MR imaging in the characterisation of benign intratesticular mass lesion

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Section: Uroradiology & genital male imaging
Area of Interest: Genital / Reproductive system male
Procedure: Comparative studies
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Imaging Technique: MR
Special Focus: Pathology Case Type: Clinical Cases
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Patient: 45 years, male

Clinical History:

A 45-year old man was referred to the Urology department for vague scrotal pain. Sonographic examination revealed the presence of a hypoechoic right intratesticular mass lesion. Laboratory analysis was unremarkable. The patient had a history of surgery for undescended testis ipsilaterally. MR imaging examination of the scrotum was followed.

Imaging Findings:

Sonography of the scrotum revealed a heterogeneous solid intratesticular mass within a small-sized right testis (Figure 1). The lesion was well circumscribed and mainly hypoechoic, compared to testicular parenchyma. Color Doppler showed no lesion vascularity.

MR imaging examination confirmed the presence of an upper pole right intratesticular lesion (Figure 2). The mass had signal intensity slightly higher and extremely lower than that of normal testis on T1 and T2-weighted images, respectively. It was well demarcated, surrounded by a low signal intensity halo. No areas of restricted diffusion were noted within the lesion (Figure 3). Dynamic contrast-enhanced sequences revealed strong, peripheral lesion enhancement, with a ring-like pattern and gradual, progressive increase of enhancement on each successive contrast-enhanced image (Figure 4). MR imaging findings were suggestive for a benign diagnosis.

Right testicular biopsy was followed and histology reported testicular parenchyma with hemorrhagic necrosis and atrophic tubules (Figure 5).

Discussion:

The majority of solid intratesticular masses are malignant and radical orchiectomy is the treatment of choice. However, it is extremely important to recognize various benign intratesticular mass lesions, including tubular ectasia of rete testis, epidermoid cyst, orchitis, fibrosis, infarction, testicular hemorrhagic necrosis, for which orchiectomy should be avoided. A possible diagnosis of benignity based on imaging findings may improve patient management and decrease the number of unnecessary radical surgical procedures. Alternative treatment planning, including
follow-up, biopsy or partial orchiectomy may be justified in these patients [1-5].

Sonography represents the first line modality in the evaluation of scrotal diseases, allowing the characterization of many benign intratesticular mass lesions [6,7]. However, sonographic findings may be nondiagnostic or inconsistent with clinical examination, including incidentally found (subclinical) lesions. MRI examination of the scrotum has been reported as a valuable adjunct modality in the investigation of scrotal pathology, especially recommended in cases of inconclusive sonographic features, as in this patient. The advantages of the technique include a wide field of view and multiplanar capabilities, allowing simultaneous evaluation of both testicles, paratesticular spaces and inguinal regions, in addition to satisfactory anatomic information and superiority in tissue characterization [1-5]. MRI may provide satisfactory results in the preoperative characterization of the histologic nature of various intratesticular lesions, in terms of morphologic information and detection of the presence of fat, blood products, fibrosis, granulomatous and solid tissue within the masses [1-5,8-10]. However, Serra et al reported that MRI proved useful following a sonographic examination in approximately 5% of cases of scrotal mass lesions [5].

MRI of the scrotum, including a dynamic contrast-enhanced subtracted technique may provide valuable information about testicular blood flow [11-14]. The technique by providing both structural and functional information has been reported useful in the differentiation between extratesticular and intratesticular diseases and the characterization of intratesticular mass lesions [11, 14].

In this patient, MRI of the scrotum revealed the presence of hypointense intratesticular mass lesion on T2-weighted images, enhancing only peripherally after gadolinium administration, findings suggestive for a benign diagnosis. DCE subtracted MR sequences showed gradual and progressive increase of enhancement, followed by either a plateau or a slower increase until the end of the examination by both intratesticular lesion and normal contralateral testis, confirming the diagnosis of benignity. To further assess the clinical value of MRI, a comparison of the diagnostic performances of DCE MRI with sonography, including contrast-enhanced ultrasound is required.

**Differential Diagnosis List:** Testicular haemorrhagic necrosis and atrophy, Testicular haemorrhagic necrosis, Fibrosis, Testicular infarction

**Final Diagnosis:** Testicular haemorrhagic necrosis and atrophy

**References:**


Fernandez-Perez GC, Tardaguila FM, Velasco M (2005) Radiologic findings of segmental testicular infarction. AJR
184:1587-1593 (PMID: 15855121)
Figure 1

a

Description: Sagittal sonographic image of the right testis depicts an upper pole intratesticular mass (arrow). The lesion is sharply demarcated, inhomogeneous, mainly hypoechoic.

Origin: Tsili A, Department of Radiology, Ioannina, Greece.

b

Description: Transverse ultrasound image shows a small-sized right testis, with an intratesticular, hypoechoic mass lesion (cursors), measuring 13 x 9 mm.

Origin: Tsili A, Department of Clinical Radiology, Ioannina, Greece.
Description: Colour Doppler image reveals absence of lesion vascularity. Origin: Tsili A, Department of Clinical Radiology, Ioannina, Greece.
Description: Axial T1-weighted image shows right intratesticular lesion, slightly hyperintense, when compared to normal testicular parenchyma (not shown in this image). Origin: Tsili A, Department of Clinical Radiology, Ioannina, Greece.
Description: Transverse T2-weighted image depicts right intratesticular mass (arrow), mainly homogeneous, with very low signal intensity, when compared to normal testis. A left hyperintense intratesticular lesion (arrowhead) is also detected, located in the mediastinum testis. Origin: Tsili A, Department of Clinical Radiology, Ioannina, Greece.
Description: Coronal T2-weighted image shows right testicular mass (arrow), extremely hypointense, when compared to normal testicular parenchyma. The lesion is well delineated, surrounded by a hypointense halo. Origin: Tsili A, Department of Clinical Radiology, Ioannina, Greece.
Description: Diffusion-weighted image (b=900 s/mm²) in transverse plane depicts lesion hypointensity (arrow). Origin: Tsili A, Department of Clinical Radiology, Ioannina, Greece.
Description: Corresponding ADC map (Figure 4a). The ADC values of the lesion (arrow) were 1.22 s/mm² (arrow), compared to those of the normal contralateral testis (1.11 s/mm²). Origin: Tsili A, Department of Clinical Radiology, Ioannina, Greece.
Description: Coronal dynamic contrast-enhanced subtracted image at delayed (180 sec) phase depicts peripheral lesion enhancement (arrow). Origin: Tsili A, Department of Clinical Radiology, Ioannina, Greece.
**Description:** Time-signal intensity curve of right intratesticular mass, with the ROI placed in peripherally enhancing halo shows strong lesion enhancement, with gradual progressive increase of signal intensity. **Origin:** Tsili A, Department of Clinical Radiology, Ioannina, Greece.

**Description:** Time-signal intensity curve of normal left testis reveals slow and progressive increase of signal intensity throughout the examination. **Origin:** Tsili A, Department of Clinical Radiology, Ioannina, Greece.
**Figure 5**

**a**

*Description:* Testicular parenchyma with haemorrhagic necrosis (right) and atrophic tubules (left) (H-E X100). *Origin:* Gousia A, Department of Pathology, Ioannina, Greece.

**b**

*Description:* Small atrophic tubules with thick, hyalinised basement membrane and rare spermatogonia (H-E X200). *Origin:* Gousia A, Department of Pathology, Ioannina, Greece.