

LETTER TO EDITOR

Microsurgery for Subclinical Varicocele: Does the Evidence Support Intervention?

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1. Introduction

Varicocele is a well-recognized cause of male infertility, yet the management of subclinical varicocele (SV), defined as venous reflux detected by Doppler ultrasonography but not palpable on physical examination, remains controversial. Traditionally, SV has been dismissed as clinically irrelevant, and major societies such as the AUA and EAU do not recommend surgical correction, especially in men with normal semen analysis [1,2]. However, recent studies and meta-analyses have challenged this dogma, raising the question of whether some patients with SV may indeed benefit from intervention [3].

1.1. Evidence from Current Guidelines

- The AUA/ASRM 2024 and EAU 2021 guidelines explicitly recommend against surgical repair of SV in infertile men, citing insufficient evidence [1,2].
- Standard semen analysis is considered insufficient to justify intervention if results are normal [3].
- Surgery remains limited to palpable Varicocele with abnormal semen or infertility [3].

1.2. Emerging Evidence Supporting Surgery

- A 2025 comparative study reported that microsurgical varicocelectomy improved semen quality and morphology in SV patients compared to observation [3].
- Thirumavalavan and colleagues demonstrated similar pregnancy rates in men with clinical and subclinical varicoceles undergoing repair [4].

- Systematic reviews and meta-analyses suggest that treatment of SV may improve sperm quality, DNA integrity, and live birth outcomes, even when baseline semen parameters are normal [5].

1.3. Pathophysiological Mechanisms

- Testicular venous reflux in SV contributes to heat stress, hypoxia, and oxidative stress [6].
- Oxidative stress leads to sperm DNA fragmentation, impairing fertility despite normal semen counts [7].
- Recent work implicates exosomal microRNAs (such as miR-210-3p) as biomarkers of subclinical testicular stress, which may normalize after surgery [8].

1.4. Risks and Considerations

- Microsurgical varicocelectomy carries risks: hydrocele formation, arterial injury, recurrence, and rarely, reduced testicular function [9].
- Surgery could theoretically worsen fertility in patients with borderline normal semen [9].
- Careful patient selection is critical [3].

2. Discussion

The controversy stems from the gap between guideline conservatism and emerging but incomplete data. Current guidelines are correct in warning against routine SV surgery; however, new evidence suggests that a subset of patients, particularly those with unexplained infertility, borderline semen quality, or evidence of oxidative stress/ The sperm DNA fragmentation index (DFI), may benefit. Thus, the debate should shift from "treat or not" to "who to treat." Personalized medicine, incorporating semen analysis, DNA fragmentation index, oxidative stress markers, and possibly exosomal profiling, may help refine treatment strategies.

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3. Conclusion

Subclinical varicocele should not be automatically dismissed as benign. While current guidelines advise against routine repair, recent evidence suggests that carefully selected patients may benefit from microsurgical intervention. Further high-quality trials are needed. Until then, an individualized, evidence-informed approach balancing risks and benefits remains most appropriate.

4. Appendix

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4.4. Authors contributions

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