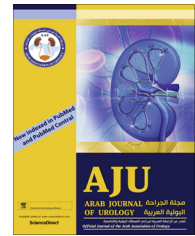




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REVIEW

Varicocele management for infertility and pain: A systematic review

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KEYWORDS

Varicocele;
Infertility;
Orchidalgia;
Hypogonadism;
Pampiniform plexus

ABBREVIATIONS

HIF1A, hypoxia-inducible factor-1 α ;
HSP, heat shock protein;
PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analysis;
ROS, reactive oxygen species;
US, ultrasonography

Abstract Despite being first described two thousand years ago, the varicocele remains a controversial multifaceted disease process with numerous biological consequences including infertility, hypogonadism, and chronic orchidalgia. The underlying mechanisms remain poorly understood and likely include hypoxia, oxidative stress, hyperthermia, anatomical aberrations, and genetics as primary components. Despite a high prevalence amongst asymptomatic fertile men, varicoceles paradoxically also represent the most common correctable cause for male infertility. In this systematic review we discuss the rich historical aspects of the varicocele and the contemporary data regarding its clinical manifestations. We performed a systematic literature review with the goal of comparing outcomes and complication rates of each of the major surgical approaches as they relate to infertility and pain. We performed a Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA)-compliant systematic literature review for manuscripts focused on varicocele and its biological consequences. We identified 112 studies suitable for qualitative analysis and included 56 of these for quantitative analysis, with an emphasis on infertility and chronic pain outcomes. Taken together, the clinical work to date suggests that the highest fertility rates and the lowest complication rates are associated with the microsurgical subinguinal surgical approach to varicocelectomy. In all, 26–40% of patients undergoing varicocelectomy will successfully achieve short-term spontaneous pregnancy, and up to 90% of all patients undergoing varicocelectomy for pain

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will have improvement and/or resolution of their symptoms. Taken together, the data support an ongoing role for varicocelectomy in both of these clinical arenas.

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Introduction

Overview and epidemiology

A varicocele is defined as a dilated pampiniform plexus, the network of small veins responsible for venous drainage from the testicle and deep tissues of the hemiscrotum. This plexus is contiguous with the ipsilateral gonadal vein, which drains into the renal vein on the left and directly into the inferior vena cava on the right. As a result, the left renal vein is typically 8–10 cm longer and has a higher hydrostatic pressure; this explains the discrepancy in incidence between the left side (which accounts for 90% of all varicoceles) and the right side, which if tense and unilateral may be concerning for malignancy [1]. Epidemiologically, varicoceles are common and occur in 15% of the general male population (Fig. 1) [2,3]. Varicoceles typically develop during puberty. A large population-based study showed a prevalence of 0.92% in boys aged between 2 and 10 years

and a dramatic rise to 11% in boys aged 11–19 years [4]. Men presenting with infertility have an even higher prevalence, ranging from 35% for men presenting with primary infertility [5] to 45–81% for those presenting with secondary infertility [5,6].

Historical perspective

The initial description of the varicocele was published nearly 2000 years ago by Celsus, who stated that ‘The veins are swollen and twisted over the testicle, which becomes smaller than its fellow, in as much as its nutrition has become defective’ [7]. Ambroise Paré in 1550 described ‘a dilatation of a vein, filled with melancholy blood, and often growing in men of melancholy temper’ [2]. Nearly 300 years later, the French surgeon Delpéch was murdered by a disgruntled patient who underwent bilateral varicocele repair and developed testicular atrophy [8]. It would take yet another 100 years before the varicocele was recognised and treated as a potential

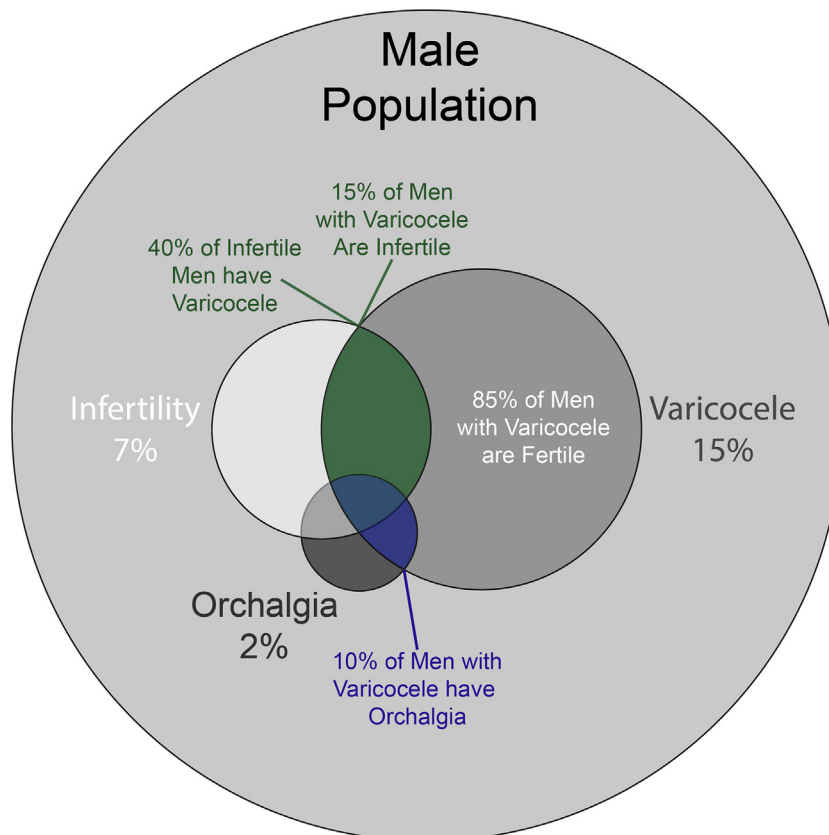


Fig. 1 Venn diagram depicting the relative prevalence of varicocele, infertility, and orchidalgia.

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