

Value of dynamic contrast-enhanced MRI & intraoperative ultrasound for management of a nonpalpable, incidental, testicular Leydig-cell tumor

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We report a case of a small, intratesticular, incidentally identified, nonpalpable Leydig-cell tumor in which preoperative, dynamic, contrast-enhanced MRI was essential in characterizing the lesion as a neoplasm. Sonographic evaluation failed to demonstrate internal color Doppler flow, resulting in a differential diagnosis that included debris-filled cyst. At surgical resection, intraoperative ultrasound was essential to locate the mass and confirm complete removal. This case highlights the value of dynamic, contrast-enhanced MRI and intraoperative ultrasound for the management of incidental intratesticular lesions with indeterminate sonographic and Doppler characterization. Radiologists and urologists should be familiar with this approach to the incidental, sonographically indeterminate, nonpalpable intratesticular lesion identified on scrotal ultrasound.

Case report

A 44-year-old man undergoing fertility workup also complained of vague, intermittent, left scrotal discomfort. On physical exam, his testes were small, each measuring 2 cm in maximum diameter. No palpable abnormality was detected. Sonographic evaluation demonstrated a normal left testis and small left varicocele. In the right testis, an oval, 3-mm hypoechoic lesion with a visible posterior wall, faint internal echoes, and no clear through-transmission was noted (Fig. 1).

Color Doppler evaluation did not demonstrate internal blood flow, but marginal flow was detected (Fig. 2). Laboratory tests for tumor markers were negative.

An MRI of the testes with dynamic gadolinium contrast enhancement was recommended to further assess the lesion, in an effort to distinguish a small cyst from a solid

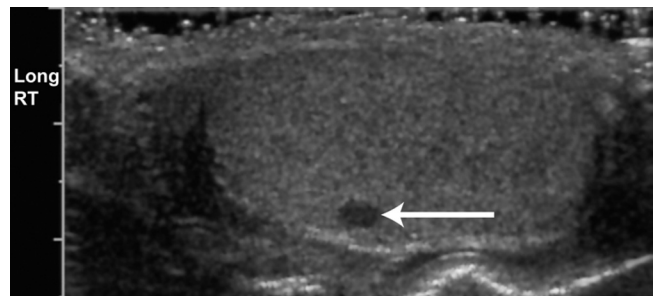


Figure 1. 44-year-old male with Leydig-cell tumor. Sagittal sonogram of the right testis shows a 3-mm hypoechoic nodule (arrow).

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mass. The MR examination revealed that the right testicular lesion was hypervascular relative to the background testicular enhancement at 60 seconds (Fig. 3A and B). These contrast-enhancement features excluded the possibility of a cyst and were suspicious for a neoplasm; surgical consultation was obtained.

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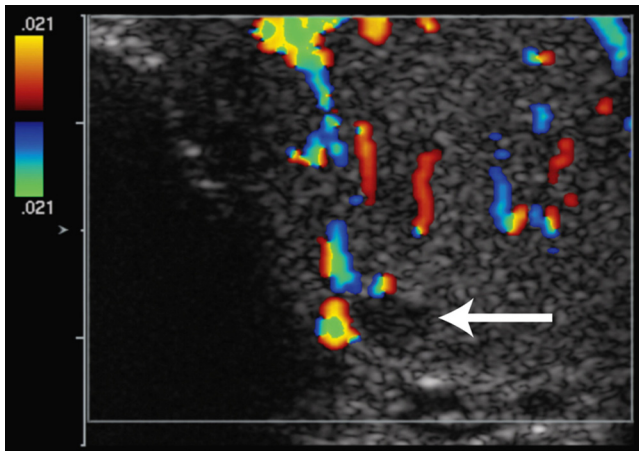


Figure 2. 44-year-old male with Leydig-cell tumor. Transverse color Doppler sonogram of the right testis focusing on the hypoechoic nodule demonstrates flow adjacent to the nodule, but not within the nodule (arrow).

The patient elected to have testis-sparing surgery (TSS). Intraoperative sonography of the right testis was requested for lesion localization, since the mass was not palpable even after the right testis was brought out through the right groin incision (Fig. 4A and B). Excisional biopsy of the lesion was successful using intraoperative sonographic guidance, with removal of only the lesion; the testis was spared when histologic analysis of the excised tissue sample identified the lesion as a Leydig-cell tumor without malignant features.

Discussion

The discovery of incidental and potentially significant intrascrotal findings is an expected consequence of the widespread use of ultrasound to evaluate scrotal disorders, in cases where scrotal imaging is desired. When these incidental findings demonstrate characteristic sonographic features, they rarely pose a diagnostic or management dilemma. However, an incidental intratesticular lesion that is sonographically indeterminate leads to a difficult management decision, traditionally forcing the urologist to choose between short-interval periodic sonographic surveillance and surgical evaluation. Although several series have reported that these small (up to 2-cm), nonpalpable testicular lesions incidentally discovered on scrotal ultrasound have a high (up to 80%) prevalence of benign disease (1), reliable distinction between benign and malignant lesions has traditionally required histologic evaluation. Histologic evaluation requires surgery, since percutaneous biopsy of testicular lesions is rarely if ever performed.

MRI can be useful in determining the need for surgical exploration, as it yields additional information that can reliably distinguish lesions suspicious for neoplasm from those likely to be nonneoplastic or benign (2-4). Muglia et al reported on their limited experience in which ten cases suspected of possibly being neoplastic on scrotal ultrasound demonstrated benign morphologic MR patterns; all 10

cases proved benign with followup (2). However, because they did not perform contrast-enhanced MRI in their cases, that series does not highlight the full potential of MRI for evaluating sonographically-indeterminate intratesticular lesions. MRI can detect enhancement patterns that are either benign (such as lack of enhancement that might be seen with testicular infarcts) or suspicious for neoplasm (when the suspected lesion exhibits an elevated mean peak

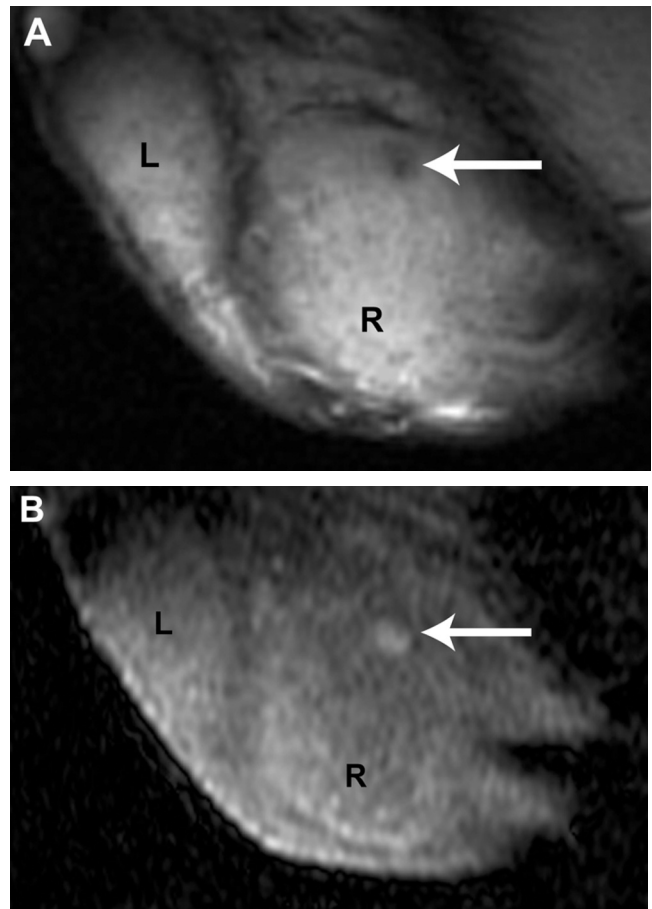


Figure 3A. 44-year-old male with Leydig-cell tumor. Sagittal T2-weighted MR image of the right testis (R) shows the 3 mm nodule (arrow) with decreased signal intensity compared to the remainder of the testis. An oblique section through the left testis (L) is included in the field of view. B. Sagittal, dynamic, gadolinium-contrast-enhanced MR image performed at 60 seconds following contrast injection shows the nodule to be hyperenhancing compared to the remainder of the right testis (R). The left testis (L) is partly included in the field of view.

height and mean slope of enhancement, often visually apparent as early and intense enhancement relative to the background testicular parenchyma) (5).

When the lesion demonstrates neoplastic-type enhancement on MRI, prompting surgical exploration and lesion excision, the surgeon and patient must choose between or-

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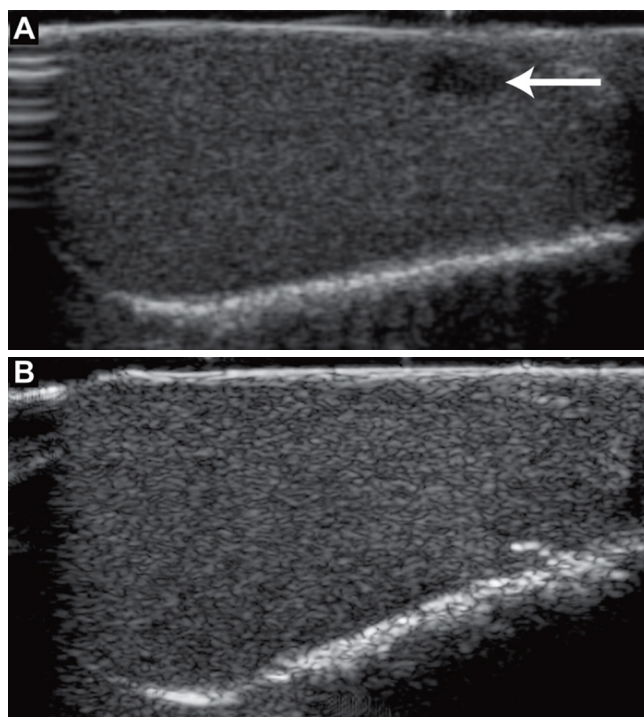


Figure 4A. Intraoperative sagittal sonogram localizes the 3-mm nodule to the closest surface of the testis. B. Intraoperative sagittal sonogram performed after surgical removal of the nodule shows no residual mass.

chiectomy and TSS. For histologically confirmed benign disease, TSS is usually preferred, since cumulative experience from several surgical series supports its efficacy in minimizing functional testicular impairment. In many cases, successful TSS is facilitated by both intraoperative imaging guidance and intraoperative frozen-section examination of tissue samples (6).

As the most common nongerm cell tumors of the testis, Leydig-cell tumors account for up to 3% of testicular neoplasms. Although they are mostly benign, up to 10% are malignant (7). Sonographically, Leydig-cell tumors are usually less than 2 cm in size and homogeneously hypoechoic to the normal background testis, with peripheral hypervascularity that is either punctuate or circumferential (8). The mass itself is rarely hypervascular on sonography; as a result, distinguishing a small Leydig-cell tumor from a complicated cyst or other benign entity can be challenging. One previous English-language case series detailed the contrast-enhanced MRI appearance of Leydig-cell testicular tumors in three men (9). In those cases, as in our patient, the tumors demonstrated marked and homogeneous enhancement.

Our patient presented with a small, nonpalpable right testicular mass incidentally discovered during workup for infertility and contralateral scrotal symptoms. Sonographic evaluation could not distinguish between a small cyst with hemorrhage/debris and a small solid nodule because inter-

nal color Doppler flow could not be demonstrated. The dynamic, contrast-enhanced MRI study was essential in demonstrating that the mass exhibited a neoplastic pattern of enhancement. The value of contrast-enhanced imaging in this case was in confirming the solid nature of the lesion and excluding a complicated cyst, enabling the patient and urologist to have confidence that pursuing histologic evaluation was necessary.

Intraoperative sonography can not only help maximize preservation of residual testicular parenchyma on the operated testis, but it can also help confirm adequate excision of the targeted lesion. Recognizing that there is a growing favorable urologic experience with TSS for Leydig-cell tumors (10-12), this case report highlights the utility of MR characterization and intraoperative sonographic localization for TSS in such cases; it aims to contribute to familiarity with this approach to the sonographically indeterminate, incidental, intratesticular mass.

References

1. Carmignani L, Gadda F, Gazzano G, et al. High incidence of benign testicular neoplasms diagnosed by ultrasound. *J Urol* 2003; 170(5):1783-1786. [PubMed]
2. Muglia V, Tucci S, Jr, Elias J, Jr, Trad CS, Bilbey J, Cooperberg PL. Magnetic resonance imaging of scrotal diseases: when it makes the difference. *Urology* 2002; 59(3):419-423. [PubMed]
3. Patel MD, Patel BM. Sonographic and magnetic resonance imaging appearance of a burned-out testicular germ cell neoplasm. *J Ultrasound Med* 2007; 26(1):143-146. [PubMed]
4. Patel MD, Silva AC. MRI of an adenomatoid tumor of the tunica albuginea. *AJR Am J Roentgenol* 2004; 182(2):415-417. [PubMed]
5. Watanabe Y, Dohke M, Ohkubo K, et al. Scrotal disorders: evaluation of testicular enhancement patterns at dynamic contrast-enhanced subtraction MR imaging. *Radiology* 2000; 217(1):219-227. [PubMed]
6. Giannarini G, Mogorovich A, Bardelli I, Manassero F, Selli C. Testis-sparing surgery for benign and malignant tumors: A critical analysis of the literature. *Indian J Urol* 2008; 24(4):467-474. [PubMed]
7. Kim I, Young RH, Scully RE. Leydig cell tumors of the testis. A clinicopathological analysis of 40 cases and review of the literature. *Am J Surg Pathol* 1985; 9(3):177-192. [PubMed]
8. Maizlin ZV, Belenky A, Kunichezky M, Sandbank J, Strauss S. Leydig cell tumors of the testis: gray scale and color Doppler sonographic appearance. *J Ultrasound Med* 2004; 23(7):959-964. [PubMed]
9. Fernandez GC, Tardaguila F, Rivas C, et al. Case report: MRI in the diagnosis of testicular Leydig cell tumour. *Br J Radiol* 2004; 77(918):521-524. [PubMed]
10. Carmignani L, Colombo R, Gadda F, et al. Conservative surgical therapy for leydig cell tumor. *J Urol* 2007; 178(2):507-511; discussion 511. [PubMed]
11. Loeser A, Vergho DC, Katzenberger T, et al. Testis-sparing surgery versus radical orchiectomy in patients

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with Leydig cell tumors. *Urology* 2009; 74(2):370-372. [\[PubMed\]](#)

12. Suardi N, Strada E, Colombo R, et al. Leydig cell tumour of the testis: presentation, therapy, long-term follow-up and the role of organ-sparing surgery in a single-institution experience. *BJU Int* 2009; 103(2):197-200. [\[PubMed\]](#)