Elastographic Imaging of Anaplastic Seminoma of Testis With Its Ultrasound and Doppler Correlation: A Case Report

Pratik J. Bhansali 1, Suresh V. Phatak 1, Gaurav V. Mishra 1, Vadlamudi Nagendra 1

1. Department of Radiodiagnosis, Datta Meghe Institute of Medical Sciences, Wardha, IND

Corresponding author: Pratik J. Bhansali, bhansalipratik12@gmail.com

Abstract

The commonest solid tumour in men between the ages of 15 and 44 is testicular cancer. Germ cell tumours, which are then subdivided into seminomatous and non-seminomatous tumours, are its primary histological kind. In the fourth decade of a man’s life, seminoma, accounts for 55% of testicular cancer. Anaplastic seminoma, which accounts for 5% to 15% of testicular seminoma, is an uncommon kind of seminoma. The anaplastic variant of classical seminoma is an uncommon type of seminoma. In order to increase confidence in diagnosing and differentiating benign from the malignant lesion and to localize lesions in the testis, tissue elastography has arisen as a definite, important supplementary method. We present a case report of anaplastic seminoma with its classical imaging findings on strain elastography and its correlation with ultrasound and doppler.

Categories: Radiology, General Surgery, Oncology
Keywords: testicular tumour, elastography, colour doppler, ultrasonography, anaplastic seminoma

Introduction

Testicular seminomas are classified as spermatocytes, classical seminoma (CS) as well as anaplastic variations of classical seminoma. Histologically anaplastic seminoma ranges from 5% to 15% [1]. Histological diagnosis is done when there are few lymphocytes, pleomorphic cells having non-clear cytoplasm, focal necrosis, no fibrovascular septae, cellular irregularity and >3 mitotic figures per high power field [2]. The testis is usually assessed using B-mode ultrasonography and colour Doppler, with its excellent anatomical delineation and location of the testis which is superficial, has been major mainstay for finding and characterising localised testicular lesions. Location whether extratesticular or intratesticular, shape of the lesion, size of the lesion and its echogenicity pattern of lesions are all precisely determined by B-mode ultrasound. Vascularity of the testicular tissue can be useful in determining whether the lesion is benign or malignant. Colour Doppler evaluates the existence and vascularity pattern in and around the lesion to thrust diagnostic spirit. Assuming that the lesions which are harder are malignant than benign, an advanced radiological techniques like tissue elastography have surfaced as an important tool in terms of quality and quantity adjunct to conventional tool to give extra details on stiffness of the tissue [3]. These techniques aim to promote improvement in diagnosis of malignant lesions and benign lesions.

Case Presentation

A 75 years old gentleman presented with a swelling on the right scrotum which was painless for one year and increased in size gradually. General and systemic examination was normal. On local examination of the right testis: a palpable mass was noted in the right side of the scrotum, which was firm, approximate size measuring 8 x 5 cm and getting above the swelling was possible. The fluctuation and transillumination tests were negative. Touch and pain sensations over the scrotal wall were present. The left side of the scrotum was normal.

Ultrasonography of the scrotum revealed a mass showing a heterogenous echotexture. A small cystic area is also seen with increased vascularity on the doppler, as shown in Figures 1, 2.
FIGURE 1: Ultrasound of right testis showing a mass lesion with heterogeneous echotexture including hypoechoic and hyperechoic areas (white arrow) and a small cystic area (yellow arrow).
FIGURE 2: Doppler imaging of right testis showing increased vascularity in the peripheral parts.

Strain elastography revealed a score of 5 on the visual elasticity score, strain ratio of the lesion was 8.2, as shown in Figure 3.
FIGURE 3: Strain elastography revealed a score of 5 on the visual elasticity score and a strain ratio of 8.2.

A: Region of a lesion used for calculating strain ratio

B: Region of a normal tissue used for calculating strain ratio

Tumour markers, beta human chorionic gonadotropin (HCG) value was 11.98 IU/L (normal range 0-2.5 IU/L). No abdominal lymphadenopathy was seen on the USG abdomen. These findings were suggestive of testicular malignancy. High inguinal orchidectomy was performed, and histopathology suggested it to be anaplastic seminoma stage IB. Patient was referred to oncology section for chemotherapy. Chemotherapy consisted of cisplatin, etoposide, and bleomycin regimen. After completion of two cycles of chemotherapy, tumour markers were normal. On follow-up, patient was doing well.

Discussion
Assessing the testis with the help of B-mode along with colour Doppler ultrasonography is a favoured imaging examination to assess and make a diagnosis of testicular pathology as it gives exquisite anatomical details of the testicular anatomy. The shape, size, extent, whether intratesticular or extra testicular origin and determining various patterns of echogenicity of the lesion can be distinguished precisely on B-mode USG. Colour Doppler assists with vascularity and type of blood flow in the pathologic area, which aids in more precise findings. Newer and higher sonographic procedures, for example, tissue elastography, is of great help in qualitative, likewise, possibly quantitative information to give more data on tissue stiffness; with this data separating malignant from benign pathologies is considerably more straightforward and more accurate, under the consideration that benign lesion is softer as compared with the stiffness of malignant lesion which is harder [3].

Normal testis on strain elastography demonstrates a classical three-ring structure which is a blue bordered surrounded by red bands and central green colour of parenchyma [4]. Lesions within the testis can be further classified as benign, non-neoplastic benign and malignant neoplasms. Among all primary malignant testicular tumours, more than 95% belong to testicular germ cell tumours and are further split into non-seminomatous germ cell tumours or seminomatous germ cell tumours, which form 60% and 40% of all germ cell tumours accordingly. Testicular seminomas have a specific character in that they are homogeneously hypoechoic lesions which are well-defined, showing no local invasion of the tunica albuginea on USG. On strain elastography features of seminomas present as a consistently stiff nature throughout. Teratoma, embryonal cell carcinoma, mixed tumours, and choriocarcinoma are categorized as non-seminomatous germ cell tumours containing two or more histological cell types. They usually also show rigid tissue stiffness and have less homogeneous elastographic features mainly because of heterogeneous cellularity. 5% of all testicular neoplasms are gonadal stromal tumours like Leydig cell tumours and Sertoli cell tumours. Most Leydig cell tumours are benign; nearly 10% of them show malignant potential on histology [5]. Gonadal stromal cell tumours more commonly show well-demarcated solitary testicular lesions, which are small in size with increased peripheral vascularity and reduced reflectivity on Doppler. On strain elastography, tissue stiffness is between mildly hard to hard [6,7]. Seminoma is the most commonly occurring pure germ cell.
tumour with an incidence of 35-50% amongst all germ cell tumours. Its incidence is predominantly in an older age group when compared to non-seminomatous tumours [8].

Strain elastography describes six scores in the form of visual elasticity score shown in Table 1 [7].

<table>
<thead>
<tr>
<th>Visual elasticity score</th>
<th>Description on strain elastography</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score 1</td>
<td>Lesion is green with tiny red spots in between</td>
</tr>
<tr>
<td>Score 2</td>
<td>Homogeneously green colour</td>
</tr>
<tr>
<td>Score 3</td>
<td>Lesion is green with few blue spots in between</td>
</tr>
<tr>
<td>Score 4</td>
<td>Lesion is green in the periphery and blue in the centre</td>
</tr>
<tr>
<td>Score 5</td>
<td>Lesion is blue with central red and green spots</td>
</tr>
<tr>
<td>Score 6</td>
<td>Lesion is completely blue</td>
</tr>
</tbody>
</table>

TABLE 1: Visual elasticity Scores based on strain elastography

Visual elasticity score is said to be hard (score >3) and soft (score <3). Hard lesions are seen in malignant tumours. Higher values of strain ratio are observed in malignant lesions [7].

Magnetic resonance imaging has been accurately differentiating between seminomatous and non-seminomatous testicular neoplasm. Seminomas are seen as low signal intensity on T2 weighted image with multinodular sharply defined homogenous intensity. In seminoma visualisation of fibrovascular septa, demonstrating low signal intensity on T2WI and enhancement more than background tumour on T1WI is one of the key features along with fibrovascular septa, which can be thin or thick showing variably low signal intensity and correlates with the fibrous capsule on histology [9]. Differential diagnosis can be extensive in the form of non-neoplastic and neoplastic lesions. There are various tumours which have similar features to that of testicular seminoma in imaging. Benign conditions such as sarcoidosis, spleno-gonadal fusion, epidermoid cyst, segmental infarction, adrenal rests, and hematoma also sex cord-stromal tumours. In contrast, malignant mimics are lymphomas, non-seminomatous germ-cell tumours and metastasis [10].

Conclusions

Strain elastography has set a new level in ultrasound radiology. Further evaluation of tissue stiffness in the ultrasound is possible with strain elastography. As seen in this case, strain elastography helps in differentiating benign and malignant lesion, thus increasing diagnostic confidence along with a multiparametric evaluation based on ultrasonographic appearance, colour doppler and tissue elastography.

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: Payment/services info: All authors have declared that no financial support was received from any organization for the submitted work. Financial relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. Other relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References


