Original Research Article

Tubercular Epididymitis and Epididymo-Orchitis: Ultrasound appearances

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Abstract

Objective: To determine the Ultrasonographic appearances in patients with tuberculous Epididymo-Orchitis and Orchitis and to correlate them with the histopathological findings. **Materials and Methods:** Total 25patients with 50 hemi scrotums of clinically suspected Epididymo-Orchitis and Orchitis with high suspicion of tubercular aetiology were assessed on ultrasonography. Of these 50 hemi scrotums, 12 scrotums of 8 patients testicular and epididymal tissues cultures were positive for Mycobacterium tuberculosis. **Results:** The most detected sonographic findings of tuberculous epididymitis were an enlarged epididymis commonly in the tail region, and marked heterogenous echo texture of the involved epididymis. Sonographic findings of testicular involvement consist of an ill defined focal intratesticular hypoechoic area or diffusely enlarged hypoechoic testis or an irregular margin between the testis and epididymis. In our study Unilateral Epididymo-Orchitis is the most common involvement pattern followed by isolated epididymitis, bilateral Epididymo-Orchitis and isolated orchitis respectively. The sonographic appearances in patients with tuberculous epididymitis are seen to be different from those encountered in nontuberculous epididymitis. **Conclusion:** Adequate evaluation of patients with high suspicion of Tuberculous Epididymo-Orchitis and Orchitis, by means of scrotal ultrasound coupled with fine needle aspiration cytology is critical to diagnostic accuracy and optimal treatment. Ultrasound significantly helpful to the initial assessment and future management of the patient with follow-up scans ensuring positive response to treatment thereby avoiding surgical intervention.

Key Words: GUTB - Genitourinary tuberculosis, TB – Tuberculosis, TBE - Tuberculous epididymitis, TBE-O - Tuberculous epididymo-orchitis, USG – Ultrasonography.

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INTRODUCTION

Genitourinary tuberculosis (GUTB) is a chronic granulomatous infection and the most common extrapulmonary site of tuberculosis (TB) representing up to 20 -30 % of all TB cases. Tuberculous infection of the scrotum is rare and occurs in approximately 7% of patients with extrapulmonary disease[1]. The epididymis being the commonest structure to be involved, followed by the seminal vesicles, prostate, testis, and the vas deferens[2].Tuberculous orchitis usually occurs as a result of direct extension from the epididymis[3].Present HIV Pandemic has resulted in a global surge in the TB prevalence which in turn resulted in the surge of extra pulmonary TB in endemic areas[4]Most of the cases are coexist with pulmonary TB or tuberculosis of other parts of lower genitourinary system including bladder, ureter and prostate. Isolated tuberculous epididymitis (TBE) or epididymo-orchitis(TBE-O) is rare[4]Clinically, TBE-O may mimicthe other testicular conditions like bacterial epididymitis, viral orchitis, infected hydrocele, spermatocele, testicular torsion, scrotal trauma, or neoplasm in healthy patients with no clinical symptoms and signs. This diagnostic dilemma may result in aninappropriate surgical procedure for a potentially

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curable medical illness, which could have been avoided with anti-TB management[5]hence accurate differentiation is important for appropriate treatment. High-resolution sonography is currently the best technique for imaging of the scrotum and its contents. In this study, we aim to describe the sonographic appearances of tuberculous epididymitis (TBE)and epididymo- orchitis(TBE-O).A high index of suspicion, scrotal ultrasonography and fine needle aspiration could be quite helpful in the diagnosis.

MATERIALS AND METHODS

This is a prospective study conducted in the department of Radio diagnosis and imaging, Vydehi Institute of Medical Sciences and Research Centre (VIMS and RC), Bangalore from Oct 2016 to Aug 2018.Clinically suspected patients of Epididymo-Orchitis and Orchitis with high suspicion of tubercular etiology were included in the study, Subsequently underwent high resolution ultrasonography of the scrotum and Fine needle aspiration cytology (FNAC). All the scans were performed on Phillips Affinity 50G machine using L5-12 MHz high frequency transducer.

RESULTS AND DISCUSSION:

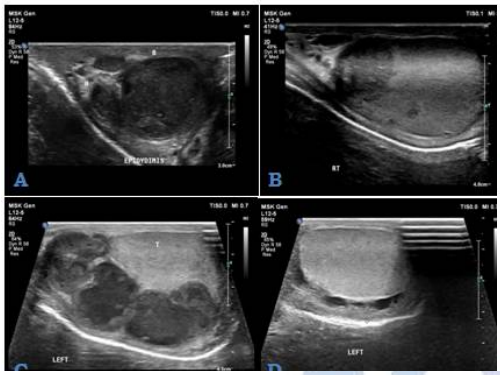
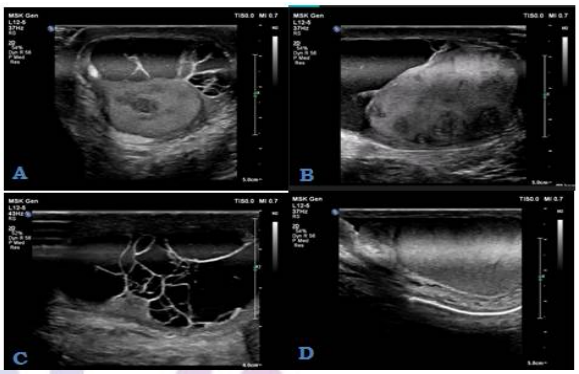


Figure 1:



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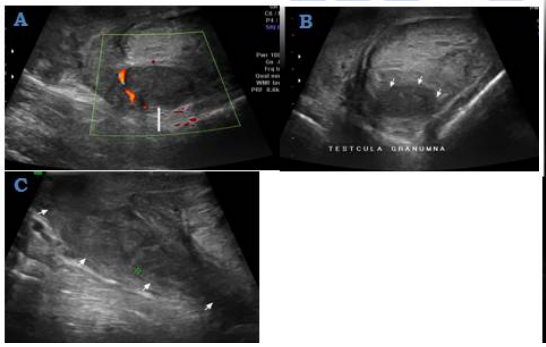

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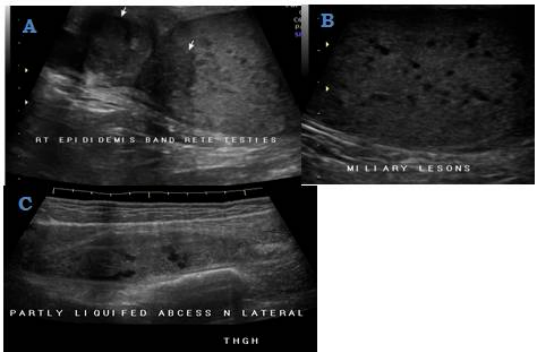

Figure 4:

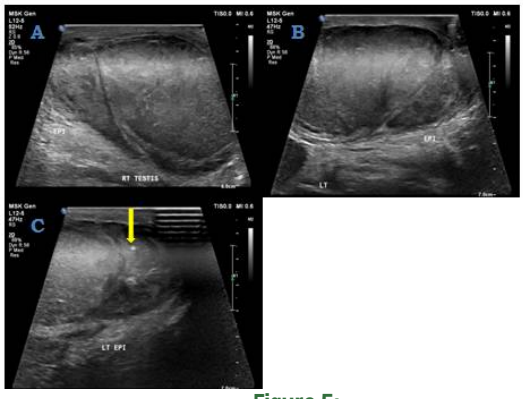

Figure 5:

Figure 1:47 year old patient with pain and swelling in the scrotum– UltrasoundScrotum- Right epididymo- orchitisand left epididymitisA)Enlarged, nodular homogenous hypoechoic right epididymis B)Hypoechoic granulomas in the right testisC) Enlarged HeterogeneousLeft epididymis with involvement ofhead, body and tail with normal left testis. D) Left scrotal wall thickening; **Figure 2:**42 year old patient with pain and swelling in the left scrotum– Ultrasound Scortum- Left epididymo-orchitisA)Enlarged, heterogeneous hypoechoic Left epididymis with involvement of head, body and tail B) Multiple small Hypoechoic granulomas in thetesticular parenchymaC) Multi loculated left hydrocele with thin septations with in. D) Normal right epididymis and testis; **Figure 3:** 38 year oldpatient with pain in the Left hemiscrotum and discharge from scrotal skin surface –UltrasoundScrotum – Left epididymo- orchitis with scrotal collection and sinus formation; A) Enlarged, Heterogeneous hypoechoic epididymis with increased peripheral vascularity (solid arrow). B) Well defined Hypoechoic granuloma (white arrows) in the testis. C) Hypoechoic area observed independent to epididymis and testis is Collection in the left hemi scrotum; **Figure 4:**34 year oldpatient with Pulmonary and Musculo-Skeletal TB, Presented with Swollen right hemiscrotum and collections in the left gluteal region and left lateral thigh – UltrasoundScrotum – Right epididymo- orchitis with miliary lesions in testis A) Enlarged, round hypoechoic epididymis with contiguous involvement of adjacent rete testis. B) Multiple small Hypoechoic lesions in rest of the testis - Miliary lesions. C) Heterogeneous Collection in the lateral compartment of thigh; **Figure 5:**54 year old patient with bilateral scrotal swelling and ulcer on the right hemiscrotum – UltrasoundScrotum -Bilateral epididymo- OrchitisAandB) Diffusely Enlarged, oedematousepididymis and testis on both sides C)Calcific speck (Yellow Arrow) in the left epididymal head;

The study group consists of 25 subjects with 50 hemiscrotums. 12 scrotums of 8 patients testicular and epididymal tissues cultures were positive for Mycobacterium tuberculosis. In our study, Unilateral Epididymo-Orchitis is the most common involvement pattern followed by isolated epididymitis, bilateral Epididymo-Orchitis, and isolated Orchitis respectively. The sonographic appearances in patients with tuberculous epididymitis are seen to be different from those encountered in nontuberculous epididymitis. GUTB is the most common extrapulmonary manifestation after lymphatic TB, representing 2–4% of all cases of tuberculosis and 15% of all non-pulmonary manifestations[3,6]. Genitourinary system involvement has been observed in 20% of pulmonary TB cases. TB of the scrotal contents is rare, occurring in about 7% of patients with TB[3,7]. Vulnerable population groups at risk for TB infection are the immunocompromised (HIV infection, organ transplants) and those suffering from chronic illness[1].TB of the scrotal contents usually results from retrograde extension from the prostate and seminal vesicles. The tuberculous bacillus can gain entry also via the hematogenous and lymphatic routes. With both hematogenous and direct spread, the epididymal tail is the first structure to be involved,[2,8,9] as it has the rich blood supply and also the first part to be involved in urinary reflux[2]. The inflammatory process may propagate to the rest of the epididymis and finally to the ipsilateral testis or may regress and heal with calcifications[6]. Isolated TB orchitis without epididymitis is very rare[3,7,10]. Clinically patients with TB epididymo-orchitis present with a painless or painful scrotal swelling and heavy sensation as principal symptoms[3,10].Ultrasonography (USG) is the best imaging modality of choice for evaluation of TB of scrotum and scrotal contents. In conjunction with USG, Fine needle aspiration cytology (FNAC) has been reported to enhance diagnosis. Characteristic FNAC picture includes epithelioid granuloma with a necrotic background and presence of variable lymphocytes. Ziehl-Neelsen (ZN) stain performed on the slides confirms the presence of numerous acid-fast bacilli[4]. Sonographic patterns of tuberculosis in the scrotum are varied and dependent on the stage of the disease[6].

Sonographic Appearances of Tuberculosis Epididymitis: Different sonographic echogenic patterns of tuberculosis epididymitis include: (a) Enlarged, hypoechoic and diffusely homogeneous (Figs.1A, 2A); (b) enlarged, hypoechoic and diffusely heterogeneous (Fig.1C); and (c) enlarged, nodular, heterogeneous and hypoechoic (Figs.3A, 4A). Kim *et al*.[8] and Drudi*et al*.[9]observed that the tail of the epididymis is the preferential site of involvement in tuberculosis epididymitis. Kim *et al*. suggested that heterogeneous and enlarged epididymis is reliable finding in differentiating tuberculosis from nontuberculous epididymitis. These findings were also confirmed in the series of Chung *et al* study[12]. The heterogeneous appearance of the epididymis is due to various pathologic stages of the disease, which include caseation necrosis, granulomas formation, and fibrosis[8,11,12].

Sonographic Appearances of Tuberculosis Orchitis: Isolated tuberculous Orchitis without epididymis is very rare[11,12]. Tuberculosis Orchitis usually result from contiguous extension of disease process through the epididymis.The Gray-scale sonographic appearances of the tuberculous Orchitis include (a) diffusely enlarged heterogeneously hypoechoic testis (Figs.5A, 5B), (b) diffusely enlarged homogeneously hypoechoic testis, and; (c) nodular enlarged heterogeneously hypoechoic testis (Figs.1B, 2B). Drudi*et al*.[9]also described another pattern of multiple small hypoechoic nodules (Figs.2B, 4B) in the enlarged testis as a miliary type and suggested that this pattern was a feature of tuberculosis Orchitis. Miliary pattern was also found in two of 18 patients in the series of Chung *et al*. study[11,12].On Colour Doppler ultrasound examination of TB nodule showslinear peripheral increased vascularity with no abnormal flow in the centre (Fig.3A)which is

well correlate with pathological findings that central portion shows, caseation necrosis, and the peripheral portion shows several medium to small sized vessels[1,13]which may help to differentiate TB nodules from other lesions[6]. Bilateral involvement of epididymides is seen in about 25% of patients,[12]and coarse calcifications also favor the diagnosis of a chronic tuberculous infection[2].

Other sonographic findings in Scrotal Tuberculosis: Other associated ultrasound findings include scrotal skin thickening(Fig.1D), hydrocele (Fig.2C), calcification (Fig.5C), scrotal abscesses formation (Fig.3C), and scrotal sinus tract. Thickening of the scrotal skin is best visualized when compared with the unaffected side. Calcification is frequently seen in the epididymis and the tunica vaginalis testis.Clinical differential diagnoses of scrotal swelling with or without pain include inflammatory processes, tumors and testicular torsion. Non- seminomatoustumors are - heterogeneous masses with cysts and calcifications. Seminomas are homogeneous, hypoechogenic and sharply delineated masses on ultrasound[14]. Testicular tumors tend to involve the epididymis in late stages of the disease[12].The presence of epididymal involvement with testicular lesion favors infection rather than tumor, being that orchitis is the complication of epididymitis[1,7].Testicular torsion usually presents with sudden orchalgia and swelling. US Doppler interrogation shows reduced or absent blood flow to the testis, in contrast to the hyperemia seen in inflammation[1]. Differentiation of tuberculous epididymo-orchitis from bacterial epididymo-orchitis is the most challenging task as both can present with similar symptoms affecting the epididymis as well as the testis. On Color Doppler ultrasound, marked vascularity observed in pyogenic etiology compared with the linear peripheral flow in the tubercular epididymo- orchitis[1,15].Ultrasound findings in association with histopathology findings are crucial in the diagnosis of scrotal tuberculosis and selecting the appropriate treatment. Ultrasound is also central in the follow-up and outcome prediction: fibrosis and calcifications are of afavorable outcome, whereas fistula formation is a poor outcome[1,15].

CONCLUSION

Tuberculous Epididymo-Orchitis commonlypresents as a scrotal mass. The clinical outcome of TBEO depends on prompt diagnosis and effective treatment. Ultrasound in conjunction with histopathology contributed significantly to the initial assessment and future management of the patients with follow-up scans ensuring positive response to treatment thereby avoiding unnecessary surgical intervention. Although Scrotal TB is still rare, it is an important consideration in the differential diagnosis, especially in aimmunocompromised patients.

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