

The Role of Laparoscopy in the Management of Non- palpable Undescended Testes

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Abstract

Background: Cryptorchidism is one of the most common genitourinary disorders in young boys. Management of non- palpable undescended testis is a surgical challenge involving evaluation and surgical management. The objective of this study is to present our initial experience with laparoscopy in patients with non- palpable testis.

Patients and methods: Laparoscopy was performed under general anesthesia on 25 patients. If the internal spermatic vessels and vas deferens made their way into the internal inguinal ring, the inguinal canal was dissected. Laparoscopic orchiopexy or orchiectomy was performed in cases with intra-abdominal testis. If the internal spermatic vessels found terminated intraperitoneally with a blind-end, the case was considered as a vanishing testis.

Results: Twenty five boys, aged from 2.5 years to 32 years (median 8.7 years) were identified with 30 non- palpable testes. In five of the 30 non- palpable testes, the vas and the vessels were through the internal ring, and the inguinal region needed dissection. Orchiopexy was performed on 4 testes and orchiectomy was performed on one atrophic testis. Twenty of 30 testes were intra-abdominally localized. Laparoscopic orchiopexy was performed in 16 testes and laparoscopic orchiectomy was performed in 4 testes. Five boys were diagnosed as vanishing testes.

Conclusions: Laparoscopy seems to offer a safe and reliable diagnostic and therapeutic option to patients with non- palpable testes.

الخلاصة

تشكل حالات الخصية الهاجرة عند الذكور نسبة 3-5% عند الولادة التامة. إن التعامل مع حالات الخصية غير المحسوسة يعتبر تحدي كبير للجراحين من ناحيتي التشخيص والعلاج. إن الهدف من هذه الدراسة هو لتقديم خبرتنا الإستهلاكية للتعامل مع حالات الخصية غير المحسوسة عن طريق إستخدام الجراحة المنظارية.

منهاج الدراسة: تم علاج 25 مريضاً ممن لديهم حالات خصية غير محسوسة عن طريق الجراحة المنظارية تحت التخدير العام. تم إستكشاف البطن عن طريق المنظار وتحديد حالة الخصية غير المحسوسة، حيث كانت إما داخل البطن أو داخل القناة المغبنية أو غير موجودة أصلاً من خلال متابعة الأوعية الدموية المنوية الداخلية وتحديد مسار دخولها إلى الحلقة المغبنية الداخلية من عدمه. تم التعامل مع حالات الخصية الموجودة إما عن طريق تثبيت أو قلع الخصية منظارياً حسب درجة نمو الخصية.

نتائج الدراسة: شملت هذه الدراسة 25 مريضاً ممن لديهم 30 حالة خصية غير محسوسة و بأعمار تتراوح بين 2.5 سنة إلى 32 سنة (معدل 8.7 سنة). تم إستخدام المنظار كوسيلة تشخيصية وعلاجية، حيث كانت الخصية داخل البطن في 20 حالة (66.6%) مما تطلب تنزيلها الى كيس الصفن في 16 حالة و قلع الخصية في 4 حالات بسبب تلف الخصية. وكانت الخصية داخل القناة المغبنية في 5 حالات (16.7%) مما تطلب تثبيتها داخل كيس الصفن في 4 حالات و قلع الخصية في حالة واحدة بسبب تلف الخصية. في حين كانت الخصية غير موجودة اصلاً في 5 حالات (16.7%).
الإستنتاجات: إن إستخدام الجراحة المنظارية كوسيلة تشخيصية و علاجية في حالات الخصية غير المحسوسة هو إجراء أمين و معتمد مع قلّة المضاعفات المصاحبة لهذا الإجراء.

Introduction

In the eighth week of intrauterine life, the testes arise in the abdominal cavity, and descend through inguinal canal in the third trimester, reaching the scrotum at 38th week. ⁽¹⁾ Isolated cryptorchidism is one of the most frequent congenital anomalies of the male genital system, ^(2, 3, 4, 5, 6) and is present at birth in 3- 5% of full-term male newborn, and is higher in preterm and low birth weight infants, reaching 30% in premature infants. ⁽⁷⁾ The rationale for treatment of the undescended testicle is the prevention of potential sequelae. The most common problems associated with undescended testicles are testicular neoplasm, subfertility, testicular torsion and inguinal hernia, and cosmetic and psychological problems. ⁽⁸⁾ Undescended testicles can be categorized on the basis of physical and operative findings: (1) true undescended testicles (including intra-abdominal, peeping at the internal ring and canalicular testes), which exist along the normal path of descent and have a normally inserted gubernaculum; (2) ectopic testicles, which have an abnormal gubernacular insertion; and (3) retractile testicles, which are not truly undescended. Approximately 80% of undescended testes are clinically palpable and 20% are non- palpable, despite careful physical examination. ^(9, 10) In boys with a non- palpable testis, approximately 50% are abdominal, 45% are atrophic (also known as vanishing testes) secondary to in utero spermatic cord torsion, and 5% are in the inguinal canal. ^(11, 12) Testicular examination of the infant and young child requires a two-handed technique. One hand should start at the hip and gently sweep along the inguinal canal, aided by surgical lubricant or warm soapy water, if necessary. A true undescended or ectopic inguinal testicle will be felt to "pop" under the examiner's fingers during this maneuver. A low ectopic or retractile testicle will be felt by the opposite hand as it is "milked" into the scrotum. The ectopic

testicle will immediately spring out of the scrotum when it is released. The retractile testicle will remain momentarily in the scrotum until further stimulation causes a cremasteric reflex. The overall accuracy of radiologic testing for undescended testis is only 44%, ⁽¹³⁾ and many modalities have been used for this purpose with varying success rates, ^(14, 15) including ultrasound, CT scan, MRI, testicular angiography and venography, pneumoperitoneography, and herniography. Many of these techniques are invasive, require anesthesia, are technically difficult to perform, or are associated with a significant rate of false-negative results. Management of palpable undescended testis is quite straightforward and diagnostic studies are usually not necessary. However, management of non-palpable testes is more complex, and aims to identify whether a viable testis is present and, if so, either perform an orchiopexy or, in selected cases, an orchiectomy.

Treatment: Cryptorchidism should be treated when the patient is aged approximately 6 months. Treatment for cryptorchidism can be hormonal, surgical or a combination of the two *Medical Therapy* Patient selection is paramount to achieve satisfactory results. Higher success rates are reported in older children (aged >5 years), in patients with testes in a lower pretreatment position, in boys with bilateral pathology, and in those with retractile testes. ^(16, 17, 18, 19, 20, 21) Primary hormonal therapy with hCG or gonadotropin-releasing hormone (GnRH) has been used for many years. **Surgical Therapy:** Successful surgical placement of the testis in the scrotum is based on the principles originally described by Bevan in 1899. These include adequate mobilization of the testis and spermatic vessels, ligation of the associated hernia sac, and adequate fixation of the testis in a dependent portion of the scrotum. ⁽²²⁾ Before laparoscopy was adventured, open surgical exploration was used often to show undescended testis, but

then, laparoscopic technique is used widely in both diagnosis and treatment of undescended testis. ⁽²³⁾Laparoscopy was used by many as a method for the localization of the non- palpable testes prior to exploration. ^(24, 25) The recent surge of laparoscopic surgery encouraged surgeons to use laparoscopy for both the diagnosis and treatment of non- palpable testes. ^(26, 27, 28)

Aim of the study: The aim of our study is to present our initial experience in the management of non- palpable undescended testes with special reference to laparoscopy.

Materials and methods

Between 2009 and 2011, 25 patients with 30 non- palpable undescended testes were enrolled in this study. Their ages ranged from 2.5 to 32 years (mean 8.7 years). Twenty patients (80%) had clinically suspected unilateral non- palpable undescended testes; 11 on the right side and 9 on the left side. Five patients (20%) had clinically suspected bilateral undescended testes. In all patients, the testes were not palpable at thorough examination, even under general anesthesia. After baseline investigations and preoperative fitness, all patients underwent laparoscopy under effect of general anesthesia. A urethral catheter was inserted into the bladder and the patients were placed in Trendelenburg position. A small U-shaped incision of 1 cm length was made just below the umbilicus. A Veress needle was inserted into the abdomen and CO₂ was insufflated to achieve a pneumoperitoneum at a pressure of 8-10 mmHg. The anterior wall of the abdomen was pulled upwards and then a 10 mm trocar was inserted into the abdominal cavity. A zero degree 10 mm laparoscope was inserted and the abdominal organs were laparoscopically inspected to rule out any injury and then specific attention to the landmarks, the location and the length of vas deferens,

testicular vessels, presence of a patent processus vaginalis or inguinal hernia, Wolffian structures and the presence of the testis and its volume, in addition to comparison with the contralateral side. *The possible findings during laparoscopy including either:* vas deferens and spermatic vessels coursing through the internal ring, viable intra-abdominal testis, and vessels and vas ending blindly prior to the internal ring. In order to find the possible intra-abdominal testis, vas deferens and spermatic vessels were traced till the internal inguinal ring. Following diagnostic laparoscopy, CO₂ was emptied, and the fascia and the skin were closed with an absorbable suture. When both the vas and the vessels end blindly intra-abdominally, no further exploration was necessary, and a diagnosis of vanishing testes is established. Descent of vas deferens and spermatic vessels through the internal ring excluded the diagnosis of intra-abdominal testis. In such cases, gentle pressure on the inguinal region was exerted to force testes just inside the internal ring proximally. If the testis could be delivered through the internal ring, the gubernaculum was divided, used for traction, and the procedure was completed laparoscopically. If this was not possible, a small inguinal incision was done to complete the procedure. Standard orchiopexy with subdartos pouch was done if the testis is found to be viable and the vessels are of sufficient length. Testicle is inspected to ensure that a dependent scrotal position can be achieved without tension on the vas. The testicle is brought out through the scrotal incision and secured with interrupted absorbable sutures in the subdartos pouch. If the testes were found intra- abdominally, they were assessed for their size; appearance and mobility; the distance between the testes and the inguinal canal; the length of spermatic vessels and vas deferens were assessed to proceed with either orchiectomy or orchiopexy. The testis was considered normal in relation to the other

testis (in unilateral cases) or according to the expected size at that age (in bilateral cases). *If an abnormal testis was found*, orchiectomy was performed, by freeing and removing the abnormal testis or nubbin of tissue at the end of spermatic cord structures, and the vas deferens and spermatic vessels were clipped and cut with laparoscopic scissors. *If a normal testis was found*, accessory ports, each 5 mm in diameter, were inserted in both the right and left sides at the midclavicular line below the level of umbilicus, and orchiopexy was carried out as described by Docimo and Peters. ⁽²³⁾ If the vessels are too short to do orchiopexy, either a staged procedure was planned (used in one case in this study) or a Fowler-Stephens procedure was carried out (not used in this study).

Results

Of 25 patients in this study with 30 undescended non- palpable testes; 11 were on the right (44%), 9 on the left (36%) and 5 were bilateral (20%). Their age ranged from 2.5 to 32 years (mean 8.7). Laparoscopy had defined the intra-abdominal anatomy in all patients with no procedure- related complications. Twenty testes (66.6%) were found intra-abdominally, which necessitated orchiopexy in 16 cases and orchiectomy in 4 testes because they were atrophied. Inguinal hernia repair was performed besides orchiopexy. The testes were fully descended to the dependent position of the scrotum (i.e. single stage orchiopexy) in 15 cases, and down to the level of superficial pouch in one case, in which a second stage orchiopexy was performed in a conventional manner six months later, and the testis was moved to the scrotum. In 5 non- palpable testes (16.7%), vas deferens and spermatic vessels exited the internal inguinal ring. In these 5 cases, inguinal region was explored, and orchiopexy was performed in 4 viable inguinal testes and orchiectomy in 1 testis,

because it was extremely atrophied. Blind-ending spermatic vessels were found in 5 testes (16.7%) and these cases were considered as vanishing testes, and no further exploration was necessary in these cases. No intraoperative complications were seen. There was no major blood loss during the surgery. The mean operation time was 30 minutes for diagnostic laparoscopy, and 90 and 70 minutes for laparoscopic orchiopexy and orchiectomy respectively; 60 and 50 minutes for inguinal orchiopexy and orchiectomy respectively. The patients were discharged from the hospital within 24 hours. No postoperative complications reported in all the above mentioned patients and there was no morbidity and no mortality in those patients. No malignancy was detected in all orchiectomized testes. Patients were followed for a period ranged from 6 to 24 months. At follow-up, all testes were well down in the bottom of the scrotum and all testes were of normal size.

Discussion

The goal of managing a boy with an undescended testis is to place the testis in the scrotum, to maximize its potential for spermatogenesis, to allow screening for malignant degeneration in adolescence and adulthood, and to close the patent processus vaginalis, which is usually present in these boys. ⁽⁹⁾ Laparoscopy was first used by Cortesi to diagnose impalpable undescended testes in 1976 and later, Lowe reported a large series of diagnostic laparoscopy in cases of non-palpable testes. ^(29, 30) Only after 1990, laparoscopy was used for the treatment of non- palpable testes as the urologists gained experience with the method and since then, laparoscopic orchiopexy and orchiectomy have been increasingly used. ^(31, 32) In the literatures, it was reported that the accuracy rate of laparoscopy in determining the location of the testes was more than 95%. ^(33, 34) Elder performed laparoscopic completed by open

orchiopexy in 12 non- palpable intra-abdominal testes with an accuracy rate of 92% ⁽³⁵⁾ while Esposito and Garipoli performed totally laparoscopic orchiopexy in 33 non- palpable intra-abdominal testes with an accuracy rate of 100%. ⁽³⁶⁾ Laparoscopy helps to localize testes and guide the operation and can be used safely in all age groups. Blind-ending spermatic vessels obviate other investigational techniques and can be considered absence of testes. Absence of testes is usually due to prenatal or perinatal torsion. When spermatic vessels are through the internal inguinal ring, it is obligatory to assess the inguinal canal. These vessels may extend to a testis, which can be small, and the testis may contain remains of seminiferous tubules, which must be removed. During an inguinal exploration, we found that one of 5 undescended inguinal testes (20%) was extremely atrophied and orchiectomy was done. Moore *et al* performed diagnostic laparoscopy in 96 patients with 117 non- palpable testes, and found intra-abdominal testis in 24% and vanishing intra-abdominal testis in 7% of the patients. There were descended vas deferens and spermatic vessels through the internal ring in 66% of the patients, but there were no vas deferens and spermatic vessels in 3% of the patients. Diagnostic laparoscopy rarely causes complications in cases of non- palpable testis. The anterior wall of the abdomen is thinner in children than in adults, and therefore, laparoscopy may have a higher risk of complications in children. Undescended testes in adults should be treated with orchiectomy. When bilateral undescended testes are treated with orchiectomy, testosterone supplements should be given and prosthesis of testes should be placed to avoid negative effects of an empty scrotum on the patient. A bilateral orchiopexy was performed in a 25 years-old patient after obtaining biopsy from the testes. The patient was informed about the risk of testicular cancer, and he had been followed regularly since the operation.

Conclusions

Laparoscopy makes it possible to avoid unnecessary surgical interventions in the cases of non- palpable undescended testis and helps localize the testes, determine paratesticular pathologies, select an appropriate surgical procedure and perform orchiopexy safely. In fact, unnecessary surgical operations can be avoided in 42% of the cases. ⁽³⁷⁾ Although the mean operation time is usually longer in laparoscopy compared to open operations, with experience the duration can be shortened. Laparoscopy is an important alternative in the diagnosis and treatment of non- palpable testes because it has the advantages of an acceptable rate of complication, less severe postoperative pain, smaller scar, shorter hospital stay and early return to daily activities.

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