

Laparoscopy in the Evaluation of the Non-Palpable Undescended Testes

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ABSTRACT

Aim of Study: To examine the role of laparoscopy in the evaluation of the non-palpable undescended testes in paediatric patients.

Method: A review of all laparoscopies performed for the evaluation of the non-palpable undescended testes in a children's hospital over a 12-month period was conducted. Special attention was paid to the patients' age, the location of the testes at the time of laparoscopy, the subsequent surgical procedures and the complications.

Results: Sixteen boys underwent laparoscopy to localise 20 nonpalpable testes. 12 patients had unilateral disease while 4 had bilateral disease. 15 non-palpable testes were intraabdominal, 3 had inguinal testicular remnants and 2 had 'vanished'. A contralateral inguinal hernia was incidentally found in one patient. A patient with epididymal-gonadal non-union was not apparent at laparoscopy. There were no post-laparoscopic complications in all 16 patients.

Conclusion: Laparoscopy is safe and accurate in the evaluation of non-palpable testes in children. The accurate localisation of intraabdominal testes facilitates the development of an optimal surgical strategy.

Keywords: diagnostic laparoscopy, cryptorchidism

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INTRODUCTION

Cryptorchidism has an incidence of 0.8 - 2%, being nonpalpable in 20% of the cases⁽¹⁾. A nonpalpable testis is defined as a testis not palpated by any examination technique, including pre-operatively under anaesthesia⁽¹⁾. Nonpalpable testes have an increased risk of malignant transformation, infertility and epididymal malformation⁽²⁾. Surgical treatment is especially prone to failure compared to the palpable gonads. Many diagnostic methods have been described, the most promising is the use of diagnostic laparoscopy. We

present our experience with the laparoscope in the evaluation of the nonpalpable testes.

MATERIALS AND METHODS

The records of boys with nonpalpable testes who underwent diagnostic laparoscopy from July 1997 to June 1998 were reviewed. The criterion established for laparoscopy was testicular absence detected by physical examination of the patient under general anaesthesia. A total of 16 patients with 20 nonpalpable testes were identified. Data collected included patient age, affected side, location of testis at time of laparoscopy, operation performed, surgeon, and complications.

Under general anaesthesia, the child was catheterised only if the bladder was palpable. With the patient in the Trendelenburg position, an umbilical incision was deepened into the peritoneum and a 5 mm Hasson blunt trocar was inserted into the peritoneum under direct vision. Once the abdomen was insufflated with carbon dioxide (pressure limit 10 mmHg) it was inspected laparoscopically to rule out any injury and then with particular attention to landmarks, testicular location, the location of the vas deferens and the testicular vessels and the presence of a patent processus vaginalis. Subsequent surgery was planned according to the laparoscopic findings.

RESULTS

In this 12-month period, 154 testes in 135 boys were explored for cryptorchidism. Sixteen (11.9%) boys aged 13 months to 14 years (median age 24 months) underwent laparoscopy to localise 20 (13.0%) nonpalpable testes. The endoscopic findings are summarised in Table I. Twelve (75%) patients had unilateral nonpalpable testis while four (25%) had bilateral disease. The ratio of left-to-right sided nonpalpable testes was 1.4:1. Fifteen (75%) nonpalpable testes were intraabdominal (Fig. 1), the remaining five (25%) had the vas deferens and the testicular vessels entering into the inguinal canal (Fig. 2). Subsequent inguinal exploration of the latter patients revealed 3 to be testicular remnants and 2 to have 'vanished'.

One patient had bilateral anorchia revealed on

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Fig. 1 Intraabdominal testis.

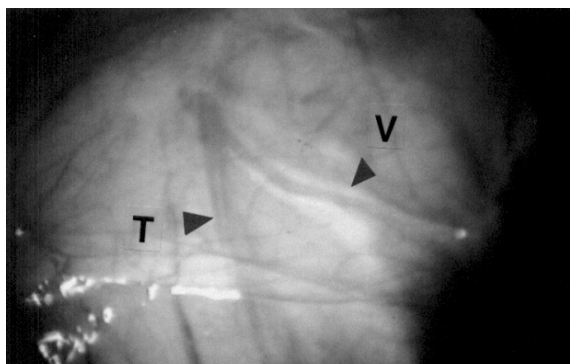


Fig. 2 Vas deferens and testicular vessels converging into internal ring (V: vas deferens, T: testicular vessels)

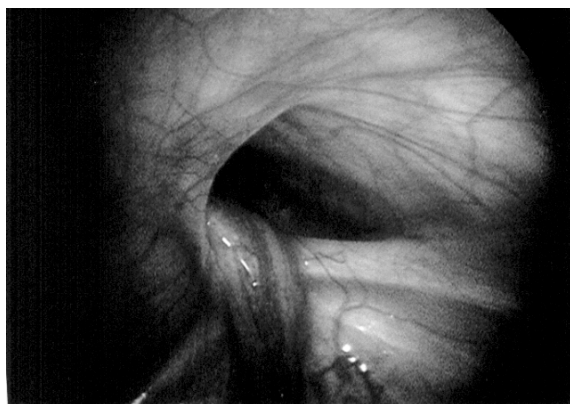


Fig. 3 Laparoscopic view of an inguinal hernia.

hormonal evaluation and laparoscopy showed the vas and the vessels to enter the inguinal canal. Inguinal exploration confirmed a left atrophic inguinal testis and a 'vanished' right testis. A contralateral inguinal hernia (Fig. 3) was incidentally found in an obese 14-year-old for which a herniotomy was also performed. Epididymal-gonadal nonunion was found in one intraabdominal testis during conventional orchidopexy, which was not apparent at laparoscopy. Orchidectomy was performed which confirmed epididymal-gonadal nonunion together with peritubular fibrosis and an absence of Leydig cells on histology. All 15 intraabdominal testes were found between the external iliac vessels and the internal inguinal rings.

14 of the 15 intraabdominal testes were managed by

Table I. Summary of endoscopic findings.

Age	Location of testes	Operation
13 mths	Left: intraabdominal, deep to internal ring	Left orchidopexy
15 mths	Left: intraabdominal, deep to internal ring	Left orchidopexy
16 mths	Left: intraabdominal, deep to internal ring	Left orchidopexy
18 mths	both: intraabdominal, deep to internal ring	Right orchidopexy, Left orchidopexy
18 mths	Right: atrophic intracanalicular testes	Right orchidectomy
19 mths	Right: intraabdominal, deep to internal ring	Right orchidopexy
20 mths	Both: intraabdominal, deep to internal ring	Bilateral orchidopexies
24 mths	Left: vanished testis	Left inguinal exploration and biopsy
24 mths	Left: intraabdominal, deep to internal ring	Left orchidopexy
26 mths	Left: intraabdominal, deep to internal ring	Microvascular anastomosis
3 yrs	Right: high intraabdominal, right iliac fossa (epididymal-gonadal nonunion)	Right orchidectomy
3 yrs	Both: intraabdominal, deep to internal ring	Bilateral microvascular anastomosis
8 yrs	Left: atrophic intracanalicular testes Right: vanished testis	Left orchidopexy, excision biopsy of distal right vas deferens
13 yrs	Left: atrophic intracanalicular testes	Left orchidectomy
13 yrs	Right: intraabdominal, deep to internal ring	Right Fowler-Stephen orchidopexy
14 yrs	Right: intraabdominal, deep to internal ring Left: inguinal hernia	Right orchidopexy, left herniotomy

orchidopexy. (10 underwent standard orchidopexy, 1 Fowler-Stephens orchidopexy, 3 orchidopexy with microvascular anastomosis). The patient with epididymal-gonadal nonunion in an intraabdominal testis had an orchidectomy. 4 of the 5 intracanalicular atrophic or vanished testes were removed for biopsy. One was brought down to the scrotum due to strong objection from the patient's father despite reiteration of the high risk of malignant degeneration. There were no post-laparoscopic complications in all 16 patients.

Imaging techniques have been unreliable especially when the testes were intraabdominal or were too atrophic to be visualised in the inguinal canal. 4 patients had prior ultrasonography to attempt to localise 5 nonpalpable testes. Only one of the intraabdominal testes which was situated deep to the internal inguinal ring was localised pre-operatively.

DISCUSSION

Management of the nonpalpable testes remains a diagnostic and a therapeutic challenge to all paediatric surgeons. Many diagnostic methods have been described which included hormonal evaluation, ultrasonography, venography, arteriography, computer tomography, magnetic resonance imaging, laparoscopy and exploration. Since 1976, when Cortesi et al first reported a case of abdominal testis identified by laparoscopy⁽³⁾, many authors have found laparoscopy a valuable adjunct to clinical examination in the search of the nonpalpable undescended testes.

The most feared of complication in laparoscopy is that of the iatrogenic trauma to the intraabdominal viscera. The child's peritoneum seems more elastic and does not puncture readily. In addition, the abdominal anterior-posterior diameter is smaller and makes the child more prone to visceral injury during the introduction of the laparoscope. The 'open' Hasson blunt trocar insertion technique has its documented advantages over the 'blind' insertion of Veress needle. In spite of this, blunt bowel injury has been reported⁽⁴⁾. The insertion of the trocar must be done under direct vision and with ease. To date, we had no complications from this technique. We also found that the insufflating pressure of 10 mmHg is sufficient, in contrast to authors using 15 mmHg⁽⁵⁾.

Despite its embryological origin at the inferior renal pole, majority of the intraabdominal testes is found in the pelvis, most commonly close to the internal ring and in areas adjacent to the external iliac vessels. 75% of our patients' testes were in this region. Besides looking at the internal inguinal rings for vas deferens (medially) and the testicular vessels (laterally) which converge into the internal ring in the shape of 'V', in unilateral cases, it is prudent to inspect the contralateral side especially in the interpretation of findings in relation to the diameter of the vessels. The distance of the testes from the internal ring, the length of the vas deferens and the vessels will give an indication to the ease of the subsequent orchidopexy. Laparoscopic identification of blind-ending testicular vessels prior to entering the internal ring is sufficient to diagnose a vanishing testis, which does not require further surgical exploration^(4,6).

The accurate localisation of intraabdominal testes facilitates the development of an optimal surgical strategy. Laparoscopy allows the visualisation of the testis, to assess its presence, position, size and the relative lengths of the vas deferens and the gonadal vessels⁽⁷⁾. It permits the planning of further management (orchidopexy or orchidectomy), or indeed avoids extensive exploration for an absent testis when blind-ending vessels are noted. Fusion anomaly of the epididymis and the gonad is known to be more frequent

in cryptorchidism (43%)⁽⁸⁾. Identification of the dysunion can be difficult and is often obscured by the orientation of the testes. Our one case made us aware of the pitfall of diagnostic laparoscopy.

Following the development of diagnostic laparoscopy, various authors including Jordan (1992)⁽⁹⁾, Docimo (1995)⁽¹⁰⁾ and Poppas (1996)⁽¹¹⁾ have reported their use of laparoscopic surgery in the management of the nonpalpable undescended testes^(5,12). The majority of their patients were treated with a single stage procedure and they have reported good results. The other options include standard orchidopexy via the inguinal approach, Fowler-Stephens orchidopexy via the inguinal or the laparoscopic approach with laparoscopic vascular clipping and laparoscopic orchidectomy^(5,12).

CONCLUSION

Laparoscopy in the evaluation of the nonpalpable undescended tests in paediatric patients has been proven to be safe and accurate in this and many other reports. When compared to the other imaging modalities, laparoscopy is the most reliable technique to determine the site of the nonpalpable testis. Nevertheless, if laparoscopic examination is technically unsatisfactory for some reasons, exploration is still indispensable.

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