Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Radiology

A Rare Case of Isolated Testicular Tuberculosis and Review of the Literature

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DOI: 10.36347/sjmcr.2024.v12i05.090 | **Received:** 15.04.2024 | **Accepted:** 22.05.2024 | **Published:** 29.05.2024

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Abstract **Case Report**

Testicular tuberculosis is an uncommon manifestation of extrapulmonary tuberculosis that affects the male reproductive system. We present a case report of a 36-year-old man with chronic testicular pain and shrinking of the testicle. Despite the absence of specific symptoms, radiological imaging techniques, including testicular ultrasound and MRI, aided in the diagnosis of testicular tuberculosis. The ultrasound revealed hypoechoic areas with macrocalcifications and infiltration of the epididymis and spermatic cord. The MRI showed specific signal characteristics indicating chronic infection. However, definitive diagnosis relied on histopathological examination through fine needle aspiration cytology. We highlight the challenges associated with diagnosing isolated testicular tuberculosis and emphasize the importance of integrating clinical, radiological, and histopathological findings for accurate diagnosis and appropriate treatment.

Keywords: Testicular Tuberculosis, Extrapulmonary Tuberculosis, Radiological Imaging, Diagnosis, Histopathology.

INTRODUCTION

Extra-pulmonary tuberculosis (EP-TB) mostly refers to tuberculosis that affects the lymph nodes. Although genital tuberculosis is uncommon, the testicular form is particularly rare, accounting for only 3% of cases of tuberculosis affecting the genital area [1]. Testicular TB can occur during disseminated TB, but isolated testicular TB is extremely rare. In most cases, it clinically mimics other testicular lesions such as testicular tumor, infarction, or even testicular torsion. Radiological features can also resemble those of many other diseases. Only recognition and understanding of the radiological characteristics can help diagnose testicular TB. Testicular ultrasound and MRI are often used to confirm the diagnosis [2].

Sometimes, a testicular biopsy is necessary, especially in the elderly, because excluding testicular cancer in this age group remains the main concern. We report the case of a 36-year-old woman with a late diagnosis of testicular tuberculosis, describing the radiological findings identified by testicular ultrasound and MRI.

CASE REPORT

We report the case of a 36-year-old man who presented with chronic testicular pain and shrinking of the testicle for over a year and a half. The patient had no history of sexually transmitted infections or risky sexual behavior. The symptoms persisted without fever and without affecting the patient's general condition. Clinical examination revealed right testicular hypotrophy with palpation of a hard nodule that caused minimal pain, and slight swelling of the epididymis without palpable local or regional lymph nodes. Blood tests showed normal blood count, negative CRP, and sterile urine culture. The search for BK in urine was negative.

The testicular ultrasound showed a poorly defined hypoechoic area with macrocalcifications and homogeneous vascularization on color Doppler, while the rest of the testicular parenchyma showed normal vascularization. There was also infiltration of the epididymis and the homolateral spermatic cord without any detectable signs of torsion.

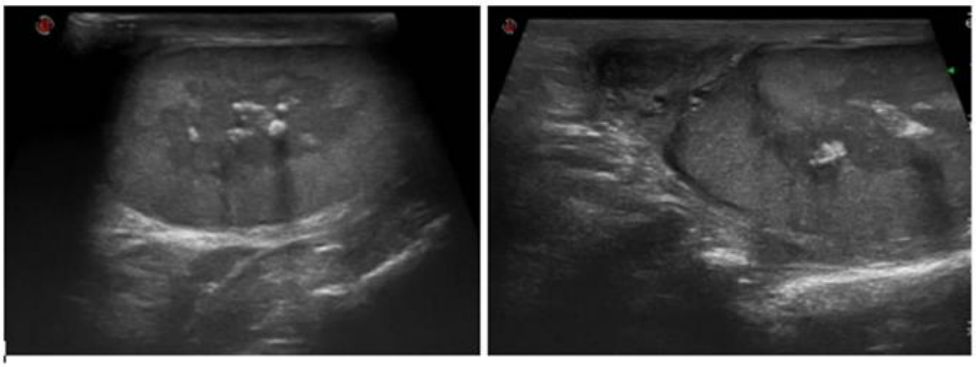

Figure 1: Testicular ultrasound showed a hypoechoic area with macro calcifications and a hypertrophied appearance of the epidydimal head

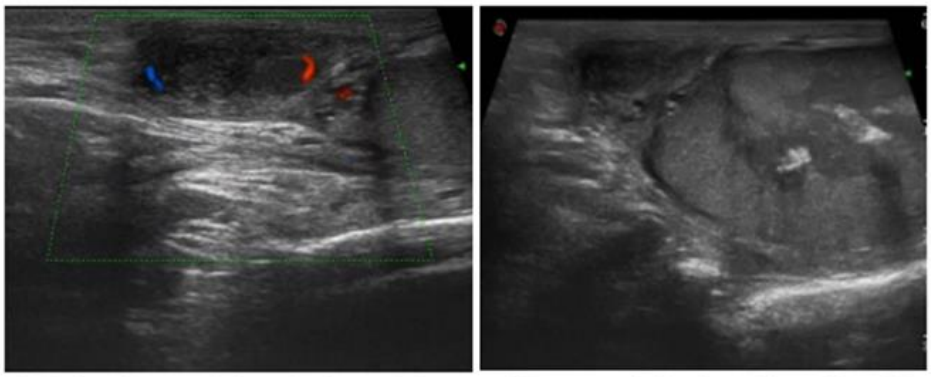

Figure 2: Testicular ultrasound showed a hypoechoic area with macro calcifications. The epidymal head is enlarged with normal vascularization on color Doppler

An MRI was requested to better characterize and rule out a tumor origin. The MRI revealed a right testicle that was reduced in size with an isosignal heterogeneous T1 area, T2 hypersignal, without diffusion restriction, and with delayed enhancement after gadolinium injection. This area contained calcifications with signal void on all sequences. Based on these results (ultrasound with MRI), it was concluded that the testicular involvement was due to chronic infection, and a diagnosis of chronic tuberculous orchitis-epididymitis was made. A fine needle aspiration cytology was subsequently performed by the urologists, and the histopathological results were in favor of testicular tuberculosis.

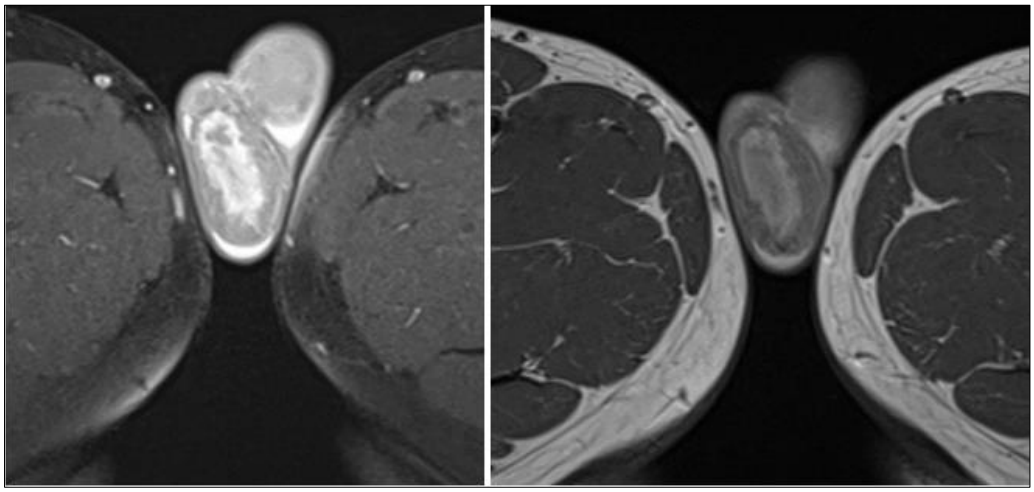

Figure 3: Testicular MRI: Signal abnormality in moderate hypersignal seat of zone in frank hyposignal on the T1 and T7 sequence not enhanced after injection of gadolinium

DISCUSSION

Testicular tuberculosis is a rare form of extrapulmonary tuberculosis that affects the male reproductive system. It occurs when the bacterium Mycobacterium tuberculosis (the causative agent of tuberculosis) infects the testicle, causing inflammation and destruction of tissues. The symptoms of testicular tuberculosis can include scrotal pain, swelling, and sometimes a mass can be found in the affected testicle, as well as fever and weight loss if the infection is widespread. However, some men with testicular tuberculosis may not experience any symptoms, generally, the involvement is unilateral [3]. It usually occurs between the ages of 38 and 40 years, but it can also affect people of all ages, including children [4].

Diagnosing tuberculous orchitis is often challenging, especially in the absence of a history of tuberculosis infection [3]. Blood tests may not be specific or may show signs of orchitis or epididymitis, such as an elevated white blood cell count. Urine culture and acid-fast bacilli (AFB) staining are commonly performed to detect tuberculosis infection in the urinary tract. Specialized culture media may be required to identify the bacteria.

The radiological presentation of genital tuberculosis is often nonspecific and difficult to distinguish from other infectious causes. Imaging is used to determine the extent of the damage, look for complications, and monitor the response to antituberculous treatment. Furthermore, imaging provides guidance for tissue sampling and drainage procedures [5].

Ultrasound is currently the best technique for imaging the male genital system [6]. The three grayscale ultrasound appearances of tuberculous epididymitis include diffusely enlarged heterogeneous hypoechoic lesions, diffusely enlarged homogeneous hypoechoic lesions, and diffusely enlarged nodular heterogeneous hypoechoic lesions. Other associated ultrasound findings include extra-testicular intrascrotal calcifications, which were observed in our second case [7]. Epididymal infection can extend to the vas deferens and show thickening with hypoechogenicity of its wall. In our case, an atrophic testicle with macrocalcifications indicated the chronicity of the disease in our patient.

Ultrasound can provide additional useful information for differential diagnosis, including intrascrotal and sinus tract calcifications. In Doppler mode, a centrally hypo-vascularized lesion is described. This absence of vascular signal is interpreted as corresponding histologically to a granuloma with caseous necrosis, whereas vascular signals are found in the periphery [8].

A study by Benchekroun *et al.*, reported that doppler ultrasound showed a clear vascular lesion in the central part of the nodule in their case [9]. This finding may be explained by the fact that the lesion was diagnosed during its acute phase, unlike in our case where the nodule showed no vascularization on color doppler ultrasound, with normal vascularization of the rest of the testicular parenchyma, since the patient was diagnosed at a later stage.

MRI with contrast may be essential and useful in the diagnosis of tuberculous epididymitis and orchitis when the lesion is indeterminate on ultrasound and Doppler. On MRI, epididymal orchitis typically appears as heterogeneous areas of low signal intensity on T2weighted images. The low signal intensity of the lesions on T2-weighted images is attributed to chronic inflammation, fibrosis, and calcifications, as tuberculosis infection of the scrotum is usually diagnosed at a chronic stage [10], as in our case.

MRI can also show hydrocele, an enlarged and hyperenhanced epididymis on T1-weighted sequences after contrast injection. A heterogeneous swelling of the testicle with hypointense bands may also be observed [11]. Despite the radiological characteristics of ultrasound and MRI, distinguishing between testicular tuberculosis and testicular tumor can be challenging in some situations. Only anatomopathological examination, obtained through fine needle aspiration cytology or surgical intervention, can provide a definitive diagnosis [12]. The most common complication of testicular tuberculosis is infertility caused by obstruction of the seminal pathways or as a consequence of caseous necrosis. Treatment usually involves surgery and a six-month course of antitubercular therapy.

CONCLUSION

After analyzing the details of our case and reviewing various case reports in the literature, we can conclude that the diagnosis of isolated testicular tuberculosis is challenging. Radiological examinations can help in diagnosis, but the definitive diagnosis still relies on histopathology.

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