# Varicocele in Youth

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***Thirty boys 8 to 18 years of age seen in a general urologic practice with emphasis on pediatrics had palpable varicoceles. A concomitant finding was that 77 percent of these patients had a smaller testis on the left side. Because the small testis is present before maturity, its size appears due to arrest of testicular growth rather than to atrophy.***

***Surgical correction is advisable when the varicocele is pronounced, the involved testis is distinctly smaller or there is scrotal pain.***

Thirty patients 8 to 18 years of age seen between 1955 and 1978 in our private practice had a palpable varicocele at presentation. The left testis was smaller than the right in 77 percent of these patients and, in 10 percent, so much smaller that it was considered abnormal, either from atrophy or from serious arrest in growth. The varicocele of child and teenage years may well require surgical correction under certain conditions described herein.

## Anatomy and Physiology

The venous return from the left testis is quite different from that on the right (Figure 1). The right spermatic vein arises from the arborization of veins surrounding the testis and its contents, becoming a single conduit just above the internal inguinal ring. It enters the vena cava at an acute angle, before the entrance of the renal vein. Its blood flow is thus added to the larger vena caval stream, which provides little or no resistance at its entrance into this main system. In contrast, the left internal spermatic vein, after a similar arborization in the scrotum, courses parallel to the vena cava and enters the left renal vein at right angles to flow. In the upright position this anatomical arrangement produces an increased pressure gradient on the left. Any failure in the venous valvular action produces dilatation of the dependent vascular bed to the point that stream is slowed and at times reversed, allowing renal venous blood to enter the dependent spermatic system. When the patient is supine, the enlarged vessels may not be felt in the scrotum, or are felt as collapsed cords. When the patient is standing, the veins are rapidly engorged, to the point that the scrotal plexus can be felt as very large cords. The added weight of the venous blood may lead to scrotal enlargement on the left side.

The physiologic effects on the testicle itself (possibly atrophy or testicular arrest) and on both testes (possibly infertility) must still be considered largely as conjecture. Yet it is conceivable that a change in scrotal temperature, more pronounced on the left than on the right, occasioned by the warmer retrograde flow from within the body cavity, would be influential. Such effect would be accentuated by the superimposed stasis of venous blood in the dilated system. It is well accepted that a difference in temperature will impair spermatogenesis in humans. Lipshultz and Corriere noted that their infertile patients' testes are measurably smaller than those of the fertile controls and they suggest that warmth is the limiting agent.[1]

## Patients and Methods

Our patient group consists of 30 boys and young men between the ages of 8 and 18 years. One of them, an 8-year-old boy, is, we believe, the youngest patient with varicocele yet reported. The presenting complaints were as follows: scrotal ache, usually after exercise (nine patients); scrotal mass—to be identified (seven patients); varicocele (eight patients); enuresis, proteinuria, meatitis (six patients).

We graded the varicoceles as follows:

*Grade 1*: Veins clearly palpable as cords with the patient in the upright position.

*Grade 2:* Massive distention of the venous system in the scrotum.

The comparative sizes of the testes judged by gross palpation were recorded as follows:

*Grade 1:* The testicle clearly smaller than its counterpart.

*Grade 2:* The testicle ¼ or less the size of the right one.

In all cases the venous distention subsided with the patient in the supine position. Semen quality was not studied. An excretory urogram (IVP) was routinely obtained for diagnostic evaluation.

During the same period, 88 adults with infertility and varicocele were evaluated and surgically treated. Com-

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parison of observations of this group with the teenage group aided us in our study of this lesion.

## Surgical Indications

Interruption of venous flow via the internal spermatic veins is the goal of corrective operation. The venous return from the testis is not impaired, for it is then completely and safely shunted via small collateral vessels, entering the deep circulation below the level of the surgical interruption.[2] Direct scrotal approaches have long been condemned because of the severe complications from bleeding and the inability to locate each venous channel. If the venous return via the spermatic vein or veins is eliminated, the operation is uniformly successful. After several months, the veins can be palpated as collapsed, thin cords when the patient is standing.

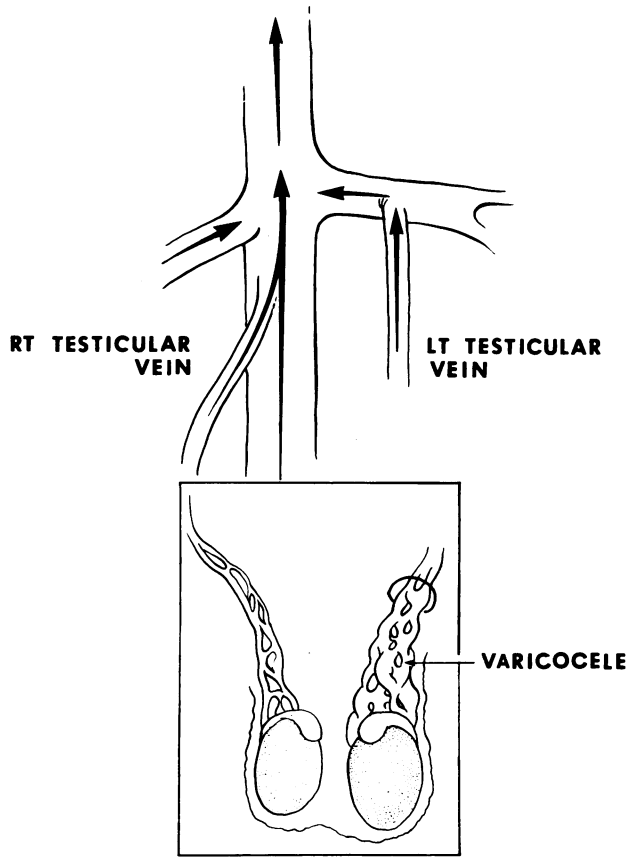


**Figure 1.**—Venous return from left and right testes.

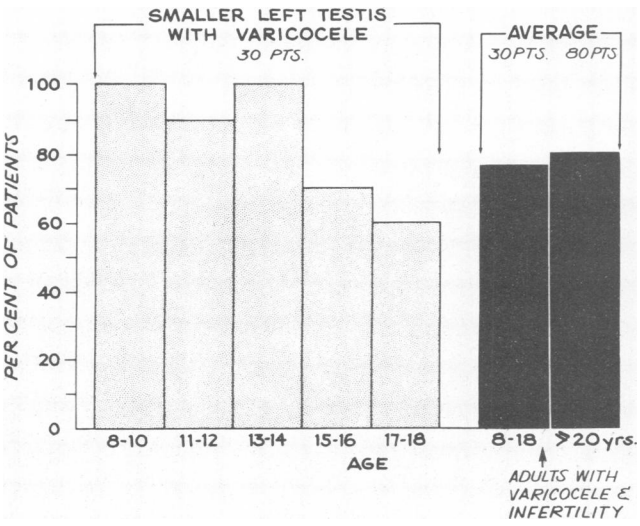


**Figure 2.**—LEFT, Association of left varicocele with smaller left testis in youth. RIGHT, Incidence of smaller left testis in boys with varicocele and in adults with varicocele and infertility.

In this series, we have limited our surgical correction to (1) those patients whose symptoms are believed to arise from the varicocele regardless of the grade of varicocele or of testicular size; (2) those with grade 2 varicocele, regardless of testicular size, and (3) those with a clearly smaller left testicle regardless of the degree of varicocele size.

## Results

The grades of varicocele and of testicular size are given in the Patients and Methods section. Figure 2 plots the percentage of smaller left testes with respect to age (8 to 18 years old when the child was first seen); these figures are then compared with the findings in adults. In 77 percent of the young patients the left testis was demonstrably smaller than the right one (Figure 2). In 10 percent there was what we consider to be an advanced form of growth arrest, the left testis being not more than a fourth the size of the right one. Though the smaller testis tended to be softer in consistency, this was not a uniform finding. No consistent relationship of the varicocele grade to the degree of testicular growth arrest was discovered; neither was there any correlation between symptoms (scrotal aches) and grade of varicocele or testicular size.

The incidence of growth arrest was highest in the 8 to 14 age group, amounting to almost 100 percent. This suggests that the earlier the varicocele develops the greater its effect on the growing testis.

## Discussion

Previous studies are few and limited. Two, one from Denmark[4] and one from Belgium,[5] suggest that the varicocele first appears when the boy is between the ages of 10 and 14 (incidence 2 percent to 11 percent). In the report from Belgium, involving more than 4,000 adolescents and college students, the investigators noted a smaller left testis 34 percent of the time with a grade 2 varicocele, and 81 percent of the time with a grade 3 varicocele. The authors concluded that subjects with varicocele grade 2 or 3 are at risk for disturbances in fertility. Although Russian investigators have been interested in the pathogenesis of childhood varicocele for a long time,[6,7] and have a large experience in its surgical correction, they have paid little attention to testicular morphology.

Lipshultz and Corriere[1] made careful measurements

of testicular size of patients having a combination of infertility and varicocele. In their control patients (fertile, no varicocele) they found that the normal testes were symmetrical, but in the presence of varicocele, a smaller left testis was likely to be found. They further suggested that often both testes are smaller than normal when a left varicocele exists.

In our series, 82 percent of our adult patients who have both infertility and varicocele have a smaller left testis. Of the youth group, 77 percent had a smaller left testis associated with a varicocele (Figure 2), a figure extremely close to that in the adults. We noted a small left testis in 20 percent of our adult infertility group and serious arrest in 10 percent of our young patients. The loss of testicular mass in the 8 to 13 age group is striking, which suggests that in these years of rapid growth varicocele has its most damaging effects and perhaps its greatest requirement for surgical correction. A surprising result after corrective operations was *catch up* growth of the smaller testis in two patients, to the point that left and right testes were equal in size and consistency two years later.

## Conclusions

From this study of 30 boys with varicocele, we conclude the following: (1) The appearance of a varicocele presumably is related to the physical changes occurring with puberty since rarely does a varicocele appear before puberty. (2) There is no evidence that the varicocele necessarily increases in size with age. (3) The size of the varicocele bears no consistent relationship to left testicular size at presentation. (4) The earlier the varicocele appears the more likely the chance of arrest of testicular growth.

Efforts at detecting the presence of varicocele by examining the genitalia of young male patients in the upright position are worthwhile because of the possible relationship between varicocele, small testis and lowered fertility. Surgical correction is recommended when the varicocele is very large, the left testis is appreciably smaller than the right or there is scrotal discomfort.

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