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Laparoscopic versus open orchiopexy in the management of peeping testis: A multi-institutional prospective randomized study

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Abstract *Objective:* Peeping testis is an inconsistently palpable/seen undescended testis that migrates back and forth at the internal inguinal ring. Both open and laparoscopic orchiopexy are effective forms of management. The present study aimed to evaluate the efficacy and safety of both approaches.

Patients and methods: Between September 2007 and January 2012, 46 peeping inguinal testes were randomly treated with either open (25 cases) or laparoscopic (21 cases) orchiopexy procedures. Spermatic vessels were preserved for all cases. Operative details, postoperative morbidity and final testicular site and size were recorded.

Results: The median age of the children was 2.5 years (range 0.5–12.0). The follow-up period ranged from 1.0 to 5.5 years. Of these testes, 20 in the open surgery group and 19 in the laparoscopic group maintained correct intrascrotal position ($P = 0.428$). Re-do orchiopexy was indicated for two cases in the surgical group ($P = 0.493$). No cases of testicular atrophy or hernia were encountered.

Conclusion: Open and laparoscopic orchiopexy procedures for peeping testes are fairly comparable. However, laparoscopy is relatively more effective, as two re-do orchiopexies were required in the open surgical group.

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Introduction

Cryptorchidism is one of the most common congenital anomalies found in full-term male neonates; at the age of three months there is a prevalence of 1–2%. Undescended testis (UDT) is the absence of one or both testes from normal scrotal position; during initial clinical evaluation it may be palpable or nonpalpable. On physical examination, approximately 20–27% of extrascrotal testes are found to be non-palpable testes (NPT) [1,2].

A peeping testis is a special cryptorchoid testis that emerges from the internal ring and is fairly mobile between the inguinal region and abdominal cavity; hence, it is not consistently palpable/seen in the inguinal region. Peeping testis represents a diagnostic challenge and a therapeutic dilemma. Open surgical treatment of such testes is the most popular approach among pediatric urologists and surgeons. Due to the difficult surgical mobilization of some peeping testes, as well as significant complications, including testicular retraction/atrophy (3–18%), it was hypothesized in the present study that laparoscopic orchiopexy for such high inguinal testes is an attractive alternative approach [3–7].

The work presented herein is a prospective randomized study to compare open and laparoscopic orchiopexy procedures for the management of peeping testis. The aim was to evaluate the success and morbidity of both approaches.

Materials and methods

The study was reviewed and approved by the institutional ethical review boards of the authors' affiliations. Parental informed consent was signed preoperatively. Between September 2007 and January 2012, all children with newly diagnosed unilateral peeping testes were included in a prospective study. Peeping testes with a minimum diameter of 7 mm or more were included. Sample size calculation was carried out using Epi-info™, version 3.3 (Centers for Disease Control and Prevention [CDC], 2005; Atlanta, GA, USA). A calculated sample of 46 was needed to detect an effect size of 0.3 between the two groups (25 from the open orchiopexy group and 21 from the laparoscopic orchiopexy group), with a *P*-value < 0.05 and 90% power.

A total of 143 children presented with unilateral NPT. Initial clinical evaluation in a frog-legged position (after application of lidocaine 5% topical anesthetic gel to the inguinal region) revealed palpable high inguinal testis in 38 children. Scrotal-inguinal ultrasonography (performed by seven radiologists using a 38 mm linear array transducer at 10 MHz) revealed inguinal testis of ≥ 7 mm in maximum diameter in eight more children, in addition to the clinically palpable 38 testes. Testicular volume was calculated in cm³ using the following formula: length \times width \times height \times 0.523. Testicular volume discrepancy was estimated by the formula: (the non-peeping testicular volume – the peeping testicular volume) \times 100 \div the non-peeping testicular volume. Preoperative testicular volumes for the non-peeping UDTs were within normal for the children's ages. Testicular volume discrepancy of >20% was considered for evaluation. Testicular atrophy was considered if the size of

the testis was less than the contralateral normal sized one, by one-third or more.

The selected 46 children completed the present study. The children were quasi-randomized into two treatment groups according to the month of presentation; those who presented in odd months were treated with open orchiopexy and those in even months were treated with laparoscopic orchiopexy. Four surgeons (AE, AA, HA and KFN) performed the surgical procedures at the three institutions.

Although all, included peeping testes, were not palpable under general anesthesia, 31 of them were palpable using the bimanual digital rectal examination. Spermatic vessels of peeping testes were preserved for all cases. The contralateral testes were: normally descended in 33 cases, high scrotal in six cases and at superficial inguinal pouch region in the remaining seven patients. Contralateral surgical orchiopexy of UDT was performed at the same session. All children received a single dose of i.v. 1st generation cephalosporin (50 mg/kg) 1 h before induction of anesthesia.

The technique of open orchiopexy (*n* = 25) was as follows: through a transverse inguinal incision, the subcutaneous tissues then the inguinal canal were opened sharply. The testis was delivered, the gubernaculum was divided, and the patent processus vaginalis was dissected and ligated at the level of the internal inguinal ring. Dissection continued proximally into the retroperitoneum to mobilize the testicular vessels off the peritoneum. A dartos pouch was then created in the bottom of the ipsilateral hemiscrotum, to which the testis was delivered and fixed. The incisions were closed anatomically and local infiltration of 2% lidocaine at a dose of 4 mg/kg was applied.

The technique of laparoscopic orchiopexy (*n* = 21) was as follows: after insertion of a urethral catheter, a 5 mm umbilical trocar was inserted using the open Hasson technique. A pneumoperitoneum was created to 10–12 mm Hg. Two additional 5 mm trocars were inserted in the mid-clavicular line just below the level of the first trocar. The peeping testis could then be seen to be emerging from the internal ring. The dissection was started with an incision of the peritoneum, lateral to the testicular vessels down to the internal ring, followed by division of the gubernaculum, then incision of the peritoneum medial to the vas deferens. When such testis reached to the contralateral internal ring, the peritoneum was incised over the testicular vessels and wide mobilization of the testicular vessels up to the upper retroperitoneum was done. A subdartos pouch was created, a grasping forceps was placed into the peritoneum medial to the inferior epigastric vessels and the testis was fixed to the bottom of the scrotum, as in the surgical group. Local instillation of 2% lidocaine at a dose of 4 mg/kg to the peritoneal cavity through a trocar port was applied at the end of the procedure.

A visual pain analogue scale (VPAS) was calculated for all children 6 h after the procedure by three Post-Anesthesia Care Unit (PACU) nurses; one in each institution. A pain score of 4–6/10 was the indication for rectal paracetamol 15 mg/kg, whilst a pain score of >6/10 was the indication for additional analgesia by i.v. Pethidine (1 mg/kg). All children were discharged on postoperative Day 1; they were followed up clinically 1 month, 3 months and 1 year

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