REACTIVE HYDROCELE AFTER LAPAROSCOPIC PALOMO VARICOCELE LIGATION IN PEDIATRICS

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Summary.- OBJECTIVES: To evaluate the incidence of hydrocele following laparoscopic Palomo varicocele ligation in pediatric and adolescents in our institution.
METHODS: Between 1997 and 2009, 180 boys diagnosed as having varicocele who underwent Palomo laparoscopic ligation were evaluated retrospectively. Outcome variables recorded for analysis were age at presentation, symptoms, varicocele grade (Dubin-Amelar classification), testicular atrophy, length of hospital stay, perioperative complications, recurrence and hydrocele formation after surgery. Mean follow up was 5.8 years (6 months-9 years).

RESULTS: Age at diagnosis ranged between 9 and 19 years. Mean age at operation was 14.1 ± 1.8 years. There were 177 left-side varicoceles (98%) and four cases were bilateral. Testicular atrophy was noted in 45. Mean operative time was 38 min. The last 63 surgeries were performed on a two-trocar basis with Ligasure vascular sealing device and operative time decreased significantly to 22 min. Median hospital stay was 31h. Twenty-three patients developed hydrocele (13%); 11 of these underwent Winkelman-Lord’s hydrocelectomy at least 1 year after Palomo (9% of total). Of the remaining 12, two resolved spontaneously and 10 were stable at mean 4-year follow up.

CONCLUSIONS: Laparoscopic Palomo procedure is a safe successful method to correct varicoceles in pediatric and adolescent males. Reactive hydrocele formation following laparoscopic varicocelectomy is a worrisome problem particularly in cases with longer follow-up.

Keywords: Varicocele, Palomo, Laparoscopic varicocelectomy, Reactive Hydrocele.

Resumen.- OBJETIVO: Evaluar la incidencia de hidrocele reactivo tras la técnica de Palomo laparoscópico en pacientes menores de 19 años en nuestro centro.
MÉTODOS: Entre los años 1997 y 2009, 180 varones menores de 19 años diagnosticados de varicocele fueron incluidos en el estudio. Las variables registradas fueron edad, sintomatología, grado de Varicocele según la clasificación de Dubin-Amelar, tamaño testicular,
INTRODUCTION

Varicocele is a very common disease in older children and adolescents. Its incidence increases gradually from 10–12 years of age to adulthood, affecting up to 15% of adolescents (1,2,3). The dilated spermatic veins of the pampiniform plexus is secondary to a failure in the valvular competence of the venous drainage of the testis and predominantly affects the left testicle. Varicocele can result in testicular atrophy even close to 30% (13-15).

Since 1988, when it was first described, high ligation of the spermatic veins by laparoscopy (laparoscopic Palomo technique) has become the preferred technique for surgical correction of varicocele in pediatric and adolescent patients (12). Regardless of the surgical technique, the appearance of reactive hydrocele is the most frequent complication after correction of varicocele. Different authors have reported hydrocele rate even close to 30% (13-15).

The aim of our study is to evaluate the occurrence of reactive hydrocele in our series after treatment of varicoceles in older children and adolescents through high sperm ligation (Palomo procedure) by laparoscopy.

MATERIAL AND METHODS

We retrospectively reviewed clinical records of 180 patients diagnosed as having varicocele treated by laparoscopic Palomo technique in the Department of Pediatric Surgery at University Hospital of Santiago from 1997 to 2009. All patients were clinically diagnosed with colour Doppler ultrasound, which envisioned the retrograde flow in the spermatic veins after Valsalva manoeuvre. We used the Dubin and Amelar classification to categorize the patients (16). We measure the size of the testes with a Prader orchidometer. Surgery was indicated only in cases with varicocele grade III or grade II in which testicular atrophy was evident and the patient complained scrotal discomfort. None of our patients was referred due to infertility.

The laparoscopic procedure has been described previously (17). Upon access into the cavity with open technique through the umbilicus, we established the maximum level of CO2 at 14 mmHg. We use another working port (5 mm) in right lower quadrant. Spermatic vessels were dissected through the retroperitoneum with an incision of about 2 cms. After dissecting the vessels, they were sealed using a high-power bipolar coagulation system (Ligasure®, Tyco Healthcare, Boulder, Colorado, USA). The first cases were ligated with endo-clips, but we modify the technique to minimize surgical time. We do not close the hole in the peritoneum. The trocar orifices were closed with absorbable suture and Dermabond for skin. All the patients received postoperatively propacetamol IV and the day after surgery were discharged.

In all cases we collected data about age, clinical presentation, ultrasound findings, testicular size, degree of varicocele, hospital stay, complications, recurrence, and above all, the appearance of reactive hydrocele. Median follow up was 5.8 years. Follow-

up was performed 3 months after surgery and every 6 months to a minimum of 2 years after surgery. We were especially concerned about the late appearance of testicular atrophy or reactive hydrocele.

We conducted a descriptive analysis of all the variables included in the study. For quantitative variables we used the Student’s test. Chi-square (\( \chi^2 \)) was employed for the association of qualitative variables. Statistical significance was set at \( p < 0.05 \). Data analysis was performed with the statistical program SPSS \( \text{®} \) 12.0.

RESULTS

We analyzed 180 patients who underwent laparoscopic Palomo technique over a period of 12 years (1997-2009). The mean age at diagnosis was 14.8 years (range 9-19 years). The 97.9% of our cases were left varicocele, while only 4 patients had bilateral involvement. 70% of our series had been rated grade III varicocele on clinical examination. The affected testis was decreased in size in 45% of patients. Only 14 patients reported testicular discomfort as clinical presentation.

Mean operative time was 38 min (25-82 min). Last 63 surgeries were performed with only 2 trocars and Ligasure® for coagulation and sealing of the spermatic vessels and operative time decreased to an average of 22 min (16-32 min) \( p < 0.05 \). Median hospital stay was 31 hours (range 1 to 7 days). Only 2 conversions were recorded during the first year to what we assumed to be the learning curve. In one patient there was significant bleeding from an injury of a epigastric vein with a trocar. 2 older patients reported a major pain in the right shoulder for the first 24 postoperative hours.

23 patients were diagnosed as having reactive hydrocele during follow-up (13%). Although the Ligasure group showed a lower incidence, this was not statistically significant (\( p = 0.23 \)). Only 11 patients underwent surgical correction of the hydrocele by Winkelman-Lord technique (9% of total cases) because of the size. Of the remaining 12 patients, 10 remained stable and in 2 cases it has been resolved (median follow up of 4 years in these patients). The diagnosis of reactive hydrocele was performed on average 6 months after surgery. 5 patients showed reactive hydrocele 2 years after laparoscopic ligation. But all cases requiring surgical correction by plication of tunica vaginalis hydrocele had already apparent after 3 months postoperatively. The age above 15 years was a prognostic factor for hydrocele development after laparoscopic ligation (\( p < 0.05 \)). Patients under 15 years are unlikely in our experience of developing a clinically significant hydrocele after laparoscopic Palomo technique. The degree of hydrocele showed no statistically significant correlation with the appearance of reactive hydrocele. The median follow up of all patients was 4.8 ± 2.5 years.

Coloured Doppler ultrasound showed a resolution of varicocele in 98.5% and persistence in 3 cases during follow-up. Only one of these cases was operated again (redo Palomo procedure) due to the existence of a high retrograde flow in the doppler. The remaining 2 patients are being observed due to low flow shown by Doppler. We have not noticed testicular atrophy after laparoscopic ligation. In contrast, 63% of the patients showed enlarged ipsilateral testes after two years of follow up.

DISCUSSION

The surgical procedure indicated for the correction of varicocele in pediatric and adolescent patients is still controversial. The ideal technique would be one that had a low recurrence rate with the lowest incidence of reactive hydrocele. Most procedures involving low rate of recurrences usually implies high rates of reactive hydrocele. This fact was believed due to attempts to preserve intact the lymphatic often involves the persistence of small spermatic veins unnoticed during the procedure (18). The easiness of the technique and the low rate of recurrence of varicocele should be accompanied by a lower rate of hydrocele, but combine these three factors is not simple and no technique has outperformed the others when combining these 3 requirements (1-15,19,20).

Antegrade sclerotherapy has recurrence rates up to 18%. Selective embolization of testicular vein is an invasive technique that involves a high level of radiation due to a difficult long-time procedure. The microsurgical subinguinal approach implies lower recurrence rates, but failure rises to 15% (21).

The inguinal approach described by Ivanissevich has a recurrence rate of 16% while the high retroperitoneal approach through an open technique (Palomo) has the minimum rates of recurrence (22). Clearly, the laparoscopic Palomo technique has proven its ease of learning and its very low rate of recurrences, but these data have not been accompanied by a lower rate of reactive hydrocele; this remains stable at 12-20% (23). High ligation of the spermatic vessels implies an almost certain transection of the ipsilateral scrotal efferent lymphatics. Attempts to preserve these lymphatic vessels intimately attached to the spermatic artery and vein during laparoscopic
dissection represent a large increase in surgical time, a high difficulty of the technique and a high risk of relapse due to small inadvertent preservation spermatic vessels that are left unsealed (18).

Palomo open procedure (high ligation of the spermatic vessels) has been classically associated with elevated rates of reactive hydrocele (close to 15-20%) during follow-up. By contrast, techniques involving the preservation of lymphatics have referred reactive hydrocele rates even lower than 5% (24,25,26,27). Wide divergences between rates of reactive hydrocele in small series with short follow-up make difficult to obtain conclusions respect the best surgical procedure.

We should not underestimate the importance of reactive hydrocele as well as the discomfort it may cause due to increased scrotal volume especially in adolescents. Theoretically, hydrocele may also alter the temperature-regulating mechanism of the testis with the implications this would have on fertility. However, we think that is preferable to have a reactive hydrocele rates close to 15% with low rates of recurrence (less than 3%). Attempts to minimize the occurrence of hydrocele after varicocelectomy increased recurrence rates even up to 10% (13).

Varicocele in pediatric patients may be a different entity respect adult patients as confirmed by other authors. In our study we found significant differences between the adolescents group and the group of children less than 15 years in terms of results and occurrence of postoperative hydrocele. Perhaps the laparoscopic surgical approach should therefore be different in both groups, trying to make the preservation of lymphatics much more effective in adolescents because of the high probability of postoperative development of hydrocele (28,29).

The use of dyes (isosulfan blue or methylene blue) to stain the lymphatics and help to avoid their lesion during dissection has not yet been demonstrated in long-term studies. Its reliability and potential side effects of scrotal or intraparenchymal injection must be discarded prior to its generalized employ. Probably will be a future option but actually the recommendation of widespread use precise more scientific evidences (30-32).

CONCLUSIONS

In our study, laparoscopic correction of varicocele is a safe, effective and suitable procedure in pediatric and adolescent patients. The most undesirable and frequent complication is reactive hydrocele, which sometimes may appear more than one year after the procedure. Due to this fact, the incidence of hydrocele described in published studies may be even lower than reported.

REFERENCES AND RECOMMENDED READINGS
(*of special interest, **of outstanding interest)


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