Laparoscopic Assessment and Treatment of Non-Palpable Testis in an 18-Year-Old Male

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Laparoscopy, both diagnostic and therapeutic, has been used in the management of pediatric non-palpable testes. We report a case of left non-palpable testis at the unusual age of 18 years. Laparoscopic exploration revealed an intra-abdominal testis lying between the internal inguinal ring and external iliac vessels. The testis was visually in good condition and, in contrast to the accepted procedure of orchiectomy performed in late adolescent cryptorchidism, we decided to preserve this intra-abdominal testis, which was located too far from the scrotum for a primary orchidopexy. The first stage of the Fowler-Stephens procedure was performed laparoscopically. The second-stage orchidopexy was performed successfully through an inguinal approach 3 months later, after sonographic ascertainment of non-decreased testicular volume. Laparoscopy allows thorough exploration for an intra-abdominal testis, with simultaneous therapeutic options. Our experience highlights the feasibility of laparoscopic assessment and treatment of cryptorchidism in adolescents and young adults. [*J Chin Med Assoc* 2005;68(3):150–153]

Key Words: cryptorchidism, laparoscopic surgery, testis, undescended

Introduction

Laparoscopy for non-palpable, undescended testes was first described by Cortesi et al,[1] and improved by Jordan et al,[2] and is now gaining popularity in the pediatric field. This technique not only reveals the presence or absence, and confirms the anatomical position, of a cryptorchid testicle, but also allows treatment through primary orchidopexy or the Fowler-Stephens procedure with vascular division. Literature has accumulated rapidly in the last few years showing a variable success rate for laparoscopy.[3–7] While laparoscopy has generally been regarded as the diagnostic approach of choice, therapeutic efficacy depends on several factors: previous testicular surgery; meticulous retroperitoneal dissection; high mobilization of the testis; adequate vessel length; and ample vas deferens collaterals. Nonetheless, the overall success rate of 90% exceeds that with conventional open surgery.[5–8]

Nowadays, most cases of undescended testes are diagnosed and managed in infancy. Patients with cryptorchidism identified in adolescence or early adulthood are exceptionally rare. We report a case of left non-palpable testis, at the unusual age of 18 years, managed with laparoscopy. Although the risk of developing testicular cancer is much higher for this post-pubertal patient than for the general population, we decided to preserve and correct the intra-abdominal, non-atrophied testis, instead of performing conventional orchiectomy. Here, we report management via a laparoscopy-assisted, staged Fowler-Stephens procedure.

Case Report

An 18-year-old male with long-term, neglected left non-palpable testis underwent laparoscopic assessment. The patient's body weight was 55 kg, and height was 170 cm, and he had an unremarkable history. The testis was non-palpable, even under general anesthesia. The external genitals were normal in appearance, with the opposite testicle in dependent position.

The laparoscopic procedure started with the stomach and bladder decompressed, and the patient

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lying in the supine Trendelenburg position. Pneumoperitoneum was created, with insufflation to 12 mmHg after a Veress needle was punctured through a subumbilical vertical incision. A 5-mm trocar sheath was inserted steadily after withdrawing the puncture needle. A 30° telescope was advanced through the sheath. First, a thorough exploration was done to confirm no iatrogenic trauma, followed by inspection of the left lower quadrant. The intra-abdominal testis was recognized between the internal inguinal ring and external iliac vessels (Figure 1A).

The camera sheath was removed and the incision extended to accommodate a 10-mm sheath. Two accessory ports of 5-mm trocar sheaths were created bilaterally at the midclavicular line, slightly lower than the umbilical port. A 10-mm zero-degree telescope was used, with instruments passed through the bilateral accessory ports. The testis appeared ashen and non-atrophied, and careful inspection revealed that its size was equivalent to the opposite one.

We decided to preserve and bring down the cryptorchid testicle. The dissection proceeded by peritoneal incision from the internal inguinal ring to iliac vessels. The testis was detached from the peritoneum and areolar tissue with blunt dissection. All bleeding vessels were coagulated with electrocautery. The internal spermatic vessels, and the whole vas deferens complex, were skeletonized and dissected free from the peritoneum. The internal spermatic vessels were traced as far cephalad, and laterally, as possible to gain additional length. The mobile testis, however, appeared to be at a distance of 3 cm from the inguinal ring. We grasped the testis and moved it, at greatest stretch of the supporting vessels, into the internal ring, but failed to achieve a safe intra-scrotal placement without concern of vascular compromise. Subsequently, it was decided to perform a staged Fowler-Stephens procedure; vascular clipping and division then became necessary.

The internal spermatic vessels were divided with endoscissors, after applying double clips bilaterally at both ends of the cut point (Figure 1B). The testis and the vas deferens were brought through the internal ring. The relatively short vas deferens pedicle, however, did not permit completion of a 1-stage Fowler-Stephens procedure, despite wide mobilization and division of the internal spermatic vessels (Figure 1C). The testis lodged in the inguinal canal, halfway between the internal ring and dependent scrotal position. The peritoneum over the internal inguinal ring was closed with intracorporeal sutures, and the high intra-abdominal testis was downgraded to an inguinal one (Figure 1D).

Three months later, sonographic examination confirmed a non-decreased volume of the testis; perfusion to the gonad from vas deferens collaterals was determined indirectly. The second stage of the Fowler-Stephens procedure was performed through an inguinal approach. The inguinal undescended testis was pulled down and fixed to a dartos pouch at the dependent portion of the left hemi-scrotum. The patient was regularly followed at an outpatient clinic for 2 years, and the testis showed normal consistency without atrophy.

Discussion

Cryptorchidism is reported to have an incidence of 3.4% in full-term infants, but a much higher incidence (30%) in pre-term infants. In both cases, spontaneous descent of the testis or testes may occur in the first year of life, particularly during the first 6 months; thus, the incidence of cryptorchidism decreases sharply to 1.1% at age 1 year, and remains constant until adulthood.[9,10] The anatomical positions of cryptorchid testes are categorized into inguinal (~50–70% of cases), intra-abdominal (~10–35%), ectopic (beyond the external inguinal ring), or just vanished. Multiple modalities, including surgery and hormonal therapy, have been proposed for cryptorchidism to prevent infertility, malignant transformation, and inguinal hernia. Some researchers suggested that all cases of cryptorchidism should be treated as early as age 6 months, and that correction should be completed before age 2 years, since degenerative changes could take place as early as the first year of life.[11,12]

In instances of a non-palpable testis, it is imperative to determine whether a testis actually exists. In this respect, diagnostic laparoscopy is undoubtedly feasible, and is more accurate than imaging studies. The procedure can be performed in infants only 6 months old, but lower-than-normal pressures and volumes must be used for pneumoperitoneum at this age. The presence or absence of an undescended testis should be confirmed, and the position and contour of the testis, cord structures, and internal spermatic vessels, should all be inspected. When the internal spermatic vessels cannot be seen, a vanished testis is concluded. If both the vas deferens and internal spermatic vessels are piercing the internal ring, inguinal exploration is warranted. If an intra-abdominal testis exists, laparoscopic orchiectomy can be performed for the damaged or atrophied testis, otherwise, direct orchidopexy or the Fowler-Stephens procedure with vascular division is the required surgical approach.

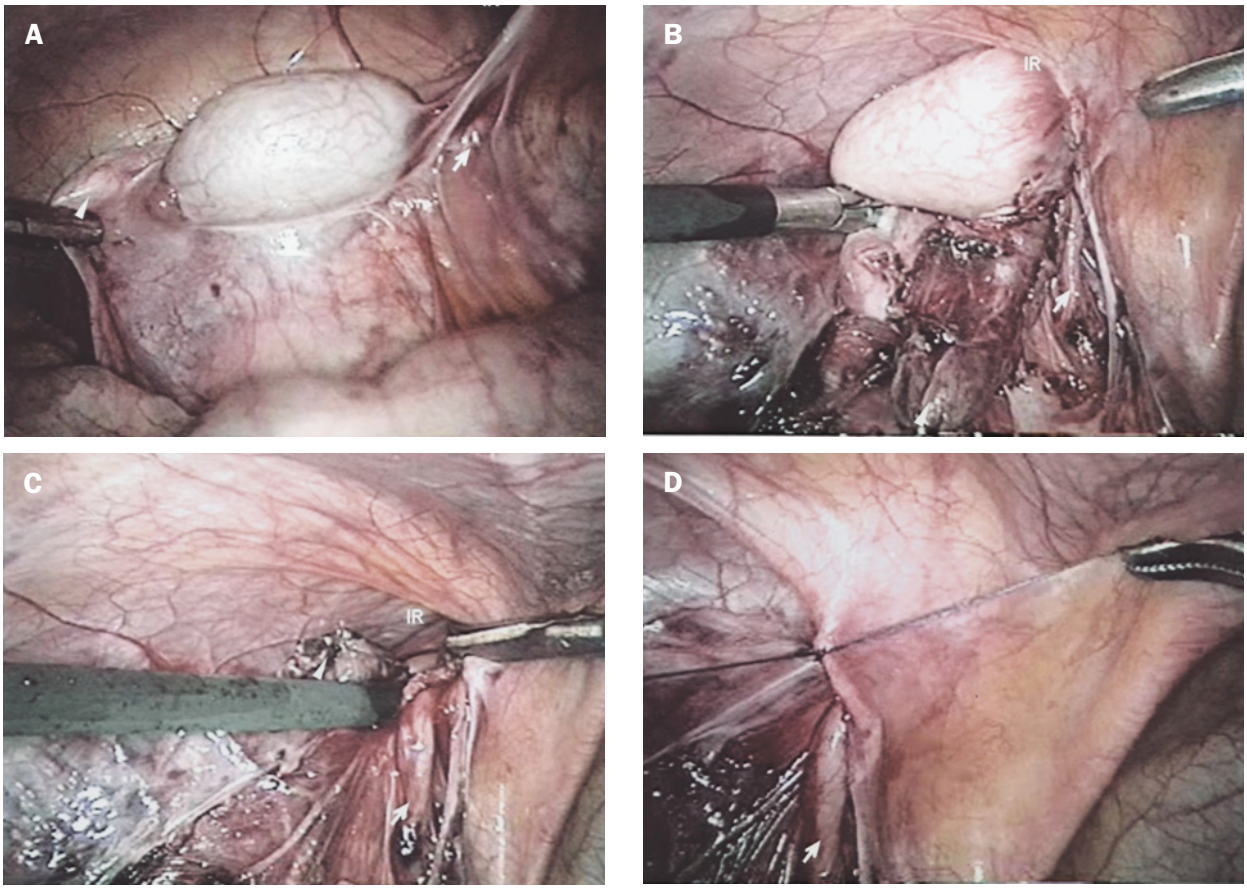

Figure 1. (A) Laparoscopic view of intra-abdominal testis (the arrow indicates the vas deferens and vas deferens artery; the arrowhead indicates the internal spermatic vessels). (B) The mobile testis after the internal spermatic vessels were divided. (C) The testis lodged beneath the internal ring with the vas at greatest stretch. (D) The internal ring was closed, after the testis, vas deferens, and vas deferens artery, were brought through it. IR = internal ring.

The choice of treatment depends on testis motility and length of the internal spermatic vessels. There is no clear-cut distinction between short vessels/high intra-abdominal testes and adequate vascular length/low testes regarding prediction of whether a 1- or 2-stage procedure is needed. In some circumstances, the testis can be placed directly into the scrotum without vascular division. However, 2-stage procedures provide the benefit of collateral propagation, which allows cord stretch and lengthening several months later. The 1-stage procedure saves the patient from repeated surgery and tedious adhesiolysis. Recent literature suggests that there is no difference in success rate between 1- and 2-stage Fowler-Stephens procedures; the overall success rate is 85%, and previous testicular surgery is considered the most important adverse factor.[13]

In the current report, we performed a laparoscopic assessment and the first stage of the Fowler-Stephens procedure simultaneously; the intra-abdominal testis was pulled into the inguinal canal after peritoneal dissection with the internal ring closed. The testis was nourished from the vas deferens. A conventional orchidopexy through an inguinal incision was delayed for 3 months, allowing collateral vessels to grow. While we used ultrasound to confirm that testicular volume was normal, Doppler may be a more accurate measure of both testicular volume and flow states. Manak et al demonstrated, using color Doppler, intratesticular perfusion from collateral blood flow in the vas deferens artery after preliminary dissection of the internal spermatic artery in cryptorchidism.[14]

In our present report, the subject was diagnosed at the unusual age of 18 years. Spermatogenesis in such a cryptorchid testis was minimal, and fertility was presumably lost. In addition, the likelihood of a germ-cell tumor in undescended testes is higher than in the general population. Importantly, most of the recent literature focuses on pediatric cryptorchidism, i.e. laparoscopic Fowler-Stephens procedures for intra-

abdominal testes in late adolescents or young adults are rarely performed clinically, such that the indication remains inconclusive. Post-pubertal cryptorchidism used to warrant total removal of intra-abdominal testes; however, in our case, the strategy of preserving a healthy testis, as observed intraoperatively, is convincing. Bringing down the testis makes scrotal examination and early detection of malignant transformation much easier. The statistical risk of testicular cancer is about 1 in 1,000 to 1 in 2,500 cryptorchid testes. Therefore, immediate orchiectomy is not justified for this level of risk.[15] Furthermore, in 1-fifth of testicular cancers, unilateral orchiectomy for an undescended testis had failed to guarantee that the opposite testis would remain free from malignant changes.[16] Although the risk of testicular cancer is not reduced by orchidopexy, detailed surveying of the testis for adverse consequences becomes possible.

A staged procedure rather than single surgery was carried out for our patient, mainly because of insufficient length of the vas deferens artery. The concept of the Fowler-Stephens procedure comes from the double blood supply of the testicle. That is, the vas deferens artery becomes the sole circulation after the internal spermatic vessels are divided. Any stretch or unopposed tension on the vas deferens pedicle would result in catastrophic testicular atrophy. We did not proceed with direct orchidopexy because of doubts about adequate vascularity. Delayed inguinal orchidopexy was easy to perform and proved to be a safe and practical strategy.

Our patient benefited from minimally invasive laparoscopy, with early ambulation, less wound pain, and next-day discharge; the fixed testis remained in place without atrophy. Laparoscopy seems to be applicable with great efficacy in cases of adolescent or early-adult intra-abdominal testis. Although there is no evidence that orchidopexy reduces the incidence of testicular malignancy, the procedure provides easier testicular examination and permits the earlier detection of tumors, should they occur.

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