

Laparoscopic-Assisted Management of Impalpable Testis in Patients Older than 10 Years

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ABSTRACT

Objective: Cryptorchidism affects 1% of male births. The majority of patients with undescended testis are identified and treated in childhood, but a significant proportion of them especially in third-world countries are neglected and present late. Herein, we present our initial experience of managing impalpable testis in older children and adults with laparoscopic assistance.

Patients and Methods: This study was conducted from 2003 through 2008 at LUMHS Jamshoro. Thirty-two patients with 40 impalpable testes were included in this study. Diagnostic laparoscopy was performed in 32 anesthetized patients. Laparoscopic-assisted orchiopexy or orchiectomy was performed in patients with intraabdominal testis. Testicular vessels and vas deferens were mobilized and after obtaining sufficient length were brought through the posterior wall of the inguinal canal by creating a neo-inguinal ring medial to the epigastric vessels after a small inguinal incision.

Results: Of 40 impalpable testis, ultrasound localized 16 (40%) of them, and on laparoscopy, 36 (90%) were localized, 30 (75%) as intraabdominal and in 6 (15%) cases vas and vessels were entering into the internal inguinal ring (intraacanalicular). The remaining 4 patients were diagnosed as having vanishing testis (anorchia). Laparoscopic orchiectomy was performed in 14 (35%) of these testes, while single-stage laparoscopic-assisted orchiopexy using Prentiss' maneuver was performed in 16 (40%) testis. No major complications occurred. Seven testes were associated with ipsilateral hernias and were simultaneously repaired laparoscopically.

Conclusion: Laparoscopic-assisted single-stage orchi-

pexy is a safe and successful procedure for intraabdominal testis in adolescents and older patients. The additional benefit of shortening the usual course of spermatic cord was beneficial to fix the testis in the scrotum without tension.

Key Words: Laparoscopic-assisted orchiopexy, Impalpable testes, Laparoscopy.

INTRODUCTION

Undescended testis is the most common congenital urological disorder with an overall incidence of 1.8% to 4% in full-term male newborns¹ and decreases to 1% at age 1 year. Nonpalpable testes account for approximately 20% of undescended testis.²⁻⁴ Spontaneous descent after the first year of life is uncommon. Untreated cryptorchidism has deleterious effects on the testis over time, with the risk of malignancy in intraabdominal testis as high as 5%, increasing with age.⁵ Therefore, early investigations and treatment of impalpable testis is important to increase the likelihood of fertility and to allow adequate follow-up for possible testicular malignancies. Undescended testis in adults is rarely seen in developed countries. Overall, the majority of patients with undescended testes are identified and treated in childhood, but a significant portion of them in third-world countries present late due to the inaccessibility of healthcare and various other socioeconomic reasons.

Historically, surgical exploration has often been used to diagnose and manage impalpable testis. With the advent of laparoscopy, a technique reported by Cortesi⁶ has been used widely in the diagnosis of undescended testis. The diagnostic and therapeutic management of the nonpalpable testis has changed over the years, and there are many studies on laparoscopic management of nonpalpable testis in pediatric surgery, but very few studies have been performed for the management of older patients. With this background, we evaluated the usefulness of laparoscopy in localization and treatment of impalpable testis by using Prentiss' maneuver^{7,8} to shorten the course of the spermatic cord in adolescents and older patients.

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PATIENTS AND METHODS

This prospective study was conducted at Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan, from June 2003 to July 2008. Thirty-eight patients with 46 impalpable testes who were admitted to our institution for management were enrolled in this study. Six patients were lost in follow-up and were excluded from the study; therefore, 32 evaluable patients with 40 impalpable testes were included in the study. Careful physical examination to palpate and locate the testis was performed with patients in supine and standing positions. All patients with impalpable testis who were ≥ 10 years of age were included in study. Patients with palpable testes, who were < 10 years of age and who did not give consent were excluded from the study.

Because it was cost effective and noninvasive, ultrasonography (US) of the abdomen and pelvis was performed in all cases. Computed tomography (CT) and magnetic resonance imaging (MRI) were not done, because most patients could not afford them, and patients immediately underwent laparoscopic assessment. All patients were fully informed regarding the laparoscopic-assisted orchiopexy or orchiectomy according to our hospital protocol. We recommended orchiectomy in all postpubertal patients. However, in special cases where patients preferred orchiopexy and strictly refused orchiectomy, the wishes of the patients were considered accordingly after counseling in detail and explanation of the possible future consequences. Malignancy was excluded in these cases by frozen section. Data were collected in a specially designed proforma document, containing all demographic, operative, and postoperative details for each subject. The ethics committee at our institution approved the protocol.

Laparoscopy was performed with all patients under general anesthesia (GA). Before laparoscopy, palpation of the testis was repeated with patients under GA to localize the testis. A single-dose prophylactic antibiotic was given at the induction of anesthesia. A urethral catheter was placed to empty the bladder, and the patient was placed in a Trendelenburg position for laparoscopy. A 12-mm supraumbilical transverse incision was made, and a 10-mm trocar was inserted under direct vision by using the Hasson technique. Two other 5-mm ports were made along the anterior axillary line on either side accordingly for orchiopexy or orchiectomy.

When the testis was diagnosed as intraabdominal, the volume of the testis, length of the vas and vessels, and the association of inguinal hernia were determined. Where

the testis was found to be atrophic, laparoscopic orchiectomy was the preferred procedure. Testes were freed by incising peritoneum over them. A grasper was used to lift up the testis, and spermatic vessels and vas were freed, clipped, and cut with laparoscopic scissors.

In cases where the vas deferens and spermatic vessels were seen entering the deep inguinal ring, intraabdominal testis were excluded and the inguinal canal explored. In these cases, the inguinal canal was explored by using the open surgical technique, and orchiopexy or orchiectomy was performed taking into consideration the size of the testis, age and wishes of the patient.

In the majority of patients in our study, one-stage laparoscopic-assisted orchiopexy was performed. When testis was found near the deep ring (peeping into the internal ring) or found having a normal size, testis along with its vascular pedicle were mobilized. Dissection was started by incising the peritoneum over the testis, and the pedicle was mobilized carefully as high as possible. The optical magnification of the laparoscope was very much helpful in this stage. The length of the vas and vessels was measured by using a ruler intraoperatively before and after mobilization. After sufficient length was obtained, the Prentiss' maneuver was used to shorten the course of the spermatic cord by creating a neo-inguinal ring medial to the epigastric vessels by a small inguinal incision. Testes were brought down into the scrotum and were fixed in a subdartos pouch in a standard fashion as in the open surgical technique. None of the patients in this study had hypospadias, Müllerian ductus remnants, or ambiguous genitalia.

Follow-up

All those patients who underwent orchiopexy were reviewed at 3 months and 1 year after the procedure to assess the postoperative outcome.

RESULTS

During the study period, 32 evaluable patients with 40 impalpable testes underwent laparoscopic management of the testis. Ages of patients ranged from 11 years to 37 years with a mean age (\pm SD) of 19.3 ± 6.98 years. Of 32 patients, 18 (56.25%) had impalpable testis on the right side, 6 (18.75%) on the left side, and 8 (25.00%) patients had bilateral involvement. Ultrasonography localized 16 (40%) of these impalpable testis, while laparoscopy revealed 36 (90%), and the remaining 4 (10%) testes were

Table 1.

Testicular Localization by Ultrasound Versus Laparoscopy

Site	Ultrasound	Laparoscopy
Intracanalicular	2	6
Intraabdominal	14	30
Not localized	24	4

diagnosed as vanishing testis (Anorchia) as shown in **Table 1**.

Of 30 intraabdominal testes, single-stage laparoscopic-assisted orchiopexy was successfully performed in 16 (40%) testes, while laparoscopic orchiectomy was performed in 14 (35%) testes. Testes were atrophic and were easily retrieved through a 10-mm port. Six testes where vas and vessels entered the internal ring were diagnosed as intracanalicular testis. They were explored by inguinal incision, inguinal orchiopexy was done in 2 (5%) testes, and inguinal orchiectomy was performed in the remaining 4% of testes. Blind ending vessels were seen in 4 cases, and they were diagnosed as vanishing testes as shown in **Table 2**. Seven (17.5%) testes were associated with ipsilateral hernia, and hernia repair was done laparoscopically at the same time. All orchiectomy specimens were sent for histopathology and none had malignancy. The mean operative time was 20 minutes (range, 10 to 25) for diagnostic laparoscopy, 60 minutes (range, 45 to 70) for orchiectomy, and 90 minutes (range, 60 to 100) for laparoscopic-assisted orchiopexy as shown in **Table 3**.

No major complications occurred. Minor complications were seen in 3 patients: subcutaneous hematoma at the port site in 1 patient and surgical emphysema in 2 patients.

DISCUSSION

The ability to reproduce has always been of paramount importance, but cryptorchidism/undescended testis may cause infertility. The diagnostic yield of ultra sonography,⁹ computed tomography,¹⁰ and magnetic resonance imaging¹¹ varies from 32.1% to 67.0%, which is not satisfactory. Many surgical techniques have remained in use for correction of this pathology over the years. Cortesi et al⁶ were the first to use laparoscopy as a diagnostic tool for impalpable testes, while Jordan¹² described the first laparoscopic orchiopexy in 1992. Since then after the success of laparoscopy in many other fields and improvements in video technology, laparoscopic orchiopexy and orchiectomy have gained considerable support and are used frequently.¹³⁻¹⁷

The main benefit of laparoscopy lies in the fact that it can be used as a diagnostic tool then converted immediately into a therapeutic tool. It is not permissible to leave the intraabdominal testis untreated, unless it is a vanishing testis. Another benefit of laparoscopic surgery is that surgery can be done minimally invasively with few holes and a small inguinal incision. Conventional orchiopexy cannot produce good results in the case of intraabdominal testis, because the testicular vessels are short and adequate lengthening is not easy. One- and 2-stage laparoscopic Fowler-Stephens orchiopexy have been used successfully in pediatric patients.^{18,19} Very few studies have been performed analyzing the laparoscopic management of impalpable testis in older patients. This is because in the Western world patients are identified and treated in childhood due to good health care systems and awareness of the problem. In developing countries, late presentation of undescended testis is not uncommon; however, with the introduction and increasing use of laparoscopy in the third world, a few studies have been done in India for

Table 2.

Procedures and Outcomes*

	Diag Lap N (%)	Lap Orchiopexy N (%)	Lap Orchiectomy N (%)	Ing Orchiopexy N (%)	Ing Orchiectomy N (%)	Intraabd Absent Testis N (%)
Intraabd Testis	30 (75)	16 (40)	14 (35)	-	-	-
Vas & vessels entering int ring	6 (15)	-	-	2 (5)	4 (10)	-
Intraabd blind-end vessels	4 (10)	-	-	-	-	4 (10)
Total	40 (100)	16 (40)	14 (35)	2 (5)	4 (10)	4 (10)

*Diag=diagnostic; Lap=laparoscopic; Ing=inguinal; Intraabd=intraabdominal; int=internal.

Table 3.
Operative Time and Complications of Operations

Procedures	Mean operative Time (Minutes)	Perioperative Complications	Postoperative Complication
Diagnostic laparoscopy	20 (10-25)	2 Subcutaneous emphysema	-
Laparoscopic- assisted orchiopexy	90 (60-100)	-	1 Hematoma
Laparoscopic orchiectomy	60 (45-70)	-	-
Inguinal orchiopexy	50 (45-55)	-	-
Inguinal orchiectomy	45 (40-50)	-	-

management of impalpable testis in adults^{20,21} with satisfactory results inconsistent with the results of this study. In our study, patients were comparatively older compared with patients in other international studies, because of the late presentation of patients in this part of world. We utilized the benefits of minimally invasive surgery in this age group and performed either orchiectomy or one-stage laparoscopic-assisted orchiopexy in the majority of patients.

There are current recommendations for orchiectomy in postpubertal patients up to age 32²² and 50 years.²³ However, we could not adapt this aggressive approach due to patient's preference for orchiopexy for various social reasons. Orchiopexy was done after frozen section in this subset of patients who strictly refused orchiectomy. These patients were informed regarding the future consequences including risk of cancer and were advised to receive regular follow-up. In this study, we used Prentiss' maneuver^{7,8} and shortened the course of vas and vessels by creating a new inguinal ring medial to inferior epigastric vessels. In this way, we were able to bring down the testis and fix it in the subdartos pouch successfully without tension, in all cases.

In this laparoscopic-assisted study, the advantage of laparoscopy was combined with open surgery. The spermatic vessels were mobilized as high as possible by laparoscopy, a neo-inguinal ring was created medial to inferior epigastric vessels to shorten the course of the spermatic cord, and the remaining part of the procedure, ie, fixation of testis in the subdartos pouch, was completed by the open surgical method. In our study, operative time for single-stage laparoscopic-assisted orchiopexy was 90 minutes compared with other international studies^{24,25} where operative time for laparoscopic orchiopexy was 205 and 180 minutes, respectively. This short operative time may be because after mobilization, fixation of the testis in the subdartos pouch was performed using open surgery.

However, these international studies were done in pediatric patients, whereas our study was done in comparatively older patients.

CONCLUSION

Laparoscopy is a safe, effective modality in the diagnosis and management of impalpable testis in adolescents and adult men, especially when ultrasonography is not informative. Performing the Prentiss' maneuver by shortening the usual path of the spermatic cord medial to the vessels was beneficial for fixing the testis in the scrotum without tension.

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