Society of Radiologists in Ultrasound
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Erin Prince, MD
University of Alabama at Birmingham
Birmingham, AL

1. Clinical History

A 41 year-old male presented to his primary care provider for prostate screening. The patient had a history of hypogonadism and low testosterone, as well as a family history of prostate cancer. Physical exam demonstrated significant left scrotal swelling. Palpation of the right testicle was normal. Palpation of the left testicle was limited secondary to scrotal swelling. A scrotal ultrasound revealed a large left hydrocele. However, an incidental 6 x 5 x 5 mm echogenic solid lesion was noted in the upper pole of the right testis with associated posterior shadowing, internal Doppler flow and minute echogenic foci, concerning for germ cell tumor versus Leydig cell tumor. The patient subsequently underwent a partial orchiectomy. Intraoperative frozen section demonstrated Leydig cell tumor with positive margins. The surgery was then converted to a right radical orchiectomy. Follow-up visits and examinations revealed no evidence of metastasis.

2. Figures

See below

3. Figure Legends

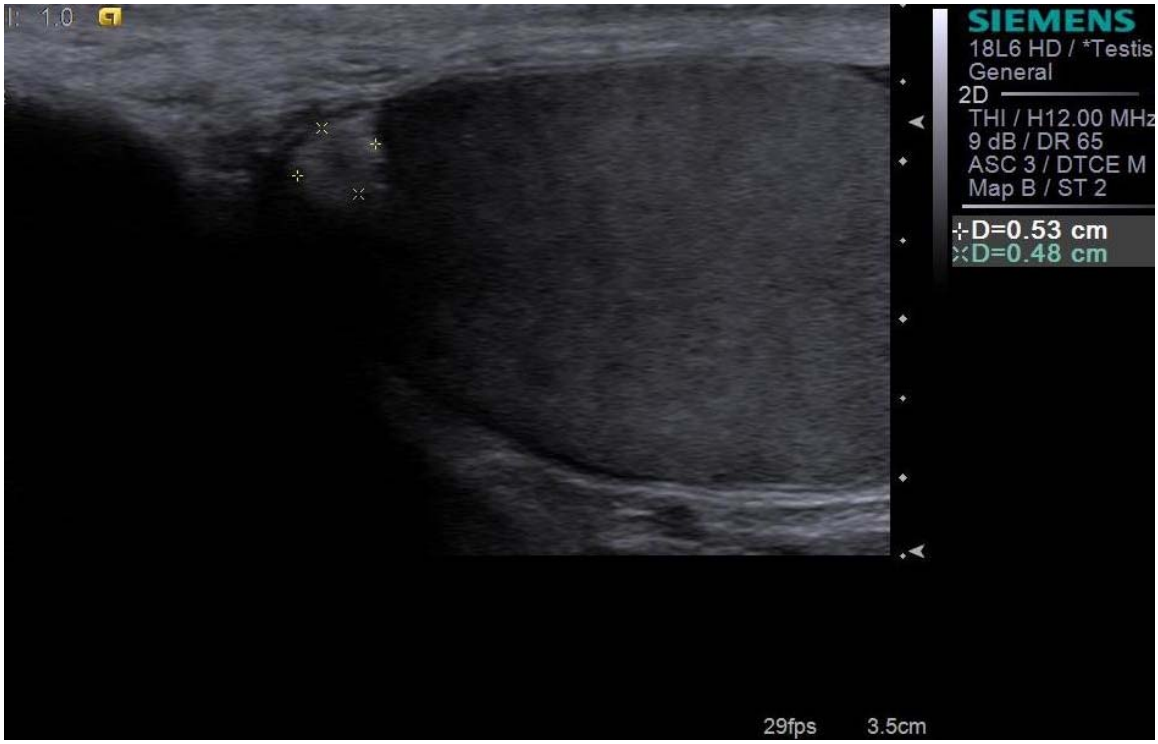

Figure 1: Longitudinal grayscale ultrasound image of the upper pole of the right testis demonstrates a 0.5 x 0.5 cm echogenic lesion with associated posterior shadowing.

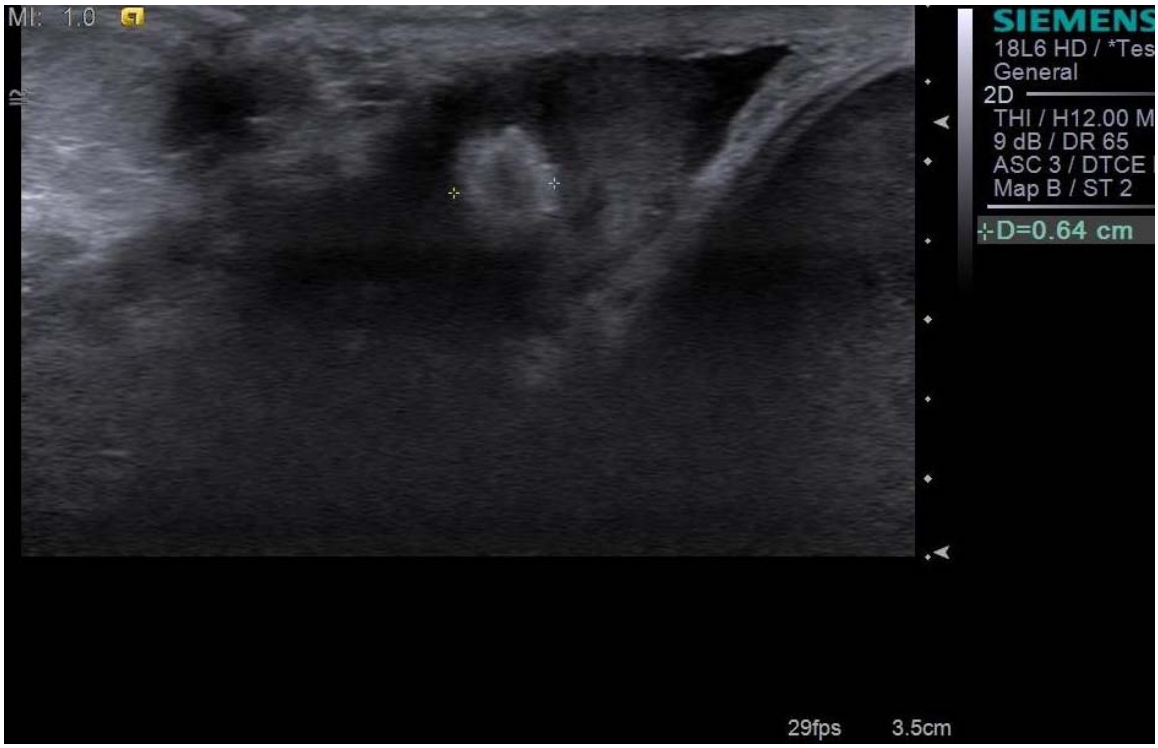

Figure 2: Transverse grayscale ultrasound image of the upper pole of the right testis again demonstrates the echogenic lesion.

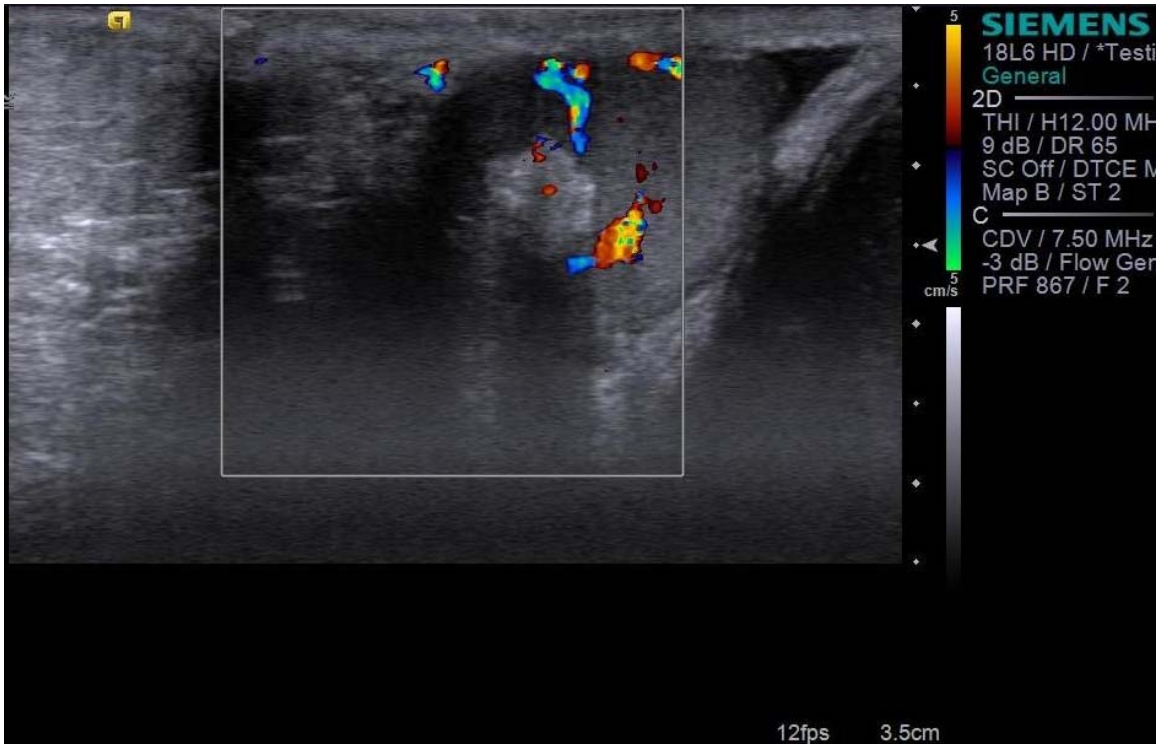

Figure 3: Transverse grayscale ultrasound image with color Doppler of the upper pole of the right testis shows increased flow within the echogenic lesion.

4. Diagnosis

Final Diagnosis: Leydig cell lesion.

Histologic evaluation showed sheet-like arrangement of polygonal cells with round or oval nuclei and prominent nucleoli, abundant eosinophilic cytoplasm, frequent lipofusin pigment and distinct cell borders. No malignant features were identified.

5. Discussion

Testicular neoplasms are divided into primary germ cell, primary nongerm cell and secondary (metastatic) lesions. The two most common nongerm cell tumors are Leydig cell and Sertoli cell tumors, which constitute approximately 5-10% of primary testicular neoplasms [1]. The incidence of Leydig cell tumors demonstrates two separate peaks, one in the preadolescent stage and another peak in those greater than 50 years of age [2]. Patients may present with painless testicular enlargement or a palpable mass, although some lesions are found incidentally for imaging requested to evaluate a separate problem (for example, infertility or erectile dysfunction) [3]. Leydig cell tumors are known to mainly produce testosterone, although estrogen may also be produced directly or through aromatization of the testosterone. These hormones may produce such effects as precocious puberty, gynecomastia, decreased libido and infertility. Leydig cell tumors may also be found in the spermatic cord, adrenal glands, and ovaries [4].

Ultrasound is typically considered the gold standard for evaluation of both palpable and

non-palpable testicular tumors. This likely stems from the fact that ultrasound is widely available, easy to perform, comparatively inexpensive and without harm to the patient. Because there has been a significant recent increase in ultrasound evaluation of the scrotum for infertility workups and technology has improved providing high resolution images, testicular tumors are progressively being diagnosed at earlier stages and as smaller masses. Given the high prevalence of gynecomastia in this patient population, many people suggest testicular ultrasound examination in the early work-up of this entity. Diagnostic ultrasound retains a high sensitivity for detection of testicular tumors (96.6%); however the inability to reliably distinguish benign from malignant lesions keeps the specificity low at 44.4% [3]. Scrotal sonography is best performed with the highest frequency transducer that provides adequate penetration [5]. Leydig cell tumors are usually seen as small, hypoechoic solid lesions on ultrasound, which may be hard to differentiate from testicular seminomas. Additionally, ultrasound may show cystic areas within the tumor from foci of hemorrhage, present in up to 25% of cases [3]. Often, Doppler imaging reveals hypervascularity internally as well as increased peripheral blood flow [4]. However, findings are variable and hyperechoic Leydig cell lesions may be seen as well. For the above mentioned reasons (including high sensitivity and wide availability), ultrasound is usually sufficient in the evaluation of testicular masses and magnetic resonance imaging is seldom necessary [5].

Historically, malignant potential has been described in approximately 10% of Leydig cell tumors. Histopathologic characteristics that are considered more likely to represent malignant degeneration include size greater than 5 cm, nuclear atypia, greater than 3 mitoses per 10 high power fields, infiltrative borders, necrosis and vascular invasion [6]. Despite these histologic distinctions, often it is very difficult to differentiate benign from malignant disease [3]. The standard of care for Leydig cell tumors remains radical orchiectomy given the chance of malignancy, and some studies report that metastasis may occur up to 8 years following resection [6]. However, as these tumors are increasingly being detected at a smaller size, argument is being made for selective cases to undergo testis-sparing surgery (including local enucleation) dependent on imaging and clinical characteristics [3, 6]. The most common sites of metastasis (in order of decreasing frequency) are retroperitoneal nodes, liver, lungs and bones. Therefore, in addition to radical orchiectomy, malignant Leydig cell tumors are often treated with retroperitoneal lymphadenectomy. Unfortunately, chemotherapy and radiation are not effective for these malignant tumors and median survival is reported as 2 years (ranging from 2 months to 17 years). Following surgical resection for benign Leydig cell tumors, prognosis remains excellent, although testicular dysfunction and infertility can be frequently seen [4].

Therefore, although the imaging findings in our patient were not completely diagnostic of a Leydig cell tumor, the ultrasound characteristics were worrisome enough to prompt surgical evaluation. Our differential diagnosis included both Leydig cell tumor and germ cell tumor. Given the small possibility of malignant degeneration of Leydig cell tumors and the relative ineffectiveness of chemoradiation treatment for these malignant tumors, it is important to recognize the imaging features of both germ cell and nongerm cell tumors of the testicles. Also, as testis-sparing surgery is becoming more accepted, early

sonographic detection of these testicular lesions may decrease post-surgical morbidity.

6. References

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7. Authors

Erin L. Prince, MD and Tatum A. McArthur, MD

8. Institution

University of Alabama at Birmingham
Department of Radiology
Jefferson Tower North, 619 19th Street South, Birmingham, AL 35249