Changing Concepts in Microsurgical Pediatric Varicocelectomy: Is Retroperitoneal Approach Better Than Subinguinal One?

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Purpose: To compare and to assess two different microsurgical "lymphatic-sparing" techniques (subinguinal/inguinal vs. retroperitoneal) used for the treatment of a pediatric and adolescent varicocele in terms of success rate, complications and mean operative time.

Materials and Methods: A retrospective study included 54 consecutive patients affected by a varicocele and treated with a microsurgical (loupes – operating microscope) magnification. Thirty-four out of 54 (group 1) underwent subinguinal ligation with the help of loupes magnification (× 3); 20 out of 54 (group 2) underwent retroperitoneal (Palomo like) ligation with preservation of lymphatics and with the help of an operating microscope (× 6 to 10). The two groups were homogeneous in terms of mean age, clinical and color Doppler ultrasound grade of disease. Pre- and post-operative testicular volume was measured in all cases. All the procedures were performed under general anesthesia and in an outpatient basis.

Results: Mean post-operative follow-up time was 23.6 months. In group 1 we observed 3 (8.8%) early complications (wound's infection, transient hydrocele), 2 (5.8%) recurrences and 1 (2.9%) major complication (atrophy of the testis). Mean operative time was 45 ± 6 min. In group 2 we did not observe complications and/or varicocele recurrence and mean operative time was 38 ± 7 min. Comparison of mean operative time between the two groups resulted statistically significant differences ($P < .05$) such as the difference in testicular "catch-up" growth volume between pre- and post-operative evaluations.

Conclusion: Retroperitoneal microsurgical "lymphatic-sparing" varicocelectomy is safe and effective method. In our experience, it is preferable, in the pediatric and adolescent patient, to the subinguinal/inguinal approach in terms of success rate, complications and operative time duration.

Keywords: pediatrics; varicocele; therapy; physician's practice patterns; lymphatic vessels; postoperative complications; retrospective studies.

INTRODUCTION

Whilst there is general agreement in considering varicocele as a major cause of male infertility, there is still no consensus on what might be the best treatment method. Published studies[1-5] comparing more than a technique applied (laparoscopy, microsurgery, interventional radiology) have definitively shown that microsurgical subinguinal or microsurgical inguinal procedures offer the best outcome in terms of increased fertility, decreased postoperative complications and recovery time. Furthermore, microscopic varicocelectomy is safe and effective even in pediatric age.[6-8] Friedman and colleagues reported[9] a simple modification of the classical Palomo technique in which a successful alternative method to correct a varicocele was obtained using the magnification of an operating microscope in the retroperitoneum, and so sparing the lymphatics. In this retrospective study, we compared two different microsurgical techniques employed in a pediatric population (the subinguinal microscopic varicocelectomy and the retroperitoneal microscopic one) in order to assess, respectively, success rate, complications and mean operative time.

MATERIALS AND METHODS

We retrospectively reviewed the medical records of 54 consecutive patients (mean age 14.3 years, range 8-18 years) with clinical grade II/III varicocele who underwent microsurgical varicocelectomy performed by the same surgeon. Thirty-four patients (group 1) underwent subinguinal microsurgical ligation with the help of loupes magnification (× 3) whilst 20 patients (group 2) underwent retroperitoneal microsurgical ligation with an operating microscope (× 6 to 10). The two groups were homogeneous in terms of mean age, clinical and ultrasonographic grade of disease according to Sarteschi and colleagues.[10] All the procedures were performed under general anesthesia and in an outpatient basis. Indication for surgery was testicular hypotrophy. All patients with a difference in testicular volume greater than 2 mL or ≥ 15% on the affected side were included in this study. We did not obtained semen data because our patients were too young to be assessed using a semen analysis.

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Figure 1. The small incision at the left flank with exteriorization of the gonadal bundle.

Operative Technique

Group 1. The surgical approach consisted of a small subinguinal incision without opening the external oblique aponeurosis using loupes magnification (×3). The gonadal vessels were identified and a vessel loop passed around the gonadal bundle, then all the identifiable spermatic veins were ligated while the spermatic artery and deferential vessels spared. Subcutaneous and cutaneous layers approximated using absorbable stitches.

Group 2. Twenty patients underwent a microscopic retroperitoneal varicocelectomy according to the technique described by Friedman with a modification that we introduced, that is a selective ligation of spermatic veins and artery with preservation of the entire remaining bundle instead of a selective sparing of the lymphatics, as suggested by Friedman, with "en bloc" ligations of the remaining bundle. All patients were under general anesthesia. Through a transverse incision at the level of the anterosuperior iliac spine, the external fascia incised and internal oblique and transversalis muscles split, the gonadal bundle was easily identified and externalized at the level of the skin incision (**Figure 1**). With the aid of an operating microscope (**Figure 2**) and under high magnification (× 6 to 10), spermatic veins and artery were identified, dissected and the entire remaining bundle repositioned. Muscles and skin approximated using a running 4.0 absorbable stitch. All the procedures were on an outpatient basis.

Statistical Analysis

Description of population and parameters has been reported as mean values with standard deviation (SD).

Figure 2. The operating microscope is essential in the retroperitoneal lymphatic-sparing procedure.

Table 1. Complications in study groups.

Complications	Group 1	Group 2
Wound infection	2	0
Hydrocele	1	0
Testicular atrophy	1	0
Persistence	1	0

A comparison among the two study groups regarding the preoperative and postoperative parameters was done using the student's t-test. Statistical Package for the Social Science (SPSS Inc, Chicago, Illinois, USA) version 17.0 was used for statistical analysis. Values of $P < .05$ were considered significant.

RESULTS

Mean postoperative follow-up time was 23.6 months. In group 1, we observed 3 (8.8%) early complications (wound's infection in 2 cases and transient hydrocele in 1 case). In one case (2.9%), we observed a persistence of varicocele, that needed a redo varicocelectomy and in another one a major complication (testicular atrophy) occurred (**Table 1**). Mean operative time was 45 ± 6 min in group 1 while in group 2 was 38 ± 7 min. This difference was statistically significant ($P < .05$). In the "retroperitoneal" group we did not observe early, late complications and/or recurrence. In both group no cases of postoperative scrotal hematoma was detected. The difference in terms of early and late complications was not significant ($P < .05$). The preoperative volume of left testis was 5.1 ± 3.2 mL in group 1 and 5.4 ± 3.1 mL in group 2. This difference was not statistically significant ($P > .05$). Postoperative volume of the affected testis between the two groups was respectively 7.6 ± 3.4 and 9.6 ± 4.5 mL. This difference was statistically significant ($P < .05$). The difference in testicular volume between pre- and post-operative in both groups resulted statistically significant too ($P < .05$) (**Table 2**).

DISCUSSION

The increasing rate of varicoceles diagnosed in pediatric patients and the clear benefit of the early intervention in terms of semen quality justify the increasing number of surgical procedures performed in prepubertal age.[3,11] Varicocele has an adverse effect on the histologic, endocrine and biochemical testis function[12] and is considered as a major cause of male infertility. However, not all men with varicocele are infertile and require a treatment. Operative treatment should be reserved to those cases in which a decreased testicular size and/or altered semen quality are observed even considering the fact that varicocele may decrease the potential for fertility in the affected men in the future.[13] The effects of varicocele are, indeed, long term and progressive, leading to alterations

Table 2. Clinical data in study groups.

Variables	Group 1	Group 2	*P* Value
Mean operative time (min)	45 ± 6 2	38 ± 7	< .05
Mean testicular volume (mL)			
Preoperative	5.1 ± 3.2	5.4 ± 3.1	> .05
Postoperative	7.6 ± 3.4	9.6 ± 4.5	< .05

in semen quality and decrease in testicular volume.[14-16] Current guidelines state that adolescent varicoceles should be treated when reduced ipsilateral testicular size is observed or upon detection of testicular or semen abnormalities.[17] Most studies regarding varicocelectomy in adolescents demonstrate either an improvement in testicular size or semen quality following the surgery.[13,18] Noteworthy is the fact that varicocele has been associated with a damaged DNA indicating important spermatogenic alterations and suggesting that early treatment is mandatory.[13] As we know, many surgical and non-surgical challenges are proposed as a therapeutic option. Nowadays, the most popular varicocelectomy methods include the Ivanissevich technique, the Palomo one, the microsurgical, the laparoscopic and the embolization techniques. Postoperative hydrocele formation and recurrence are the most frequent complications. Between the various surgical options the subinguinal approach seems to offer the best outcome in terms of hydrocele formation and recurrence but the duration of the operation is usually longer.[19] Microscopic inguinal or subinguinal approach has to be considered as a viable option for adolescent varicocele treatment. The microsurgical low inguinal or subinguinal approach was reported in the adult infertility literature as the method with the highest success rate (99%) and the lowest morbidity (no hydrocele). Laparoscopic varicocelectomy is a good option in experienced hands. Transvenous percutaneous varicocele treatment has the advantages of a quick recovery and minimal pain. The success rate changes from 89% to 95% with approximately 6 % of complications, in addition to the issue of radiologic exposure of the testes. Al-Kandari and colleagues[19] studied 120 patients with 147 varicocelectomies performed using three different techniques. The recurrence rate was 2% (1 patient) with microscopic subinguinal varicocelectomy and 13% (7 patients) and 18% (9 patients) with open inguinal and laparoscopic methods, respectively. This report was statistically significant in favor of microscopic subinguinal varicocelectomy. In our study, both techniques have proven to be successful in terms of effectiveness. In the "subinguinal" group a major complication occurred, consisting of testicular atrophy and probably caused by a ligation of the spermatic artery. In the same group a case of recurrence occurred. This patient underwent a successful redo microsurgical procedure, with retroperitoneal approach, after performing a diagnostic venography. In group 1, three minor complications (2 wound infections and 1 transient hydrocele) occurred. No major or minor complications occurred in group 2.

CONCLUSION

So, both by a careful review of the literature that according to our experience, microsurgical open techniques appear to be safe and effective. In the context of the microsurgical lymphatic sparing techniques and in our experience in the pediatric and adolescent patient, the retroperitoneal approach with the aid of an operating microscope seems to be safer and more effective in respect to subinguinal microsurgical especially in terms of both postoperative volume increase and mean operative time. Moreover, despite the difference was not statistically significant, retroperitoneal approach appears to be burdened by a lower complications rate.

CONFLICT OF INTEREST

None declared.

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