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## INVITED COMMENTARY

Male Fertility

### Asymptomatic male with grade 3 left varicocele and two children desiring vasectomy with low testosterone

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When studying varicocele and infertility, substantial knowledge have been acquired in many important areas, including prevalence, etiology, and pathophysiology to the point that varicocele is considered as the main cause of primary and secondary infertility in adult men. On the other hand, offering surgical treatment of varicoceles to improve androgen levels (without a focus on improving fertile potential) is quite controversial. In this invited commentary, we will discuss the medical workup of an asymptomatic man desiring vasectomy who was presented with a left grade 3 varicocele and low testosterone levels.

The effect of varicocele-induced testicular hyperthermia on spermatogenesis is well established, but since 1966 several reports have also focused on its hypoxia-related negative effects on Leydig cell function.<sup>1,2</sup> Varicocele-induced testicular hyperthermia may hinder the function of 17-alpha hydroxyprogesterone aldolase, which is responsible for the conversion of 17-alpha hydroxyprogesterone to testosterone. In contrast, testicular temperature return to within normal range by varicocelectomy has been shown to increase the enzymatic conversion of 17-alpha hydroxyprogesterone to testosterone, thus improving Leydig cell function.<sup>1,3</sup>

Varicocele is a time-dependent disease. The progressive effect of untreated clinical varicoceles on testicular function may deteriorate not only spermatogenesis but also androgen production. Moreover, men with palpable varicocele exhibit lower testosterone levels compared to counterparts without varicocele and proven fertility; and this holds true at any given age.<sup>2</sup>

It has been recently shown that testosterone levels are significantly improved after varicocele repair in hypogonadic adult men.<sup>4</sup> Interestingly, even hypogonadic men in their 50's or 60's exhibit increased testosterone and semen quality following varicocelectomy.<sup>5</sup> However, it is not yet possible to determine if the observed increase in the testosterone levels is sustained over time due to a lack of studies

with a long-term follow-up. Moreover, there is still a debate as to the effects of varicocele repair on testosterone levels in eugonadal men.

It has been our experience that microsurgical varicocelectomy may improve the semen quality and androgen production in hypogonadal men with clinical varicocele. In general, these observed effects are achieved in a 3-month follow-up period. Such beneficial effects on androgen production may avoid the need of hormone replacement therapy in symptomatic individuals.

Our data are in agreement with the recent observations indicating that testosterone levels are improved after microsurgical varicocelectomy in hypogonadal men even at older ages. In contrast, these effects are equivocal in men with normal testosterone levels.

Microsurgical varicocelectomy performed by experienced surgeons is associated with a low risk of complications, and it has been recommended as the method of choice for treating varicocele. However, when performing varicocelectomy and vasectomy at the same operative time, great caution should be taken not to injure the deferential veins as well as cremasteric and testicular arteries.

In conclusion, it seems sound to recommend microsurgical varicocelectomy aiming at improving androgen production in men with low testosterone levels. However, given the limited evidence available, controlled studies with a long-term follow-up in fertile and infertile men are still necessary to establish the true benefits of surgery in these men.

#### COMPETING INTERESTS

The authors declare no competing interests.

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