

REVIEW

Testicular varicoceles

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A testicular varicocele represents an abnormal degree of venous dilatation of the pampiniform plexus. It is a relatively common condition and may present at scrotal pain and swelling. An association with male subfertility is an area of debate. This article describes the present day radiological criteria and imaging techniques to aid accurate diagnosis of varicoceles. In addition, the role of the interventional radiologist in treating this condition is discussed.

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Introduction

A varicocele is an abnormal degree of venous dilatation in the pampiniform plexus.¹ It affects approximately 15% of men. It can present with scrotal pain and swelling, or during the investigation of male sub-fertility. Nowadays most are detected incidentally in patients undergoing scrotal ultrasound for other reasons and remain clinically silent. The aetiology of varicoceles is unclear. Idiopathic varicoceles are more common on the left side where the left spermatic vein enters perpendicular to the left renal vein. The right spermatic vein enters obliquely into the inferior vena cava and this appears to have some protective effect on the right side. Retrograde flow into the internal spermatic vein results in dilatation and tortuosity of the pampiniform plexus. Less frequent causes of varicoceles include compression of the renal vein sometimes by tumour, an aberrant renal vein or an obstructed renal vein. Because varicoceles are much less common on the right side, the finding of a right-sided varicocele necessitates evaluation of the abdomen to exclude an associated abdominal mass causing compressive symptoms

(Fig. 1), this is also true in older patients who present with a recent onset varicocele.

The association of varicoceles with sub-fertility is controversial. In some patients sperm motility improves after varicocele ablation, but in others it remains the same.

In this article we will describe the criteria for diagnosis, particularly emphasizing the present ultrasound guidelines. Methods and manoeuvres to aid visualization are discussed, as well as variations in appearance. In addition the role of the interventional radiologist in treating this disorder is described.

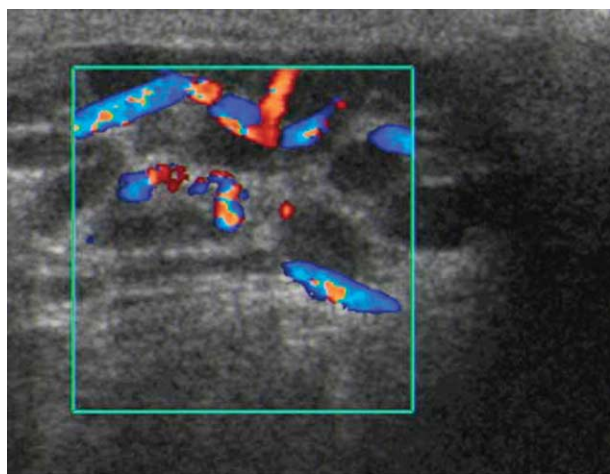
Diagnosis

Clinical

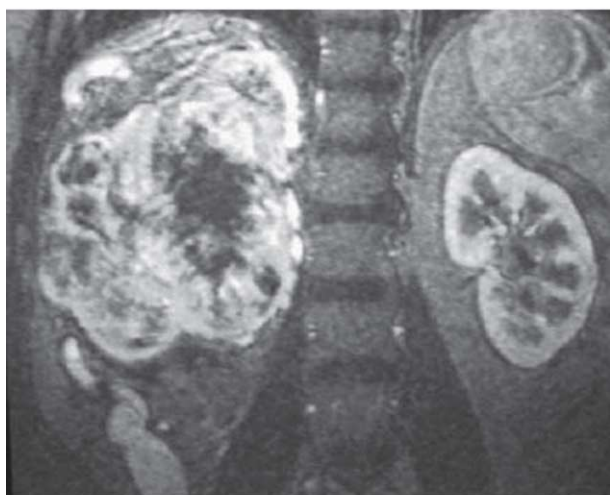
Varicoceles may be symptomatic with pain and swelling. The clinical suspicion of a varicocele depends on the expertise of the evaluating physician. A senior urologist, for example, is far more likely to make the correct diagnosis. A Valsalva manoeuvre (expiration against a closed glottis) is an important part of the clinical examination as this causes distension of the pampiniform plexus allowing greater visualization. Varicoceles greater than 3-4 mm in diameter are usually clinically apparent.¹ A large varicocele is often described as a bag of worms surrounding the testis. Dubin and

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(a)



(b)

Figure 1 (a) Grey scale ultrasound demonstrates large varicocele surrounding the right testes. (b) Coronal gadolinium-enhanced coronal fast low angle shot (FLASH) MRI image demonstrates large right renal mass with ipsilateral varices.

Amelar² devised a useful clinical grading system for palpable varicoceles. Grade 1 varicoceles are considered to be those palpable only during a Valsalva manoeuvre. Grade 2 varicoceles are palpable without the Valsalva manoeuvre. Grade 3 varicoceles are visible on examination before palpation. Although clinical evaluation with Valsalva manoeuvre is a simple and non-invasive test, clinical examination is not without limitation. A study by Orda et al. of 38 males suggests that clinical assessment is highly subjective.³ In a World Health Organisation multicentre study on 141 men with sub-fertility the sensitivity of clinical examination was approximately 50% for the detection of a varicocele when compared with venography and it had a false-positive rate of 23%.⁴ This high false-

positive rate for clinical examination makes it imperative that a practising radiologist be familiar with the radiological features and variations of testicular varicoceles.

Imaging

In the past, thermography was a widely used technique but has largely been superseded by ultrasound⁵ and will not be discussed further (Table 1).

Ultrasound is now the most frequently used method and a high-frequency transducer of at least 7 MHz should be used. The features on grey scale ultrasound include a prominence of at least two to three veins of the pampiniform plexus, of which one should have a diameter greater than 2-3 mm in a supine position.^{6,7} In a study by Rifkin et al. in 21 patients with clinically palpable varicoceles, good correlation was found when 3 mm was used as the minimum size for diagnosis of a varicocele.⁶ Other studies have suggested 2 mm is sufficient to diagnose a varicocele.⁵ However, the exact size of the vessel is variable. A Valsalva manoeuvre is an important component of the examination and should be performed routinely as it causes an increase in vessel size and conspicuousness (Fig. 2). In 1986, MacClure and Hricak assessed 50 subfertile and 25 control patients. In the subfertile group 50% had clinically detectable varicoceles while 68% had ultrasound evidence of a spermatic vein exceeding 3 mm in size. In the control group 16% had clinically detectable varicoceles while 32% had a spermatic vein exceeding 3 mm on ultrasound.⁸ This again suggested the additive importance of ultrasound over clinical evaluation alone. Unfortunately this study did not incorporate a group who underwent venography, which is considered to be the gold standard. Hamm et al.⁵ compared scrotal ultrasound with venography in 118 patients. In this study ultrasound was shown to have a sensitivity of 98% and specificity of 100% compared with venography, but 2 mm was used as the lower limit for venous dilatation.⁴ While the majority of varicoceles are extra-testicular in location, they may rarely traverse the testicle itself (Fig. 3).

During the examination, conditions should allow for maximum visualization while maintaining patient comfort. The room should be darkened and a chaperone should be made available if possible. The procedure should be fully explained to the patient and also how to perform the Valsalva manoeuvre. In our institution, it is routine for the patient to hold the penis in the anatomical position

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