Original Research Article

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Laparoscopic orchidopexy and its outcome in the management of nonpalpable testis

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ABSTRACT

Background: Management of impalpable testis represents a significant diagnostic and operative challenge. The aim of this work was to present the superior value of laparoscopy as a single tool for the diagnosis and treatment of impalpable testis.

Methods: 51 patients with 58 nonpalpable were included in our study. Study design was case series. We have conducted this study at Surat Municipal Institute for Medical Education and Research, Surat. For each patient laparoscopy orchidopexy was performed and either testis or blind ending cord structure are searched for. The testis either brought down to the scrotum or removed depending on the condition. The patients were followed up for 12 months.

Results: On diagnostic laparoscopy the number of testis found normal 54, followed by 3 hypoplastic and 1 atrophic. There were 8 testis found to be present at high intraabdominal (>2 cm from deep ring), 46 were present at low intraabdominal (<2 cm from deep ring), intracanalicular 4. Postoperative complication included minor wound infection in one patient, none of them were diagnosed scrotal hematoma, port site hernia, and testicular atrophy.

Conclusions: Laparoscopy seems to offer a safe and reliable diagnostic and therapeutic option to patients with nonpalpable testis. Intraabdominal dissection allows more testis to be brought down to scrotum. Laparoscopy clearly demonstrate the anatomy and provide visual information upon which a definitive decision can be made.

Keywords: Laparoscopy, Orchidopexy, Undescended testis

INTRODUCTION

Cryptorchidism is a common presentation in paediatric age groups. Its incidence varies from 0.8 to 1.8% at the age of 1 year. Impalpable testes represent 20% of all cases of cryptorchidism. Palpable testes are easier to relocate. The management of impalpable testis remains controversial. Localization of the site of the impalpable testes helps the surgeon plan the operation most suited for each patient. A nonpalpable testis may be either present in the abdomen or inguinal canal or absent. Various imaging techniques has been used in the past few years to determine the exact site of testis. But none of them is

completely reliable.^{2,3} After the use of laparoscopy in the diagnosis of undescended testis it has gained wide acceptance.^{4,5} Jorden was pioneer to apply laparoscopy for therapeutic purposes in boys with undescended testis. Winston introduced the use of scrotal trocar to aid in delivering of testis into scrotum.² Laparoscopy permits not only the localisation of testis but also planning for a better therapeutic program with minimally invasive procedure. Laparoscopy was used by many as a method for the localization of the impalpable testes prior to exploration. The recent surge of laparoscopic surgery encouraged surgeons to use laparoscopy for both the diagnosis and treatment of impalpable testes.³

The aim of this study was to present our experience with laparoscopy as a superior single tool for the diagnosis and management of impalpable testes.⁶

To determine the sensitivity and specificity of laparoscopy in localising nonpalpable testes, to evaluate the therapeutic role of laparoscopy in nonpalpable testes; to determine the mean operative time, postoperative complications and hospital stay; and to evaluate outcome of laparoscopic orchidopexy on 12 months follow up.

METHODS

From December 2016 to Jan 2019, 51 patients were included in our study. Study design was case series. We have conducted this study at Surat Municipal Institute for Medical Education and Research, Surat. For each patient ultrasonography and clinical examination was done followed by routine investigation and pre operative evaluation followed by laparoscopy. Either the testis or blind ending cord structure are searched for. The testis was either brought down to the scrotum or removed depending on the condition of each patient.

Inclusion criteria

All children above 9 months with nonpalpable of testis were included.

Exclusion criteria

Patients with cardiovascular diseases or not fit for laparoscopy and all patients with palpable testis were excluded.

All the patients underwent diagnostic laparoscopy under general anaesthesia. Prior informed consent was taken from parents. Procedure was done in general anaesthesia in Trendelenburg position. A 5mm trocar was introduced in abdominal cavity through supraumbilical incision. The peritoneal cavity was insufflated with carbon dioxide to maximum of 10 mm hg. With 5 mm telescope abdominal inspection was done. Various abdominal landmarks were identified. The testis were classified according to the findings as.

Intracanalicular: if spermatic vessels and vas deference were entering the internal ring; vanishing testis: blind ending vas and vessels; testicular agenesis: vas without vessels; high intra abdominal (>2 cm from deep ring); low intra-abdominal (<2 cm from deep ring)

Depending upon the findings, definitive procedure was performed laparoscopically in all patients. For laparoscopic orchidopexy another two 5 mm ports were introduced in both iliac fossa in mid clavicular line keeping ipsilateral port higher than contralateral port. The patients were followed in outpatient department for twelve months. They were evaluated for the position and

the size of testis. Data were recorded on the proforma and was subjected to statistical analysis.

Operative technique

A three port technique for laparoscopic orchidopexy demonstrates a single 5 mm supraumbilical port and 2 additional working port, in which one port opposite to operative site was placed medial to mid clavicular line at the level of anterior superior iliac spine, on operative site another 5 mm port placed at midclavicular line at the level of umbilicus for better handling of gubernaculum. Care was taken to avoid injury to vas, vessels and testis. Adequate mobilization was complete when the testis easily reaches the contralateral internal ring without undue tension. An incision was made at lower pole of the scrotum to provide a dartos pouch. A laparoscopic grasper was inserted and guide through deep ring to exit through upper part of dartos pouch, over which a 5 mm trocar canula was pigy backed into peritoneal cavity. A grasper was used through scrotal port to bring testis down into scrotum under vision avoiding torsion.



Figure 1: Visualization of internal ring (right side) vas deference and testicular vessels.

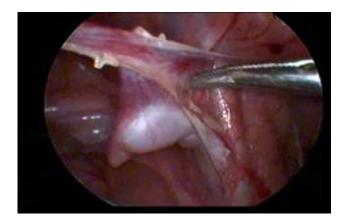


Figure 2: Dissection was done to separate testis and adhesion holding gubernaculum.

Before the ports were removed bleeding should be assessed laparoscopically under low intra-abdominal pressure by releasing the pneumoperitoneum. On

removing ports haemostasis should also be assessed at port site, as well as being sure that the umbilical closure does not include bowel or omentum. In those cases where the length of the spermatic cord was inadequate despite mobilization, the artery forceps was made to enter the peritoneal cavity directly in the region of external ring so as to be medial to epigastric vessels. In these patients, the native internal ring was obliterated with a suture.

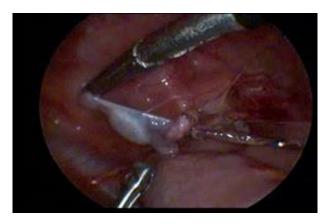


Figure 3: Mobilisation of testis by skletinisig testicular vessels and releasing vas.



Figure 4: Pulling of testis into scrotal pouch through scrotal trocar.

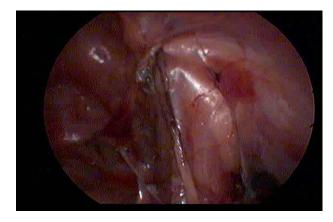


Figure 5: After complete mobilization view showing internal ring.

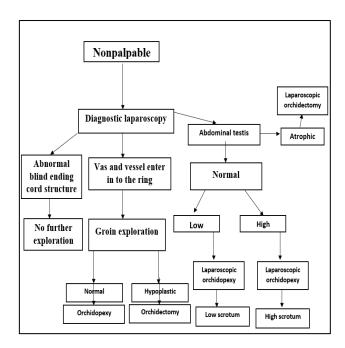


Figure 6: Algorithm followed in our series for lap orchidopexy.⁶

RESULTS

We used diagnostic and operative laparoscopy in management of 51 patients with 58 undescended non palpable testis. The youngest and the eldest patient in our study group were 2 and 12 years of age respectively.

Table 1: Patient characteristics.

	Laparoscopic assisted orchidopexy	
No. of patients	51	
No. of nonpalpable testis	58	
Mean age	5.2 years	
Laterality of nonpalpable testis		
Right	16 (27.6%)	
Left	28 (48.3%)	
Bilateral	14 (24.1%)	
Location of nonpalpable testis		
Low intra-abdominal (<2 cm from deep ring)	46	
High intra-abdominal (>2 cm from deep ring)	8	
Blind ending vas and vessels	0	
Vas and vessels entering deep ring	4	
Associated anomalies (%)		
Syndromic/chromosomal	0	
Neurological (CP/MR)	0	

Majority of patients were 4-7 years age group. Of these 58 non palpable testis, 16 (27.5%) were on right side, 28 (48.3%) were on lest side, and 14 (24.1%) bilateral. On diagnostic laparoscopy the number of testis found normal

54, followed by 3 hypoplastic and 1 atrophic. There were 8 testis found to be present at high intra-abdominal (>2 cm from deep ring), 46 were present at Low intra-abdominal (<2 cm from deep ring), intracanalicular 4. Majority of high intra-abdominal testis were hypoplastic, highlighting the deleterious effect of increased abdominal temperature on development of testis.

Table 2: Diagnostic laparoscopy findings.

Diagnostic laparoscopy findings	Number of testis	Morphology of testis (N)	(%)
High intraabdominal testis	8	Normal (7) Hypoplastic (1)	87.5 12.5
Low intraabdominal testis	46	Normal (43) Hypoplastic (2) Atrophic (1)	93.5 4.3 2.2
Blind ending vas and vessels	0	Nil	0
Vas and vessels entering the deep ring	4	Normal testis (4)	100

Table 3: Laterality of undescended testes.

Number of patients	51
Number of undescended testis	58
Bilateral undescended	14
Right side undescended	16
Left side undescended	28

In these 51 non palpable testis 28 were on left side, 16 were on right side and 14 were bilaterally undescended. Mean operative time for bilateral undescended testis was 110 minutes while 44 unilateral cases it was 56 minutes.

Table 4: Post operative analysis.

Complication	Follow up (12 months)
Minor wound infection	1
Scrotal hematoma	0
Port site hernia	0
Testicular atrophy	0
Groin hernia	0

Post-operative complication included minor wound infection in 1 patient, none of them were diagnosed scrotal hematoma, port site hernia, and testicular atrophy.

Table 5: Location of testis in scrotum at end of 12 month follow up.

Location of testis in scrotum	Number of testis examine at the end of 12 months follow up (%)
At lower part of scrotum	49 (86)
At upper part of scrotum	8 (14)

In our study none of patient had required closure of internal ring, not a single case has been reported with recurrence of hernia. In a study carried by Handa five testis were pulled down by opening in the medial end of the inguinal canal due to inadequate length of spermatic cord. In these patient the internal ring was closed by a suture.

In our study 3 patients require pull down of testis by opening in the medial end of the inguinal canal but obliteration of internal ring was not performed at same time.

In our study at the end of 12 months of follow up 51 patient who had undergone for laparoscopic orchidopexy were examine clinically for location of testis in the scrotum. A total 57 testis were examine clinically among them 49 (86%) testis were found to be present at lower pole of scrotum and rest 8 (14%) were found to be present at upper pole of scrotum.

DISCUSSION

The median age group of our study subjects was 5.2 years with patients from 9 month to 12 years of age included in our study. We were able to locate and manage the nonpalpable testes in all cases making sensitivity & specificity to be 100%. El Gohary has reported 100% accuracy in laparoscopic assessment of the testis.⁷ The closed deep inguinal ring with vas deference and vessels traversing it were found in 4 patients (8%). Godbole et al (33%) and Masao et al (35%) have also reported similar findings.^{8,9} Our study revealed normal testis in 93.1% of cases followed by hypoplastic 6.8% of cases. Morphology revealed that features of hypoplasia were high in intra-abdominal testis. Similar findings were noted in the study of Humphery and Boekman et al. 10,11 One patient had atrophic testis, confirmed upon diagnostic laparoscopy which saved the patient from unnecessary groin exploration, as has been suggested by Koyama et al.¹² We performed laparoscopic orchidopexy in 50 patients out of 58 nonpalpable testis and conversion to open orchidopexy was necessitated in none. The high percentages of successful laparoscopic orchidopexy in our study can be explain by fact that 96% of testis in our study were low intra-abdominal or intracanalicular moreover the number of vanishing testis in our study group was nil contrary to Humphery (19%), Ismail et al (9%), and Hassan et al (38%). 11,13,14

The mean operative time in our study was 56.7 minutes in unilateral cases and 110.6 minutes in bilateral nonpalpable cases. Mark and Davidson reported 15 minutes as average time for laparoscopy in unilateral nonpalpable testis. ¹⁵ As our study was the first of its kind at our institution and because of the learning curve of paediatric laparoscopy, operative time was relatively more in our study.

No major surgical complication were observed in our patients. One of our patient develop surgical site wound infection which resolved. The patients were on regular follow up. No evidence of testicular atrophy was seen in those patients with follow up till the study time. Various other authors have also reported similar findings as regards to complication following laparoscopic management of nonpalpable undescended testes. This substantiates the fact that complication rates are markedly reduced in good centres with high expertise.

The average post-operative hospital stay was 1.2 days for unilateral nonpalpable testis and 1.8 days for bilateral nonpalpable testis. Most of our patients were discharge on next day because no immediate post-operative surgical complication were seen. Koyama et al reported a hospital stay of less than one day and Desai et al discharged his patient on the next day. 12,16

Patients with vanishing testis had advantage of avoiding unnecessary groin exploration. Zubair et al and Godbole et al have reported that unnecessary exploration or negative exploration can be avoided in 20% and 42% cases, respectively.^{8,17}

At the end of 12 months of follow up patients were examine for location of testis in scrotum. A total 57 testis were examine clinically among them 49 (86%) testis were found to be present at lower pole of scrotum and rest 8 (14%) were found to be present at upper pole of scrotum. This signify that majority of testis were at lower pole of scrotum. So the laparoscopic orchidopexy have favourable outcome and no undue ascend of testis was found in patients.

CONCLUSION

Our study showed that patient with intra-abdominal testis and vanishing testis benefited from laparoscopy orchidopexy due to fact that this technique provided them with a definitive diagnosis, direct surgical approach according to the location of testis and avoidance of unnecessary abdominal exploration in case of vanishing testis. Laparoscopy clearly demonstrates the anatomy and provides visual information upon which a definitive decision can be made.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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