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Original Article

Use of strain sonoelastography in differentiation of focal testicular lesions

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ABSTRACT

Purpose: We aimed to assess potential role of strain sonoelastography in diagnosing focal testicular lesions.

Patient & methods: 21 patients with 23 focal testicular lesions were subjected to sonoelastography. Compression was performed manually by the transducer upon the testis and monitored on the compression graph on the machine. Diagnosis was reached either by surgical resection, or follow-up.

Result: 23 focal testicular lesions were included. 10 lesions were in the right and 9 in the left, and 2 lesions are bilateral. Cases included 7 focal orchitis (30.5%), two hematomas (8.7%), 7 scar tissue (30.5%), 4 seminomas (17.4%), one choriocrcinoma (4.3%), one epidermoid cyst (4.3%), and one hydatid cyst (4.3%). On strain Sonoelastography; all four seminomas and 7 scars were of low strain, also the epidermoid cyst and the two hematomas were hard, while the 7 cases of focal orchitis showed high strain. The cases of choriocarcinoma and the hydatid cyst showed mixed strain patterns. Statistical analyses showed a sensitivity of 100% in identifying neoplastic lesions, with a specificity of 40%, a negative predictive value of 100%, and a positive predictive value of 37.5%.

Conclusion: Strain Sonoelastography is useful adjunct method to differentiate benign from malignant focal testicular lesions.

1. Introduction

Ultrasonography has long been the gold standard imaging modality for the testis, due to its availability, low cost, and absence of ionizing radiation. Its sensitivity and specificity increase even more by using Doppler. However, it still has relatively low specificity [1–3].

Sonoelastography is a modern ultrasound method, which enables the representation of tissues and organs with the evaluation of their elasticity, "stiffness". Sono-elastography depicts the stiffness of tissues through evaluation of their strain. The strain of a tissue is defined by the change in length during compression divided by the length before compression and calculated in the Young's modulus (E), E = stress/strain, which estimates the stiffness of a certain tissue [4,5].

Most Sonoelastography systems display tissue stiffness in a continuum of colors from red to green to blue, designating soft (high strain), intermediate (equal strain) and hard (no strain) tissue [4–6].

In recent years, the introduction of sonoelastography, as a measure of the elasticity of tissues has been investigated in different body parts and organs such as the breast [6,7], thyroid gland [8,9], uterus [10,11], and lymph nodes [12–14]. Tumor tissues have different elasticity and undergo different deformations under pressure than healthy tissues. As a result of computer analysis, images in various colors are generated [15,16]. Recently, sonoelastography has become a method to determine tissue elasticity and detect pathological variances in the testes; both the structural analysis of testicular tissue as well as the different pathological conditions such as testicular masses [15,16].

In this study we aimed to assess the potential role of strain sonoelastography as an adjunct technique in the diagnosis of focal testicular lesions.

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Table 1
Variety of pathologies of the focal testicular lesions.

Pathology	Number (%)
Scar	7 (30.5%)
Focal orchitis	7 (30.5%)
Seminima	4 (17.4%)
Choriocarcinoma	1 (4.3%)
Epidermoid	1 (4.3%)
Hematoma	2 (8.7)
Hydatid cyst	1 (4.3%)
Total	23 (100%)

2. Materials and methods

The study was conducted upon 21 patients with 23 focal testicular lesions discovered upon conventional and doppler ultrasound. The study was approved by our ethical committee. Written informed consent was obtained from each patient. Each patient was subjected to Conventional ultrasonography (US), Doppler and Sonoelastography, using the Hitachi HI VISION Avius system (Hitachi medical corporation, Japan) equipped with a 10 MHz linear probe. Sonoelastography was performed by a senior consultant uro-radiologist with an 8 years experience in genito-urinary radiology, using Real-time Tissue Elastography application with Strain Graphs. Compression was performed manually by the transducer

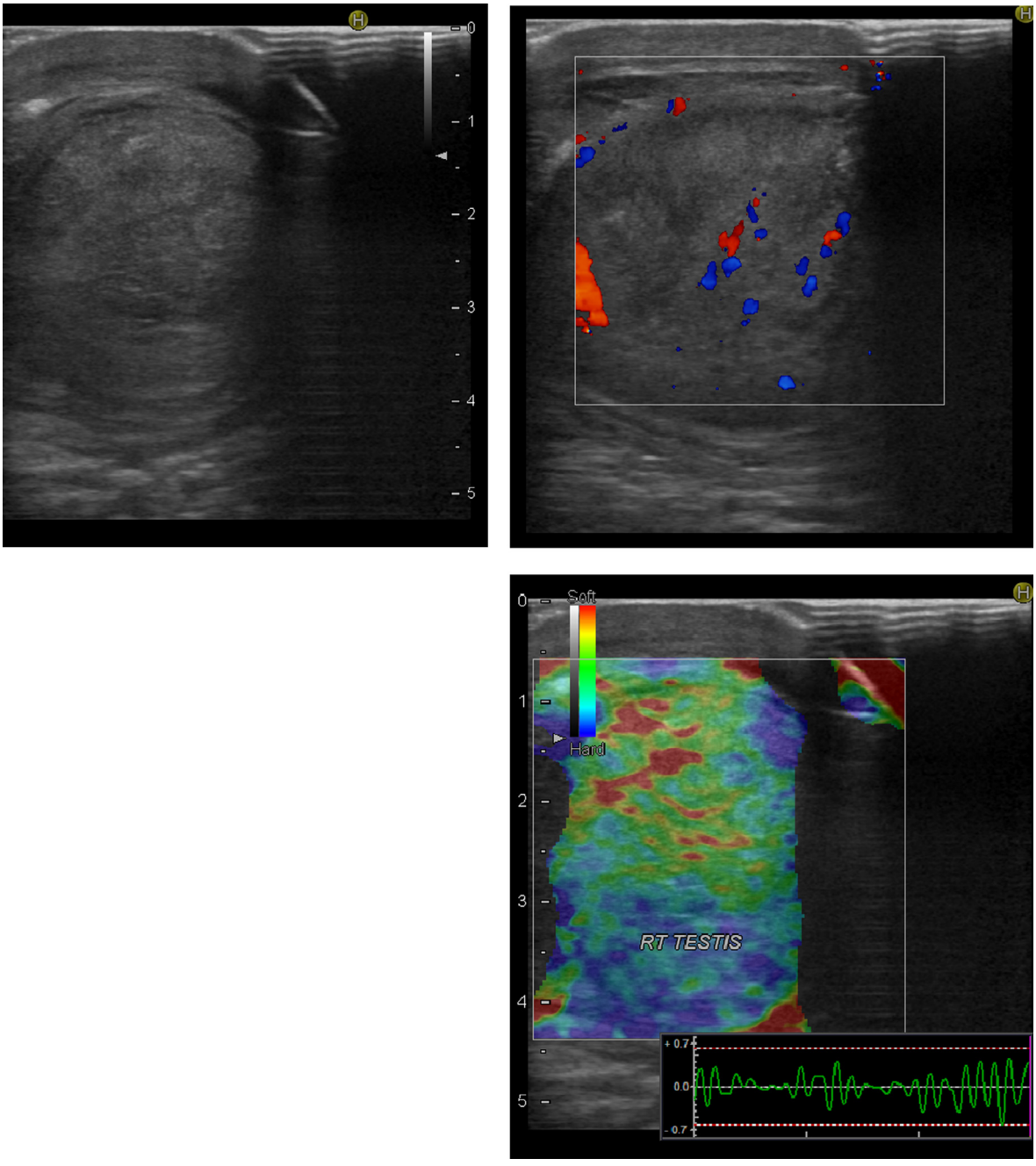

Fig. 1. 32 years old patient with right testicular swelling and pain. Grey-scale (a) and color-Doppler (b) showed an ill-defined mass with heterogeneous texture and moderate vascularity. Sonoelastography (c) shows high-strain of the mass. The mass was diagnosed as focal orchitis, and completely disappeared in the follow-up after medical treatment.

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