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Laparoscopic Management of Impalpable Testis: A Single Center Experience

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Abstract **Original Research Article**

Background: Undescended testis is a common abnormality, affecting 3–5 % of male infants at birth. Elongation of the testicular vessels is an important point in considering the procedure of choice. Fowler and Stephen showed that the division of testicular vessels, as high as possible to maintain collateral blood supply as the best way to manage high intra-abdominal testis. Moreover, single stage orchidopexy either laparoscopic assisted or open is another choice. In addition to orchidectomy. all of them made the study worthy for a definite diagnostic step to have a definite plan of your patient. ***Objective:*** To illustrate our experience on Queen Rania Al Abdulla hospital for children in the management of impalpable undescended testis according to the diagnostic laparoscopic findings. ***Method:*** We performed a retrospective data analysis of the medical records of 108 patients who underwent diagnostic laparoscopic for intraabdominal high testis in our department from august 2015 to February 2019 according to the findings we decide how to go for the definite procedure with the best outcomes. ***Result:*** The total number of children who underwent laparoscopy is 108 patients, however 18 have bilateral impalpable testes. One third of them was right sided and two third was left side impalpable testis. Then we classify the patients according to the presence of testis intraoperative, 55 testis have vas and vessels passed through the ring for which we explore the inguinal area. Furthermore, 51 has orchidopexy with good size testis and 4 testis underwent orchiectomy as the testis was atrophied. On the other hand, we found 16 atrophied testis intraabdominal for this we did laparoscopic removal. For the 55 viable testis 50 of them underwent first stage Fowler stephens procedure and the remaining 5 testis underwent primary laparoscopic orchidopexy. ***Conclusion:*** Laparoscopic exploration of the impalpable testis is the cornerstone in the management and treatment of impalpable testis .Wise decision can be made easily according to the site, size and the presence of vas and vessels.

Keywords: Impalpable testis, laparoscopic management, orchidopexy.

INTRODUCTION

Cryptorchidism, or undescended testis (UDT), is defined as failure of normal testicular descent down to the scrotum and is confirmed by the age of 3 months. The incidence rate of cryptorchidism at age of one year is 1-2%. This abnormality is bilateral in 10% of affected boys [1, 2, 3]. 20% of the undescended testes are not palpable in the inguinal canal and are termed nonpalpable testes (NPT) [4]. Evaluation of NPT begins with imaging studies using ultrasound, CT scan or MRI followed by surgery [5].

Locating the NPT by laparoscopy was first used in 1976[6]. Laparoscopic management of the NPT is based on identification and ligation of the spermatic vessels to add adequate length and, later, pulling down the testis to the scrotum along with the collateral vessels **[**7].

In this study we illustrate our experience in Queen Rania Al Abdulla Hospital for Children in the management of nonpalpable undescended testis according to the diagnostic laparoscopic findings.

METHOD

We performed a retrospective data analysis of the medical records of 108 patients who underwent diagnostic laparoscopy for NPT in our department from August 2015 to February 2019. Further treatment plan was based on intraoperative findings.

Examination under anesthesia was performed routinely after induction of anesthesia and before positioning to confirm the testes are not palpable in the inguinal canal or at the level of internal ring. Once the diagnosis of NPT is confirmed, the laparoscopic procedure is started by inserting a 5-mm trocar in through a small supraumbilical wound. A camera with 0

degree lens in introduced. Another 5-mm port is used to insert used to insert a non-traumatic grasper to aid in mobilizing adjacent structures.

The internal inguinal ring is located. The testis, vas deferens and testicular vessels should all be visualized. The size of testis is assessed and documented. Based on the intraoperative finding, further treatment plan has fallen in one of three main surgical options : open orchidopexy for testes emerging through the internal ring, orchiectomy for vanishing testes and either primary orchidopexy or Staged Fowler-Stephen Procedure for high, intra-abdominal testes.

The procedure was performed as a day case surgery and all patients were discharged on the same day. All patients were followed in the clinic at 2 weeks to assess their wounds and possible early complications and at 6 months to assess testicular location and growth.

RESULTS

108 patients underwent laparoscopy for NPT. Mean age at surgery was 20 months. 30 patients (27.8%) had right-sided NPT, 60 patients (55.6) had left-sided NPT and 18 patients (16.7 %) had bilateral involvement. Total number of testes managed in this study is 126.

48 testes (38.0%) had their vas deferens and vessels exiting through the internal inguinal ring. 44 of these were good-sized, viable testes while 4 were atrophied. Open orchidopexy through an inguinal approach has been performed for the former group and orchiectomy for the latter.

In 16 of the cases (12.6%), blind-ending vas and vessels were encountered (Vanishing testes). No further action was needed on the same side nor contralateral fixation. 62 testes (49.2%) were documented as viable intrabadominal testes where cord strcutures have not reached through the internal inguinal ring. 5 of them (8%) were amenable to primary laparoscpic orchidopexy, while the remaining 57 (91%) were located above the level of iliac vessels and were treated by staged Fowler-Stephen procedure. A second stage of Fowler-Stephen procedure was performed at 6 months of the initial surgery. At exploration, 42 testes (73.6%) remained viable with a good growth and treated subsequently with orchidopexy, while 15 testes (26.3%) had been atrophied and had orchiectomized.

At 6-month follow up, all of the 44 testes that were treated with primary open orchidopexy, as their vas and vessels were identified as passing through the internal ring, had excellent outcome with a good testicular growth. None developed wound complications or testicular atrophy. 4 out of the 5 testes that were treated with a single-stage, primary laparoscopic orchidopexy had a good outcome. One testis had atrophied at 6- month follow up. Rate of testicular atrophy in this group was 20%.

In the group of 57 testes that were treated with two-staged Fowler Stephen procedure, 15 had testicular atrophy after the first stage while 10 had atrophied by 6 months after performing the second stage. 33 testes had a good size and position outcome at 6 months of the second stage.

In all groups treated with laparoscopic approach, no port-rellated complications were documented.

DISCUSSION

Cryptochidisim is one of the most common congenital anomalies in young boys and occurs as a result of failure of normal testicular descent. Normal testicular descent occurs during intrauterine life in two phases: Transabdominal descent, between 8-15 weeks of gestation and the inguinoscrotal descent, between 25-35 weeks. Failure of the second phase of descent is more common and results in the more distal forms of UDT, but failure of the first phase of descent will lead to the more severe form of UDT, the high intraabdominal testis [8].

About 4-5% of males have UTD at birth but more than half will continue to descend in the first 12 week postnatal. By 3 months post term, the incidence of congenital cryptorchidism is 1-2%.Clinically, an undescended testis (UDT), in contrast to retractile testis, is defined as a testis that cannot be manipulated to the bottom of the scrotum without tension on the spermatic cord. An UDT can be located in various positions: intraabdominal, canalicular, prescrotal or in the superficial inguinal pouch.

Orchidopexy is indicated due to the adverse effects of UDT on temperature, endocrine function, germ cell development and fertility as well as the risk of malignancy. Management of palpable inguinal UDT is well known. However; there is no consensus about the management protocol of nonpalpable testes.

UDT is known to occur more frequently on the right side. However, in the population of our study left-sided UDT were 2-fold more common that right-sided UDT (60, left; 30, right). 16.7% of the patients (18 out 108 patients) had bilateral UDT.

Laparoscopy has emerged as an excellent management tool in the diagnosis and treatment of NPT [9]. It provides an excellent anatomic visualization of the testis, vas deferens, and spermatic vessels on both sides and has the benefit of ligation of testicular vessels should Fowler-Stephens procedure be decided [10].

If the vas deferens and spermatic vessels are seen travelling through the internal inguinal ring, open inguinal exploration is indicated. Open orchidopexy yields an excellent result if the testis is initially normal [11].

If the testis could not be visualized or the vas or vessels were seen ending blindly before the internal inguinal ring, a thorough examination should be performed. Blind-ending vas and vessels indicate vanishing testis syndrome. However, a gubernacular blood vessel can mimic blind-ending spermatic vessels [12]. If blind-ending vessels are encountered but the vas deferens was not visualized, the diagnosis of an ectopic testis should be suspected [13].

If a viable, normal-sized testis is visualized intrabadominally, the optimal method of orchidopexy should be chosen [14-16]. The limiting factor for relocating the testis is the length of spermatic vessels. This can be roughly estimated by pulling the testis towards the contralateral internal ring. If the testis can reach there without undue tension, priamary laparoscopic orchidopexy is feasible. Alternatively, staged Fowler-Stephens operation should be considered. This procedure is performed by laparoscpic clip ligation of the main spermatic vessels and 6 months later, orchidopexy is carried out based on vascular supply form the collaterals.

In our study, the three likely findings at laparoscopy were:

1. Cord structures passing through the internal ring (48 testes; 38.0%). Inguinal exploration should be performed with subsequent orchidopexy for a viable testis or orchiectomy for an atrophied testis or nubbin of tissue. 48 testes in the study (38.0%) have fallen in this category and were managed by open inguinal exploration. 4 testes (8.3%) were found during exploration to be atrophied and consequently their remnants were excised to eradicate the risk of malignant transformation. The remaining 44 testes (91.6%) were treated with orchidopexy via an inguinal approach.
2. Blind ending vas and vessels indicating vanishing testis syndrome (16 testes; 12.6%). No further action was performed in our center, although some authors may advise inguinal exploration to look for testicular "nubbins" to prevent risk of malignancy or suggest fixation of the contralateral testis.
3. Viable intraabdominal testis (62 testes; 49.2%). The choice of treatment was limited by the length of spermaic vessels. When the length was adequate to relocate the testis into the scrotum, a single-stage orchidopexy was performed. Alternatively, laparoscpic clip ligation of the main spermatic vessels and, 6 months later, orchidopexy based upon collateral, is performed (Fowler-Stephens procedure). 5 testes out of the 62 (8%) were amenable to primary laparoscpic orchidopexy, while the remaining 57 (91%) were located above the level of iliac vessels and were treated by staged Fowler-Stephen procedure. At the time of second stage Fowler-Stephens procedure, 42 testes (73.6%) remained viable with a good growth and treated subsequently with orchidopexy, while 15 testes (26.3%) had been atrophied and therefore had been orchiectomized.

At 6 month follow up, all of the 44 testes that were treated with primary open orchidopexy, as their vas and vessels were identified as passing through the internal ring, had excellent outcome with a good testicular growth. None developed wound complications or testicular atrophy.

4 out of the 5 testes that were treated with a single-stage, primary laparoscopic orchidopexy had a good outcome. One testis had atrophied at 6- month follow up. Rate of testicular atrophy in this group was 20%.

In the group of 57 testes that were treated with two-staged Fowler Stephen procedure, 15 (26.3%) had testicular atrophy after the first stage while 10 (17.5%) had atrophied by 6 months after performing the second stage. The overall incidence of testicular atrophy in this group is 43.8%. The remaining 32 testes (56.1%) had a good outcome regarding size and position outcome at 6 months of follow up after the second stage.

Overall, incidence of testicular atrophy found at initial laparoscopic or inguinal exploration 15.9% (16 blind-ending vas and vessels +4 atrophied at open exploration). The incidence of testicular atrophy post surgical intervention is seen only after laparoscopic procedures whether single-staged or two-staged, constituting 20.1% of all study population. The incidence of testicular atrophy post primary open inguinal orchidopexy was 0%, post primary laparoscopic orchidopexy was 20% (1 in 5), and post staged Fowler-Stephens was 43.9% . In all groups treated with laparoscopic approach, no port-related complications were documented.

CONCLUSION

Nonpalpable testis (NPT) is a special entity in the patients with cryptorchidism. The presence of vanishing testis is frequent. Testicular atrophy occurs in 20.1% of patients undergoing corrective surgery. This complication is related directly to the size of the testis at initial exploration and the length of spermatic vessels.

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