Chapter 7
Varicocele in Adolescents

Adolescent varicocele have been associated with testicular volume loss, endocrine abnormalities, and abnormal semen parameters [251]. Severe testicular damage is found in 20% of adolescents affected, with abnormal findings in 46% of affected adolescents. Histological findings are similar in children or adolescents and in infertile men. In 70% of patients with grade 2 and 3 varicocele, left testicular volume loss was found.

In about 20% of adolescents with varicocele, fertility problems will arise [113]. Improvement in sperm parameters has been demonstrated after adolescent varicocelectomy [252–254]. Therefore, varicocele repair has been recommended to adolescents presenting palpable varicocele and ipsilateral testicular growth retardation greater than 2 mL or two standard deviations from the mean of the normal testicular growth curve. Those presenting with normal ipsilateral testicular volume, however, should be offered follow-up monitoring with annual measurement of testicular size or semen analyses because varicocele can progress [243]. Nevertheless, due to the complexity to evaluate testicular growth retardation in adolescents presenting with bilateral varicocele or solitary testis, varicocelectomy should be considered in such cases.

Although testicular hypotrophy is the most widely accepted indication for repairing adolescent varicocele, it should be noted that testicular size may not be a reliable indicator of fertility potential in patients with varicocele [253]. Therefore, semen analysis may be discussed with older adolescents in an effort to facilitate the decision of whether or not to treat the varicocele. In cases of abnormal seminal parameters associated with high-grade varicocele, the consensus is that surgery should be offered, even when testicular size is normal.

Notwithstanding, the literature is scarce in studies determining what are the reference ranges for semen analysis results in this population, presumably because of ethical concerns associated with the procurement of semen specimens in young boys [252, 254]. In a study involving adolescents (14–18 years of age) attending a public school in Brazil, it was determined whether the grade of varicocele influenced semen quality and testicular volume [255]. Sperm progressive motility and concentration were significantly lower in adolescents with grades 2 and 3 varicocele...
compared with adolescents without varicocele, but the magnitude of change was not different according to varicocele grade. The total number of progressively motile sperm in the ejaculate was also lower in varicocele grades 2 and 3, and adolescents with varicocele grade 3 presented lower number of progressively motile sperm compared with those with grade 2. Interestingly, despite having markedly lower semen analysis results than the counterparts without varicocele, the adolescents with varicocele still had their semen parameters within the World Health Organization reference ranges, thus indicating that conventional parameters such as count, motility and morphology may not accurately discriminate those in which varicocele already affect fertility and who might benefit from intervention [34, 256]. In the aforementioned study by Mori et al. [255], testicular asymmetry was significantly less prevalent in adolescents without varicocele. Among the adolescents, 27.8% (95% confidence interval [CI]: 23.2, 32.4) presented varicocele grades 2 and 3. There was a high prevalence of testicular asymmetry in adolescents with left grade 2 (41.7%) and 3 varicocele (51.9%), whereas only 11% of the adolescents without varicocele showed minimal testicular asymmetry.

As far as the effect of varicocele repair in adolescents is concerned, the consensus is that treatment may be effective, but caution should be exercised not to overtreat these subjects [257]. Several authors reported on reversal of testicular growth after varicocelectomy in adolescents. Kass and Belman [258], in a study involving 20 adolescents aged 11–19 years with grades 2 and 3 varicocele and ipsilateral testis hypotrophy, showed that varicocelectomy led to a significant catch-up growth of the treated testis. In this study, all patients were followed for 1–6 years. The authors’ data indicated that a moderate to large varicocele was responsible for testicular growth retardation, and early ligation of the varicocele may revert this process. These findings have been corroborated by others, indicating that among adolescents with pre-operative left hypotrophy who underwent varicocelectomy, about 70% achieve catch-up growth within 28 months follow-up [259, 260]. The average proportion of catch-up growth of 76.4% (range: 52.6–93.8%) has been found according to a recent meta-analysis [261].

While some have suggested laparoscopic and subinguinal microscopic varicocelectomies as an alternative to reduce the incidence of hydroceles, which is more common after Palomo and Ivanissevich repair, the optimal choice for the operative approach in the treatment of adolescent varicocele continues to be debated [262]. Some form of optical magnification (microscopic or laparoscopic) has been advocated because the internal spermatic artery is 0.5 mm in diameter at the level of the internal ring and it allows lymphatic-sparing varicocelectomy to be performed [263, 264]. The recurrence rate with ligation methods involving optical magnification is usually <10%, and they aid preventing hydrocele formation, thus helping testicular hypertrophy development and better testicular function according to the LHRH stimulation test [236, 264, 265].
Key Points

• Adolescent varicoceles may be associated with testicular volume loss, endocrine abnormalities, and abnormal semen parameters.
• Moderate and large varicocele can be responsible for testicular growth retardation and that early ligation of the varicocele can reverse this process.
• Varicocele repair has been recommended to adolescents who have palpable varicocele and ipsilateral testicular growth retardation greater than 2 mL or two standard deviations from the mean of the normal testicular growth curve.
• To adolescents with palpable varicocele who have normal ipsilateral testicular volume, the consensus is to follow-up monitoring with annual measurement of testicular size and semen analyses (if appropriate) because varicocele can progress.
• While some have suggested laparoscopic and subinguinal microscopic varicocelectomies as an alternative to reduce the incidence of hydroceles, which is more common after Palomo and Ivanissevich repair, there is no consensus on the optimal choice for the operative approach.