

Platinum Priority – Editorial

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Does the Evidence Support Adolescent Varicocelectomy?

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As many as 10–15% of male adolescents have a varicocele. Varicocele is the most common surgically correctable cause of male subfertility and sperm counts are decreasing worldwide [1]. In young adult men, varicocele is associated with smaller testis volume and lower sperm concentration and total sperm count, similar to men with a history of cryptorchidism [2]. Why, then, is there significant disagreement regarding whether adolescents with a varicocele benefit from or “need” surgical correction?

In 1987, the Belgian Society of Pediatrics recommended screening of boys aged 12–17 yr for varicocele and referral to pediatric urology [3]. From 1989 to 2005, parents were allowed to choose between observation and treatment (antegrade sclerotherapy). In 2011, men from this study who were aged >30 yr were contacted regarding paternity, time to conception, and whether they had visited a fertility center. Of the 661 patients contacted, 361 responded, of whom 158 had desired children. Paternity was achieved in 85% following observation versus 79% in the treatment group (difference not significant). Among those with a testicular size discrepancy of >2 ml in adolescence, a similar percentage achieved pregnancy in both groups. The authors concluded that there was no benefit to screening or treatment. A more recent publication reported results from a retrospective cohort study of servicemen from the Israeli Defense Forces diagnosed with and without varicocele after 1970 [4]. Of 1845 affected men, only 3.4% underwent prompt varicocelectomy, while 1.3% underwent varicocelectomy in adulthood because of subfertility. Fertility and fecundity in the “preventive surgery” group were identical to those for the control group and significantly higher than for the secondary surgery and nonsurgical groups, suggesting that a “nonsurgical strategy provides inferior outcomes and may be overutilized.” There are numerous

methodological issues with both studies in terms of patient selection and follow-up assessment, but the difference in their findings is striking.

In this issue of *European Urology*, Silay et al. [5] (including the lead author from ref. [3]) present a scholarly analysis of the recent literature and conclude that treatment of adolescent varicocele results in better testicular volume and sperm concentration [5]. I expect that this document will provide the basis for updated guidelines from the European Association of Urology/European Society of Paediatric Urology. Careful review of the data allows one to understand the shortcomings of the extant literature and formulate future studies. Their conclusions were based on a combination of a small number of randomized clinical trials were supported by their analysis of 47 nonrandomized studies.

Choosing surgical candidates with varicocele differs between adolescents and adults. In an adolescent, testicular size, varicocele size, and in Tanner 5 patients, semen analysis, are important parameters, whereas in adults, men are selected for surgical treatment primarily on the basis of subfertility and semen analysis. In adolescents, there is a theoretical ability to achieve catch-up growth and presumably improved spermatogenesis of the affected testicle if the varicocele is treated while the testicles are still growing, whereas in adulthood, varicocelectomy allows modestly improved semen parameters but no appreciable change in testicular size. Infertile couples are often advised to undergo in vitro fertilization or intracytoplasmic sperm injection, even if the male has a varicocele and oligospermia and undergoes surgical treatment. These technologies are expensive and might be associated with multiple gestation pregnancies and a higher risk of congenital genitourinary anomalies.

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Many use testicular size disparity as a reason to perform varicocelectomy. Testicular size in adolescents can be measured using a Prader or Rochester orchimeter, calipers, or ultrasound (US). US is straightforward, but the results are operator-dependent. For example, in a recent adolescent patient seen with right testicular pain twice in 4 d, the left normal testis measured $4.5 \times 2.9 \times 2 \text{ cm}^3$ (18.5 ml) on day 1 and $4.6 \times 3.5 \times 2.1 \text{ cm}^3$ (24 ml) on day 4. In a recent study using testicular US in 345 asymptomatic males aged 11–16 yr, 13% had a smaller left testis (difference $>2 \text{ ml}$) [6]. On the other hand, Chen et al reviewed US measurements in 81 boys aged $>10 \text{ yr}$ with a varicocele and 184 “normal” boys [7]. In boys up to 15 yr of age with a varicocele, the testicles were similar in size, but in boys aged $\geq 16 \text{ yr}$, both the left and right testes were smaller than control testes. In addition, at all ages the control testicles were similar in size. These findings are exemplary of the real-world issues in interpreting testicular US measurements to identify candidates for varicocelectomy.

An important observation was made by Kolon et al. [8], who followed 71 affected male adolescents with serial US measurements. Of the cohort, 38 (54%) initially had a volume differential of $\geq 15\%$. After nonsurgical follow-up with serial US for 2 yr, 60 boys (85%) had a testicular volume differential within the normal range. However, in a subsequent publication from the same institution, Christman et al. [9] found that 66% of these young men at completion of puberty had a low total motile sperm count. Neither age at presentation nor testicular volume differential could predict normal semen volume, density, sperm motility, or total motile count. Only total testicular volume from the final US predicted total motile count. This group also reported that semen analysis for adolescents with a varicocele closely resembles that for boys with a history of bilateral cryptorchidism, a group notable for subfertility [10].

Pediatric urologists have a lot of work to do to sort out these observations. Surgical treatment for adolescent varicocele is highly successful. Multicenter randomized

prospective clinical trials comparing varicocelectomy and observation that include testicular size, varicocele size, and semen analysis should be encouraged to prevent a potentially damaging process from going untreated, while at the same time avoiding unnecessary interventions for a highly prevalent condition.

Conflicts of interest: The author has nothing to disclose.

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