



Laparoscopic Palomo varicocele surgery: Lessons learned after 10 years' follow up of 156 consecutive pediatric patients

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Abstract *Objectives:* To evaluate our experience using laparoscopic Palomo varicocele ligation in a population under 18 years, and confirm the factors involved in postoperative hydrocele formation.

Patients and methods: Between 1997 and 2007, 156 boys diagnosed as having varicocele 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 5.6 years (6 months– 9 years).

Results: Age at diagnosis ranged between 9 and 18 years. Mean age at operation was 14.1 ± 1.8 years. There were 153 left-side varicoceles (98%) and three cases were bilateral. All patients had grade II or III varicocele (38%/62%) and testicular atrophy was noted in 43.8%; 8.1% mentioned testicular pain at diagnosis. All boys underwent Palomo laparoscopic ligation of the spermatic vessels. Mean operative time was 38 min (25–82 min). The last 51 surgeries were performed on a two-trocar basis with Ligasure® vascular sealing device and operative time decreased significantly to 22 min (16–32 min) ($P < 0.05$). Median hospital stay was 31 ± 8 h. Conversion rate was 1.28%. Twenty-one patients developed hydrocele (13.5%); 11 of these underwent Winkelman–Lord's hydrocelectomy at least 1 year after Palomo (9% of total). Of the remaining 10, two resolved spontaneously and eight were stable at mean 4-year follow up.

Conclusions: Laparoscopic Palomo varicocele surgery for pediatric patients is a safe and effective procedure. Recurrence and complication rates are similar to those reported with open surgery.

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Introduction

Varicocele is a relatively common disorder in children and adolescents. The incidence increases progressively from the age of 10 years and can be detected in at least 15% of all adolescent males. Varicocele is the most common correctable etiology found in adult men with infertility [1]. The condition can often lead to testicular atrophy in prepubertal patients. Surgery is recommended in well defined cases [2]. The goal of all surgical methods of treating varicocele in children and adolescents is to improve the potential for future fertility. Success with diverse surgical procedures such as the Palomo retroperitoneal approach (1949) [3], Ivanissevich inguinal approach (1960) [4], and the more recent antegrade sclerotherapy [5], retrograde embolization, microsurgical, retroperitoneoscopic and laparoscopic procedures has been reported [6–10]. Since the first description in 1988 [11], the laparoscopic varicocele ligation procedure has become the most popular surgical method for treating this condition in children [12,13]. The aim of the present retrospective study is to evaluate our results treating varicocele in children and adolescents by the high ligation laparoscopic approach, in comparison to those of other published reports.

Patients and methods

Study design

We retrospectively reviewed the charts of 156 patients under 18 years of age diagnosed as having varicocele who were treated with laparoscopic high ligation (Palomo approach) from May 1997 to December 2007 at the Department of Pediatric Surgery, University Hospital of Santiago de Compostela, Spain. All patients underwent preoperatively an ultrasound of both testes for measurement of the gonads. The venous testicular network of the clinically affected side was assessed using color Doppler ultrasound. The Valsalva maneuver was used to evaluate retrograde refluxing blood into scrotal veins. Varicocele was graded according to Dubin and Amelar classification to three degrees [14]. Surgery was only indicated for those cases with grade III (dilated veins visible on clinical examination) and/or grade II with testicular atrophy or scrotal discomfort. All patients were evaluated by clinical palpation and testes were measured with a Prader orchidometer. No patient was evaluated because of infertility or abnormal semen parameters. Approval for the study was obtained from our institutional research ethics board.

Surgical technique

Operative setting

The surgical procedure was performed under general anesthesia with endotracheal intubation or laryngeal mask airway. No nasogastric tube was employed. A Foley catheter was inserted to ensure empty bladder but was removed immediately after surgery. The patients were placed in a 30-degree Trendelenburg position with a soft roll under the lumbar area. Pneumoperitoneum was created by inserting a Veress needle in the first 20 cases and

with open access through a circumbilical incision in the rest of the cases. Carbon dioxide was set at a maximum pressure of 14 mmHg and gas flow at 6 L/min. The surgeon stood on the right (the side opposite the varicocele) and the assistant held the laparoscope with the monitor at the foot of the table.

Laparoscopic procedure

A peritoneal window was made at the level of spermatic dilated veins before entering the internal inguinal ring. The scrotum was usually compressed for the filling of the spermatic veins. Dissection of the adventitial tissue surrounding the spermatic vessels was kept to a minimum to avoid disruption of lymphatics. No attempts were made to locate and preserve the spermatic artery in the last 120 cases. The first 105 cases were performed using a three-port procedure with 10-mm access for the camera in an umbilical incision. Another 10-mm port was used for an endoclip applier in the right lower quadrant and a 5-mm stab incision in the left -side was used for grasping forceps. By using the curved dissector, vessels were liberated from the retroperitoneal connective tissue and the psoas muscle. Two 9-mm titanium clips were applied distally and one proximally in the spermatic vessels. Veins were cut between the paired clips. The last 51 surgeries were performed on a two-trocar basis with the Ligasure® (Tyco Healthcare) vascular sealing device (5 mm in diameter) for coagulating spermatic vessels. Once the vessels were isolated, Ligasure® sealant was applied two to four times to ensure coagulation. Thermal injury to the surrounding adventitial tissue was minimized in order to preserve lymphatics. A peritoneal gap was left in all patients for healing without closure. The surgical area was inspected for hemostasis and the result was checked by again compressing the scrotum. A valve of the umbilical port was left open to allow carbon dioxide to issue from the abdomen.

Postsurgical management

Trocar wounds were closed with a Vicryl® 2/0 suture in the fascia and rapid absorbable suture for subcutaneous tissue. The skin incision was closed with a subcuticular absorbable suture and Dermabond® (skin glue). After surgery all patients were prescribed a standard regimen of paracetamol IV every 4–6 h for pain control. Most patients were discharged from hospital the day after surgery.

Follow up data

The outcome variables recorded for analysis were age at presentation, symptoms, varicocele grade based on Dubin–Amelar classification, testicular atrophy, length of hospital stay, perioperative complications, recurrence and hydrocele formation after surgery. Mean follow up was 5.6 years (6 months–9 years). Patients were assessed after surgery for hydrocele formation. Follow up schedule included office visits 3 weeks after surgery, at 6 months and every year until patient reached 18 years of age. Testicular size, recurrence and hydrocele formation were evaluated in the long-term follow up. Color Doppler ultrasound was repeated at 6 and 12 months after surgery and then every year [15].

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