

Multicenter Italian survey for varicocele treatment in pediatric age

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1. Contents

1.1. INTRODUCTION

Varicocele is the most frequently diagnosed andrological condition requiring surgery in pediatric and adolescent patients.[1]

Surveys reported that 15-20% of young people aged between 10 and 14 years has varicocele of any grade [2-3]. The gold standard to treat varicocele in pediatric age and adolescence is yet to be found. What we know about varicocele comes from the guidelines of the American Academy of Pediatrics (www.aap.org), the European Urological Association (www.uroweb.org), the American Urological Association (www.auanet.org) and of the European Society for Pediatric Urology (www.espu.org). According to these guidelines, varicocele is defined as an abnormal dilatation of testicular veins in the pampiniformis plexus caused by vein reflux. Several authors reported on the reversal of testicular growth after varicocelectomy in adolescents [4-8] (level of evidence: 2). However, this may be partly due to edema of the testis associated with the division of lymphatic vessels (level of evidence: 2).[9]

Fertility problems will arise in about 20% of adolescents with varicocele. (level of evidence: 1). The recommended indication criteria for varicocelectomy in children and

adolescents are the following: varicocele associated with a small testis, additional testicular condition affecting fertility, bilateral palpable varicocele, pathological sperm quality (in adolescents older than 16 years of age), varicocele associated with a supranormal response to LHRH stimulation test, symptomatic varicocele. Repair of a large varicocele physically or psychologically causing discomfort may be also considered.

The aim of this multicenter study is to evaluate the management and treatment of varicocele in different Pediatric Surgery Centers throughout Italy by means of a questionnaire regarding varicocele diagnosis, treatment and follow-up.

1.2. MATERIALS and METHODS

The study centers received a questionnaire regarding the management of varicocele in the period between January 2008-December 2012.

Inclusion criteria for the study were as follows: patients between 10 and 14 years of age with BMI within normal range for age, no previous inguinal surgeries, no previous scrotal traumas, diagnosis of varicocele.

Exclusion criteria for the study were the following: percutaneous varicocelectomy techniques (both retrograde and anterograde). These procedures were excluded from the study because, as reported in the guidelines, angiographic occlusion of the internal spermatic veins appears to have a higher failure rate (level of evidence: 2; grade of recommendation: B).

Each center had to complete the questionnaire considering the study period and focusing on preoperative work-up, surgical technique used and postoperative follow-up.

The first part of the questionnaire regarded the indications to surgery. To this purpose, the questionnaire did not report the international indications or guidelines.

Then the questionnaire asked to state whether the center had a dedicated varicocele outpatient clinic and dedicated staff for the management of varicocele. (table 1)

The following rates were considered as study endpoints: hydrocele rate; rate of relapses; rate of persistence; rate of testicular atrophy.

From a strictly surgical point of view, the questionnaire asked which technique was used and, more specifically, which was used for the management and treatment of varicocele relapses.

Statistical analysis was performed using the chi-square and Fischer exact tests. *P* value less than .05 was considered significant for the correlation between the variables.

1.3. RESULTS

During the study period 1,034 surgical varicocelectomies were performed. 690 cases were treated with videolaparoscopy (66.7%), 223 cases with an open inguinal technique (21.8%) and 65 cases with retroperitoneoscopy (6.2%). 47 cases (4.5%) received a percutaneous technique (trans-scrotal technique in 18 cases and subinguinal technique in 29 cases) and 9 cases were treated with the one-trocar transumbilical technique.

Preoperative work-up: all study centers performed color Doppler ultrasounds; only 2 centers also investigated the deferential reflux ($p < 0.05$) and 3 centers evaluated and measured reflux velocity (> 38 cm/sec) which was considered an indication to surgery ($p < 0.05$).

Indications to surgery: *testicular hypotrophy:* 55% of patients received surgery only if there was hypotrophy regardless of the grade of clinical varicocele (45% with at least 20%

hypotrophy, the remaining patients with hypotrophy <20%); *pain*: 20% of cases treated only when varicocele was painful regardless of its grade; *clinical grade*: 22% of cases treated with varicocele of at least grade 2 even when it was not associated with alterations of the testicular volume; *bilateralism*: 3% of cases (receiving surgery only on the left side); *type of reflux at Doppler*: only 3 centers out of 14 also considered the type of spermatic vein reflux (e.g.: >38 cm/sec)($p<0.05$); *response to LHRH stimulation test*: no study center carried out this test and therefore it was not used as an indicator; *pain associated with varicocele*: 3 centers treated patients with analgesics for at least 3 months before opting for a surgical treatment ($p<0.05$); *laparoscopy*: 5% of cases were treated with ligation alone; 17% were treated using resorbable/non-resorbable surgical clip without incision and 78% with clip and incision of the vessels; *retroperitoneoscopy*: 65% of cases treated with single access, the remaining cases with an additional trocar; *one-trocar technique*: 9 cases treated with umbilical access (thoracoscopy) + Ligasure.

Management of the lymphatic vessels: in 259 patients (25%) the vessels were intentionally conserved, 215 cases (83%) with lymphography (intradartocic) ($p<0.05$);

Management of the spermatic artery: regardless of the technique used, artery was conserved in 60% of cases; it was not conserved in 2% of cases and in 38% of cases the Centers reported that it was conserved only when recognized.

Complications: hydrocele: 1.5%-20% (regardless of the technique used), literature value: 1-16% ($p>0.05$); persistence: 0.8%, literature value 0.5-5%; relapses: 1.2%, literature value 1-15%; atrophy: 0.2%, literature value 0.2-0.8%. Atrophy developed as a consequence of the open inguinal technique.

Analysis of complications in relation to the number of surgeries performed. *Hydrocele*: study centers using lymphography showed a lower rate of hydrocele, near to 0%, only when it was correctly performed (following the standard procedure); in the remaining cases (including the cases in which surgeons believed that all lymphatic vessels had been ligated) the rate of hydroceles ranged between 2.5% and 7%, the same as for the procedures without lymphography ($p>0.05$), regardless of which technique was used. Study centers performing >18 surgeries per year had a hydrocele rate <4%, while in centers with >35 surgery per year this rate dropped to <2% ($p<0.05$). *Persistence, relapses, atrophy*: it was not possible to establish a correlation between the number of surgeries performed and any of these complications ($p>0.05$). *Complications and type of laparoscopic intervention*: VDLS procedure (including type of clips, ligation/incision, artery conservation) was not specifically correlated with any type of complication ($p<0.05$) but was associated with less relapses ($p<0.05$) respect to open techniques.

Management of complications. *Hydrocele*: 3 centers performed percutaneous aspiration (at least two aspirations). Hydrocele was treated surgically within six months from onset in 2 centers, within 12 months in 6 centers, within 18 months in 2 centers also and within 24 months from onset in 1 center only. *Persistence/relapses*: 65% of patients were treated again using the same technique of the first surgery, 25% of cases received reoperation with a different technique, 10% of cases with the percutaneous technique ($p<0.05$). The centers using at least two different surgical techniques showed a lower rate of complications ($p<0.05$).

Postoperative follow-up: In 3 centers follow-up lasted up to 18 months after surgery, in 8 centers follow-up lasted up to 12 months and in 3 centers up to 6 months. Five centers carried out also Ultrasound and Doppler tests while in the remaining centers follow-up only included a physical examination ($p<0.05$).

1.4. DISCUSSION

Both at national and international level surgeons operating in the field of pediatric uro-andrology constantly debate on the need of treatment for varicocele and its correct timing. [4-5]

Guidelines are a valuable guide to the management of a pathology but for conditions such as varicocele, which is treated also in adulthood, some key issues still offer an open debate. These include discussions on which is the gold standard technique to reduce the onset of complications, the optimal age range to treat this pathology and which are the indicators to a real need for varicocele treatment. Although recent studies showed that testicular hypotrophy may be transitory, implying that it can not be considered as an absolute indication to treatment, the evaluation of the grade of vein reflux may be a useful indicator to treatment. [10-15]

The most famous international societies of pediatric urology do not give specific indications as for % of reduction of testicular volume (as an indication to treatment) nor deal with the evaluation of the grade of reflux. As for treatment, the guidelines state that surgical intervention is based on ligation or occlusion of the internal spermatic veins. Ligation is performed at different levels: inguinal (or subinguinal) microsurgical ligation; suprainguinal ligation using open or laparoscopic techniques. The former procedure has the advantage of being less invasive, while the advantage of the latter procedure is the considerably lower number of veins that need to be ligated and the increased safety of the incidental division of the internal spermatic artery at suprainguinal level. Optical magnification is suggested to perform open surgical ligation. The optimal recurrence rate should be less than 10%. Lymphatic-sparing varicocelectomy is preferred to prevent hydrocele (level of evidence: 2; grade of recommendation: A). The methods of choice are subinguinal or inguinal microsurgical (microscopic) repairs, or suprainguinal open or laparoscopic lymphatic-sparing repairs. It is interesting to note that all these guidelines reported that angiographic occlusion of the internal spermatic veins also meets the requirements for treatment but although this method is less invasive, it appears to have a higher failure rate (level of evidence: 2; grade of recommendation: B).

This study presents some interesting findings: the number of postoperative hydroceles is considerably lower if the lymphatic vessels are correctly preserved; a reduced number of cases of hydrocele is also correlated more clearly with a high number of surgeries per year than with the type of procedure performed; relapses are not technique-related and are not associated to specific variations of the same technique (e.g. the use of absorbable or metallic clips). Relapses are less in the laparoscopic group probably because type I spermatic vein reflux is the most simple reflux to treat, and the laparoscopic ligation is “high”; relapses in laparoscopic group are not technique-related and are not associated to specific variations of the same technique (e.g. the use of absorbable or metallic clips).

The study also has some bias that may affect the results: the number of operating surgeons was different in each center (the questionnaires reported 2 operating surgeons in some centers up to 6 different surgeons from the same team in other centers), and this could have resulted in errors related to the type of surgery chosen; different surgical techniques were used following different indications to surgery: some centers used different techniques to treat different clinical grades of varicocele (e.g.: laparoscopy for grade 3 varicocele, subinguinal technique for grade 2 varicocele). Academic medical centers had a higher number of operating surgeons (including specialist trainees with a lower number of procedures performed per surgeon); complications, especially persistence/relapses, are correlated with the type of vein reflux and not all study centers carried out hemodynamic tests during the preoperative work-up in order to opt for the most suitable technique.

1.5. CONCLUSIONS

The management of varicocele in the study centers complied with the international guidelines in more than 80% of cases; The preoperative work-up was completed in 95% of cases; postoperative follow-up was at 18 months in 45% of cases, at least at 6 months after surgery in the remaining cases. Laparoscopic treatment had less relapses (independently from the technique used) respect to other techniques but there are no difference respect to hydrocele formation or persistence.

1.6. References

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1.7. Table 1: questionnaire about varicocele treatment

Patients between 10 and 14 years

Surgical indications

Age: 10 yrs ___ 11 yrs ___ 12 yrs ___ 13 yrs ___ 14 yrs ___ when clinical indicated ___

Grade: always ___ only if grade 1 ___ 2 ___ 3 ___ (Dubin and Amelar classification)

Testicular volume: only if hypotrophy ___ % (difference between testes); always ___

Spermatic vein reflux (doppler ultrasound):
spontaneous ___ intermittent ___ always ___

pain: always ___ Never ___ only if associated with ___

do you treat pain before surgery?: yes ___ no ___

if yes: which drugs do you prefer? ___

how many time do you treat pain before surgery? ___ months

Do you classify patients by pupertal development (Tanner stage)? Yes ___ No ___

Do you have an outpatients department for varicocele? Yes ___ No ___

Do you have colleagues dedicated for varicocele? Yes ___ No ___

***Pre-operative work-up Doppler Ultrasound:** Yes ___ No ___ **Testicular ultrasound:** Yes ___ No ___ **Other:** ___ ***Post-operative work-up Doppler Ultrasound:** Yes ___ No ___ **Testicular ultrasound:** Yes ___ No ___ **Other:** ___ **Follow-up visits:** 3 months ___ 6 months ___ 12 months ___ 18 months ___ **Do you perform semen analysis after surgery?** Yes ___ No ___ **Age to perform semen analysis:** >16 ___ >17 ___ >18 yrs