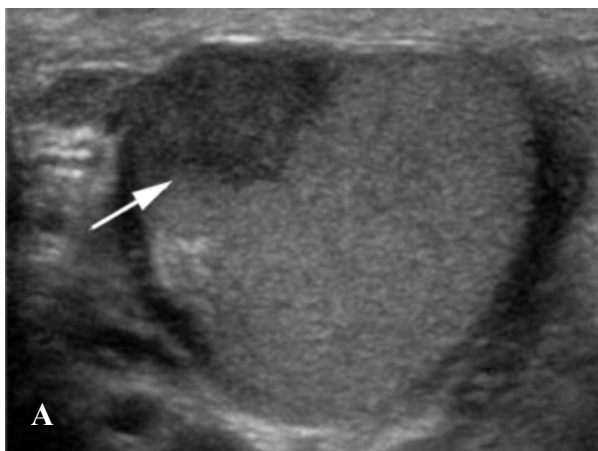
A 47-year-old man presented to the emergency department complaining of left testicular swelling and pain for 3 weeks. Additional symptoms included

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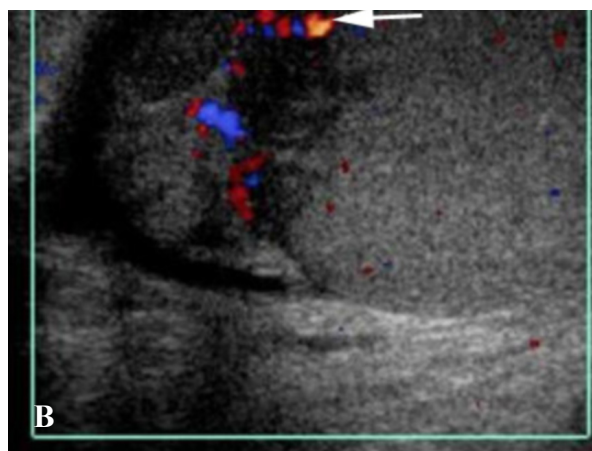
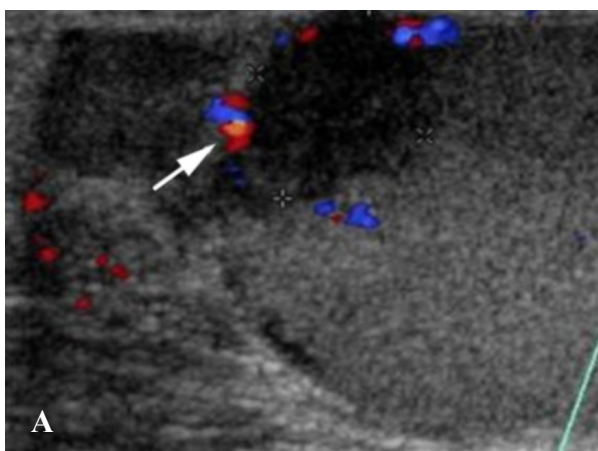
intermittent lower abdominal pain and nausea without episodes of emesis. There was no dysuria, hematuria, urinary retention, urgency, frequency, or hesitancy with urination. Furthermore there was no weight loss, loss of appetite, night sweats, hemoptysis, night fevers, or cough. A chest radiograph was normal. Past medical history was relevant for a positive PPD in 2002, with no subsequent treatment.

On physical exam, the patient was afebrile, with normal heart rate, blood pressure of 159/127, and

normal respiratory rate and oxygen saturation. His height was 5 feet 8 inches with a BMI of 20.83 kg/m². Head and neck exam was normal. There was no temporal artery tenderness. There was no meningismus. Palpation elicited reproducible pain at the left occipital insertion of the trapezius. The skin was warm and dry, with no rash, no laxity or noted thinning. His cardiac, pulmonary, and abdominal exams were unremarkable. His neurological exam revealed clear and fluent speech, intact cranial nerves II-XII, 5/5 strength throughout,



Figures 1A-B. 47-year-old man with left testicular swelling. Axial and sagittal ultrasound images of the right testicle showing a well-defined 1.1 x 0.9 x 1.0 cm predominantly hypoechoic lesion in the upper pole of the right testicle. The right testicle is otherwise unremarkable and measures 4.4 x 2.1 x 2.5 cm



Figures 1C-D. Sagittal color Doppler ultrasound image of the upper pole of the right testicle demonstrating that the well-defined hypoechoic lesion in the upper pole of the testicle has slight increased peripheral vascularity. Sagittal Color Doppler ultrasound image of the right testicle shows slightly increased vascularity between the epididymal head and the upper pole of the testicle. No significant epididymal hyperemia is noted.

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and intact sensation. Gait was normal, and there was no nystagmus. He was alert and oriented. Laboratory investigations revealed complete blood count and chemistries within normal limits.

On physical examination the left testis seemed smoothly enlarged. There was associated boggy swelling of the left spermatic cord. The right testis was unremarkable. A firm right extratesticular mass, suspected to be epididymal, was present. Laboratory findings revealed: HCG 0; AFP less than 4.13; no pyuria. A urine AFB was performed based on the patient's history of a positive PPD. His urine was negative for AFB smear and culture.

Scrotal ultrasound was performed as part of the initial evaluation. Images demonstrated the presence of a 1.3 x 1.0 x 0.9 cm, well-defined predominantly, hypochoic lesion in the upper pole of the right testicle (Fig. 1). This area was not tender to probe palpation. The lesion has slightly increased peripheral vascularity upon color Doppler interrogation. There was also noted edema with increased blood flow and small amount of fluid between the right epididymis and upper pole of the testicle. The remainder of the right testicle was normal measuring 4.4 x 2.1 x 2.5 cm. The left testicle and left epididymis were normal. Images of the upper left scrotal sac and distal inguinal canal demonstrated a serpiginous 3.0 x 1.8 cm structure with heterogeneous echogenicity which could not be separated from the left spermatic cord (Fig. 2). No abnormal vascularity was seen upon color Doppler interrogation. No peristalsis was present

on real time imaging. Small bilateral hydroceles were noted.

The patient was referred for surgical management of a testicular mass. Preoperative diagnosis was right testicular tumor probable seminoma, and possible left patent processus vaginalis with omental herniation versus spermatic cord lesion. Postsurgical pathology revealed



Figure 2. Sagittal ultrasound image of the upper left scrotal sac and distal inguinal canal just superior to the upper pole of the left testicle demonstrating a serpiginous 3.0 x 1.8 cm structure with heterogeneous echogenicity that cannot be separated from the spermatic cord. No evidence of peristalsis on the real time scanning.

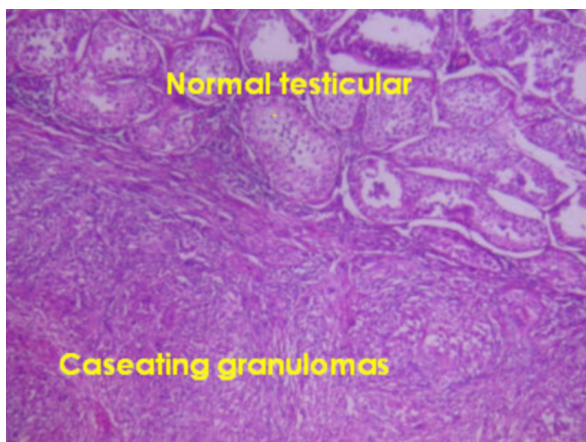


Figure 3. Right testicle demonstrating normal parenchymal tissue and caseating granulomas.

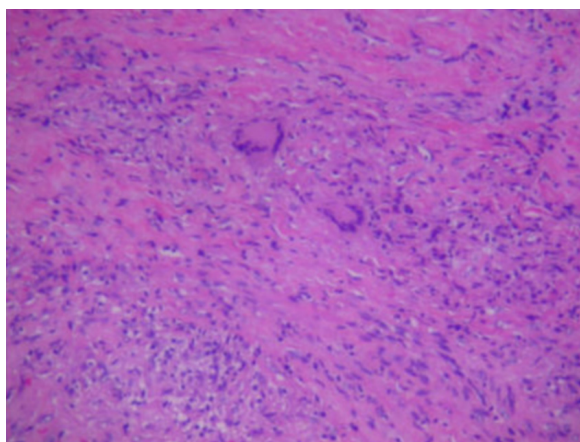


Figure 4. Left spermatic cord demonstrating caseating granulomas.

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caseating granulomata in the upper pole of right testicle (Fig. 3) and also caseating granuloma in the left spermatic cord (Fig. 4). The right epididymis was normal. Cultures were positive for *Mycobacterium tuberculosis*.

Discussion

The incidence of tuberculosis is increasing worldwide, with more than 20% of cases exhibiting extrapulmonary manifestations [1]. Populations at risk for TB infection include the immunocompromised (HIV infection, steroid therapy, malnutrition, and measles), those suffering from chronic diseases as well as immigrants and inmates. Genitourinary involvement can be found in extensive pulmonary tubercular disease or present as a primary genital lesion. Symptoms include an enlarged scrotum, with or without pain, dysuria, or urinary frequency. Female genital tuberculosis may present with pelvic pain, menstrual irregularity, and sterility. The differential diagnosis includes testicular tumor, torsion, bacterial orchiepididymitis, sarcoidosis, leprosy, brucellosis, or syphilis [4]. Accurate diagnosis is important for correct treatment.

The spread of *M. tuberculosis* to the scrotal components is typically hematogenous, usually from a primary lung or kidney site. However, it can also be disseminated via retrograde extension from the prostate and seminal vesicles to the epididymis and testicles [5]. In the case presented, the patient had no identifiable primary lung or other extra scrotal focus. Tubercular epididymitis usually arises at the epididymal tail, the area with the largest blood supply and also the first portion affected by urinary reflux [6]. From here it could extend to the testes. Isolated orchitis secondary to *Mycobacterium tuberculosis* resulting from hematogenous spread without epididymal involvement is rare [7].

Ultrasound (US) is currently the imaging modality of choice when evaluating the scrotum and its contents [8]. Various patterns of echogenicity have been described for tubercular epididymo-orchitis. These include diffuse hypoechoic heterogeneous or homogeneous enlargement, nodular hypoechoic heterogeneous enlargement, and small hypoechoic nodules in the testis (miliary orchitis) [4]. The major clinical differential diagnoses of scrotal mass with or without pain are inflammatory processes, torsion, and testicular tumor. The typical sonography of the nonseminomatous tumors is hetero-

geneous masses with cysts and calcifications. On the other hand, seminomas are comprised of homogeneous, hypoechoic and sharply delineated masses [9]. The presence of epididymal involvement and testicular lesion favors infection rather than tumor, being that orchitis is usually a complication of epididymitis [6]. Primary epididymal tumors are ten times less frequent than testicular tumors which tend to involve the epididymis in advanced stages of the disease [3].

Testicular torsion generally is easily distinguished by a more dramatic clinical picture with sudden orchalgia and swelling. Doppler US interrogation usually shows decreased or absent blood flow to the testis, in contrast to the hyperemia seen in inflammation [10]. On US a heterogeneously hypoechoic pattern of epididymal enlargement favors a diagnosis of tuberculosis [6]. Color Doppler US evaluation of tubercular epididymitis usually demonstrates focal linear peripheral hypervascularity, without abnormal flow in central portion of the lesion. These findings correlate well with pathologic findings: the central portion of the epididymal lesions demonstrates granulomas with caseation necrosis, and the peripheral portion of the epididymal lesions has several medium to small sized vessels [11].

Differentiation of bacterial epididymo-orchitis from tubercular epididymo-orchitis is the most challenging task as both can present with quite similar symptoms affecting the epididymis as well as the testis. In patients with suspected epididymal abscess discrimination between pyogenic and TB etiologies is of crucial importance, as pyogenic abscesses respond to antibiotics while tubercular ones warrant surgery. On Color Doppler US, the blood flow pattern demonstrates spotty flow to the peripheral portions of the tubercular epididymal abscess versus marked vascularity observed in pyogenic abscesses [12].

When sonographic findings are equivocal or sub-optimal, magnetic resonance imaging (MRI) can be useful as a problem-solving tool. With MR imaging, epididymo-orchitis generally demonstrates heterogeneous areas of low signal intensity on T2-weighted images. The epididymis may be enlarged and hyperenhancing on contrast-enhanced T1-sequences. Heterogeneous enhancement of the testis with hypointense bands may also be seen [13].

Radiological findings are invaluable in making the diagnosis of scrotal tuberculosis and selecting the appropriate treatment. Imaging is also central in the follow-up

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and outcome prediction: walling off with fibrosis and calcification is a favorable outcome, whereas fistula formation is an unfavorable outcome in a tubercular epididymal abscess [12].

Definitive diagnosis of genitourinary tuberculosis, although established by culture, histologic, or surgical examination, is often difficult and delayed. Polymerase chain reaction has high sensitivity and specificity, but it fails to detect whether the TB infection is biologically active or in its latent phase [14]. Antitubercular medical management (two months of isoniazid, rifampin, pyrazinamide, and ethambutol, followed by four to seven months of isoniazid and rifampin) is the treatment of choice [15]. Epididymectomy, with or without respective orchietomy, should be performed if traditional therapy fails and/or extensive disease is evident (persistent positive cultures, abscess or fistulae formation). Additionally, extensive epididymal and testicular involvement may be resistant to pharmacotherapy [1].

Testicular tuberculosis is a rare condition but should be kept in consideration when assessing focal abnormalities of the testes. This is especially true when epididymal lesions are concurrently present. History and physical examination findings can help distinguish the presence of TB from other sources of genital pathology. Sonographic evaluation is of additional assistance in determining the etiology of a testicular mass. The three main patterns of ultrasonographic presentation of tubercular epididymo-orchitis are hypoechoic heterogeneous or homogeneous enlargement, nodular hypoechoic heterogeneous enlargement, and miliary disease, demonstrated by small hypoechoic nodules in the testis. The differential diagnosis of the disease includes inflammatory disease, testicular tumor, and torsion. Color Doppler shows increased epididymal blood flow in pyogenic orchitis and decreased flow in tubercular disease. MR evaluation showing specific patterns of testicular and epididymal enhancement may also be helpful when sonographic findings are equivocal. In predicting the outcomes of patients with testicular tuberculosis, imaging is essential as abscess progression to fibrosis or calcification is favorable, while development of fistulae is of a poor prognosis.

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