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Intratesticular varicocele: sonographic diagnosis and clinical impact

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Abstract

Intratesticular varicocele is an uncommon sonographic finding that often coexists with extratesticular varicocele. Its clinical significance remains uncertain, with limited evidence regarding its effect on fertility or testicular function. This commentary discusses the peer-reviewed literature, focusing on the diagnostic features, clinical associations, and management considerations of intratesticular varicocele. Current evidence indicates that isolated intratesticular varicocele is rare and has no proven effect on semen quality or testicular volume. Management should be guided by the presence of concurrent extratesticular varicocele, as there is no established indication for direct treatment of isolated intratesticular varicocele. Further prospective studies may help clarify whether isolated intratesticular varicocele has any independent clinical significance; however, current evidence supports a cautious, observation-based approach when it is encountered in isolation.

Introduction

Intratesticular varicocele (ITV) represents venous dilatation within the testicular parenchyma, typically adjacent to the mediastinum or rete testis. On color Doppler ultrasound, it appears as serpiginous intratesticular channels demonstrating reflux that increases with the Valsalva maneuver[1]. Since its first recognition, ITV has been regarded primarily as a hemodynamic extension of extratesticular varicocele (ETV), rather than a distinct pathological entity[2,3]. Although the sonographic diagnosis is straightforward, its pathophysiological characteristics and clinical implications remain uncertain[4].

Association with extratesticular varicocele

Most available data suggest that ITV rarely occurs in isolation. Das *et al.*[2] identified ITV in 25 testes, nearly half of which were associated with ETV. Weiss *et al.*[3] and Aksu *et al.*[5] likewise found that ITV was commonly detected alongside refluxing extratesticular veins. This consistent association supports the view that ITV develops as a consequence of retrograde flow through interconnected venous pathways rather than as an independent lesion.

Diagnostic features

High-resolution color Doppler ultrasonography remains the cornerstone of ITV diagnosis. ITV appears as ovoid and/or tubular anechoic structures within the testicular parenchyma, typically subcapsular or adjacent to the mediastinum testis, measuring 2 mm or greater in diameter. On color Doppler imaging, these structures demonstrate spontaneous venous flow or flow accentuated during the Valsalva maneuver with retrograde reflux lasting more than 1 second[1,3,6] (Fig. 1, Fig. 2, Fig. 3, Fig. 4). Accurate recognition helps differentiate ITV from other cystic or vascular testicular lesions, such as tubular ectasia of the rete testis, or small intratesticular cysts. Awareness of this entity can prevent unnecessary concern and invasive procedures.

Effect on fertility and testicular volume

The effect of ITV on fertility has not been clearly established. Most available studies have examined cases in which ITV coexisted with ETV, making it difficult to determine its independent effect. Das *et al.*[2] and Aksu *et al.*[5] reported no significant correlation between the presence of ITV and testicular hypotrophy. Similarly, Weiss *et al.*[3] and Leung *et al.*[1] did not identify changes in semen parameters attributable to ITV alone. Overall, there is no convincing evidence that isolated ITV impairs spermatogenesis or testicular growth.

Clinical presentation

In clinical practice, ITV may be detected incidentally during evaluation for scrotal discomfort or infertility. While some patients report

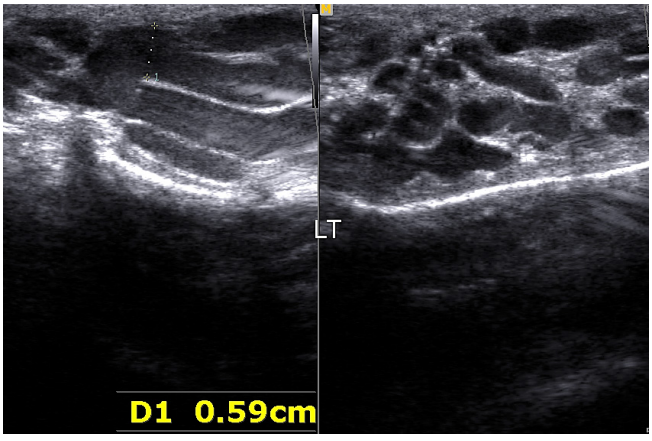

Fig. 1. *B-mode ultrasound demonstrating markedly dilated extratesticular varicoceles, with venous diameters measuring up to 5.9 mm*

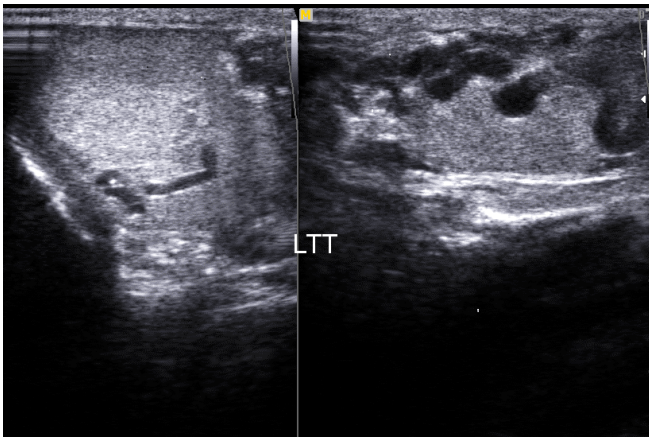

Fig. 2. *B-mode ultrasound demonstrating dilated serpiginous intratesticular tubular structures, predominantly in a subcapsular location, consistent with intratesticular varicoceles*

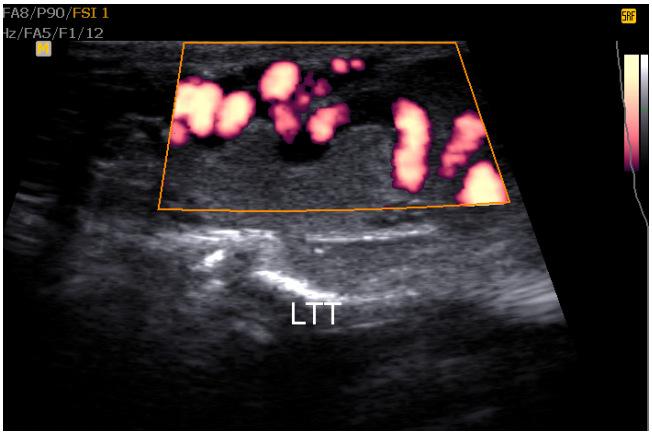

Fig. 3. *Power Doppler evaluation demonstrating spontaneous venous flow within left-sided intratesticular varicoceles*

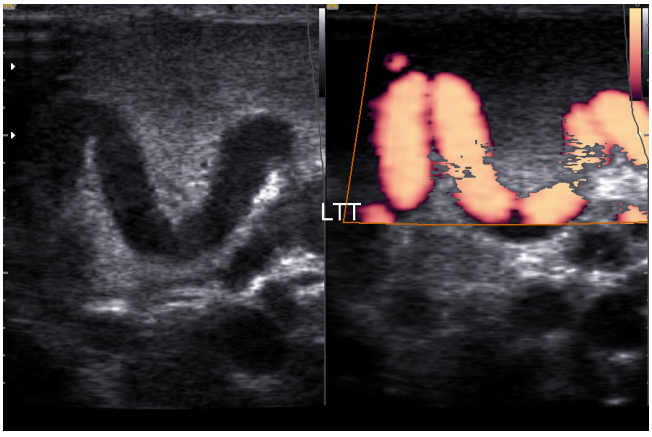

Fig. 4. *Left testis demonstrating intratesticular varicocele near the mediastinum on B-mode and power Doppler imaging*

dull scrotal pain, the discomfort is more likely related to coexisting ETV than to the intratesticular component itself[1,3,5]. Therefore, when ITV is identified without accompanying ETV, conservative observation and periodic ultrasound follow-up are generally appropriate.

Management

For patients with both ITV and ETV, the standard treatment remains surgical correction of the extratesticular reflux. Microsurgical varicocelectomy effectively eliminates reflux in the spermatic cord veins, often resulting in spontaneous resolution of the ITV on postoperative imaging[7,8]. Importantly, the intratesticular veins are not directly manipulated during surgery because doing so may result in parenchymal injury and testicular fibrosis.

When ITV is identified in isolation, there is currently no evidence supporting direct intervention. In such cases, conservative management with clinical and sonographic follow-up remains the most appropriate approach.

Conclusion

Intratesticular varicocele is a rare and often incidental finding, most frequently associated with extratesticular varicocele. Although its sonographic recognition is straightforward, its clinical significance remains uncertain. Current evidence does not demonstrate that isolated ITV has a measurable effect on semen quality, fertility, or testicular volume. Management should therefore focus on identifying and treating any associated extratesticular reflux, with isolated ITV managed conservatively. Further prospective studies may help clarify whether isolated ITV has any independent clinical significance; however, current evidence supports a cautious, observation-based approach when it is encountered in isolation.

Conflicts of interest

The author declares no conflict of interest.

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