

# Intratesticular Arteriovenous Malformation

## Color Doppler Sonographic Findings

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**A**rteriovenous malformations (AVMs) of male genitalia are rare. In the literature there are reports of AVMs involving the scrotum,<sup>1,2</sup> penis,<sup>3</sup> spermatic cord,<sup>4</sup> testis, and epididymis<sup>5</sup> and interventional treatment of scrotal AVMs.<sup>6</sup> In our literature search, we found no report about intratesticular AVMs. In this report we present the sonographic features of a small intratesticular AVM, which was incidentally found in a patient during scrotal examination for infertility evaluation. This rare entity should be considered in the differential diagnosis of intratesticular masses.

### Abbreviations

AVM, arteriovenous malformation

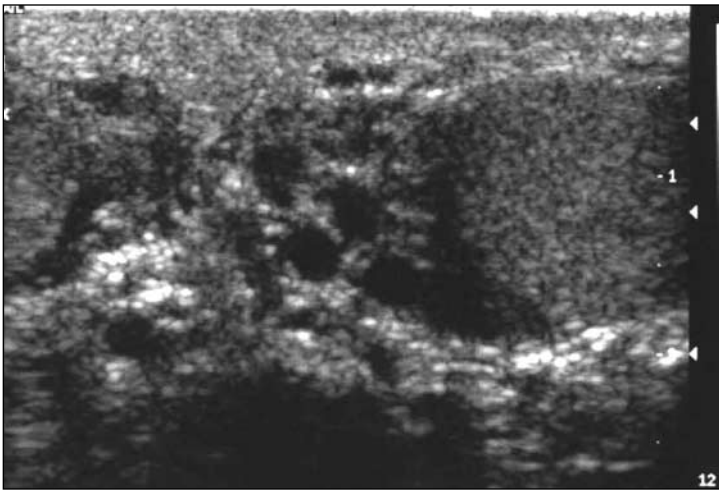
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### Case Report

A 33-year-old infertile man was admitted to our department for scrotal sonographic evaluation. His wife's fertility status was normal. Infertility workup showed a low sperm count ( $9 \times 10^6$  sperm/mm<sup>3</sup>) and low motility and normal morphologic characteristics on a spermiogram.  $\alpha$ -Fetoprotein and human chorionic gonadotrophin levels were within normal limits. Physical examination revealed bilateral normal-sized testes and grade III varicocele on the left side. Gray scale and color Doppler sonographic examinations were performed with an HDI 5000 sonography machine (Philips Medical Systems, Eindhoven, the Netherlands) with a 7-MHz linear array transducer both at rest and during the Valsalva maneuver while the patient was in the supine position.

On the left side, gray scale sonography revealed hypoechoic dilated tubular structures in the pampiniform plexus location (Fig. 1). Color Doppler sonography showed venous flow at rest and an increase in diameter (2.1 mm)



**Figure 1.** Gray scale sonogram showing hypoechoic tubular structures in the pampiniform plexus of the left scrotum.

and markedly increased retrograde venous flow of 15 seconds during the Valsalva maneuver. These findings were typical of varicocele.

On the right side, gray scale sonography showed a 6-mm-diameter hypoechoic intratesticular mass in the upper pole of the right testis (Fig. 2). However, color Doppler sonography both at rest and during the Valsalva maneuver revealed no extratesticular varicocele. The mass showed prominent enlarged tortuous vessels consisting of arteries and veins. The 5 random measurements showed peak systolic velocities ranging from 18 to 30 cm/s (mean, 22 cm/s), end-diastolic

**Figure 2.** Gray scale sonogram showing a 6-mm hypoechoic, heterogeneous, rather well-defined lesion in the upper pole of the right testis.



velocities ranging from 8 to 14 cm/s (mean, 10 cm/s), and resistive indices ranging from 0.29 to 0.52 (mean, 0.42). The arterial flow pattern was of higher diastolic velocity and lower resistance. The veins had a mean flow velocity of 6 cm/s and a continuous flow pattern that did not show reversal of flow with the Valsalva maneuver. A draining vein was also observed (Fig. 3).

The imaging findings of the mass were consistent with a small AVM. Because of the small size of the vascular mass, invasiveness, and risk of radiation, no angiographic imaging and intervention were performed. The patient refused surgery for the varicocele and mass. He had follow-up serial control color Doppler sonographic examinations. The sonographic features and size of the mass remained the same during the follow-up period of 8 months.

### Discussion

Sonography is the first choice in the determination of the nature (cystic versus solid), origin, and extent of intratesticular masses. Seminomatous and nonseminomatous tumors, which constitute about 90% of intratesticular primary tumors, lymphomas, Leydig and Sertoli cell tumors, cysts of the tunica albuginea, tubular ectasia of the rete testis, testicular cysts, lipomas, interstitial cell tumors, hemangiomas, adenomatoid tumors, and varicocele are among the main solid and cystic intratesticular masses.<sup>7,8</sup> Most intratesticular masses are malignant, and their sonographic features are well established.<sup>9</sup> Conversely, testicular tumors of vascular origin have been reported to be extremely rare.<sup>8,10</sup>

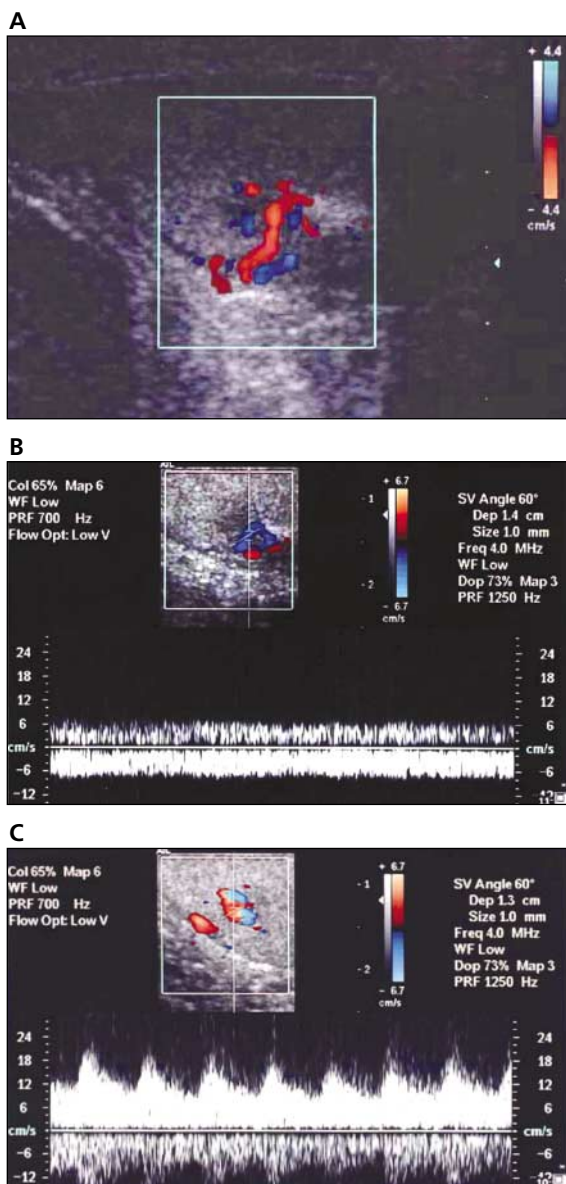
In the differential diagnosis of the lesion in our case, we considered intratesticular varicocele and hemangioma. Intratesticular varicocele is also a rare condition and is seen as straight or serpentine hypoechoic tubular structures within testicular parenchyma.<sup>11,12</sup> Pathogenesis is thought to be the same as that of extratesticular varicocele.<sup>11</sup> Although it is usually reported to be associated with ipsilateral extratesticular varicocele, isolated forms could also be seen.<sup>11</sup> Venous flow of the lesion in our case did not increase, and no retrograde flow was observed during the Valsalva maneuver; thus we excluded that entity. Tubular ectasia of the rete testis could also be considered in the differential diagnosis, but because there was flowing blood inside the lesion, we also excluded that possibility.

A hemangioma was the main concern and most probable initial diagnosis in our case. Testicular hemangiomas are among the rare benign masses; they comprise 3 major categories (capillary, cavernous, and epithelioid) and usually are not associated with hemangiomas at other locations.<sup>8-10,13,14</sup> Hemangiomas are usually characterized by testicular enlargement with

or without tenderness, which was not the case in our patient.<sup>8</sup> Gray scale sonography generally shows a focal, well-defined hypoechoic mass with calcifications, and color Doppler sonographic patterns may show variations among different types of hemangiomas, because some of them have slower flow or lesser degrees of vascular pooling.<sup>9</sup> Another reported Doppler feature is the presence of a low-resistance pattern probably representing arteriovenous shunting.<sup>9</sup> Our case had features similar to those of a hemangioma, but with color Doppler sonography we were able to show the spectral flow patterns (low-impedance flow and high peak and diastolic velocities) and a draining vein, which are characteristics of AVMs. Although AVMs could cause bruit during auscultation with the Doppler stethoscope,<sup>1</sup> there was no murmur in our case, possibly because of the small size.

An intratesticular AVM is a rare entity and could easily be confused with a hemangioma if it is small. We think that if large enough, it could be a cause of infertility; therefore, recognition of it is important for proper clinical treatment.

**Figure 3.** **A**, Color Doppler sonogram of the lesion showing a tangle of vessels and flow signals moving toward and leaving the lesion. **B**, Doppler spectrum obtained from the venous side showing relatively slow and continuous flow. **C**, Doppler spectral pattern obtained from the arterial side showing low resistance with a higher diastolic velocity.



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