

ROLE OF LAPAROSCOPY IN THE MANAGEMENT OF IMPALPABLE TESTES IN AL-KHANSAA PEDIATRIC SURGERY CENTER

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ABSTRACT

Background: Laparoscopy has significantly improved impalpable testes study and management, replacing ultrasound and magnetic resonance imaging. This study assesses outcomes and complications of laparoscopic approaches in a pediatric surgery center. Variable nomenclature leads to ambiguity. **Aim:** To evaluate the role of laparoscopy in the management of impalpable testes in pediatrics. **Patients and Method:** A prospective case series study was conducted on 50 testes of 44 children with UDT at the Department of pediatric Surgery in Al-khansa'a Teaching Hospital, Mosul, Iraq from January 2013 to January 2015. All patients had impalpable testes whether unilateral or bilateral and after meticulous repeated examinations, they subjected to laparoscopy. Surgical finding, total number of complications, complications of each procedure and percentage were estimated. **Results:** After induction of anesthesia and direct orchiopexy done, 10(20%) of testes were palpated in the inguinal region while 14(28%) of the testes were not identified intra-abdominally so this group was considered as vanishing testes. The remaining 26(52%) testes were identified intra-abdominally at different sites; 8(16%) were intra-canalicular, 6(12%) testes were identified in the abdomen, 8(16%) were identified in the abdomen proximal to the internal inguinal ring with short vessels, and 4(8%) also identified intra-abdominally with very short vessels. **Conclusion:** Laparoscopy was an important method in the diagnosis and treatment of impalpable testes. Laparoscopic management of impalpable testes was the best in dealing with all varieties of impalpable testes.

KEYWORDS: Diagnostic Laparoscope, Impalpable Testes, Orchiopexy.

INTRODUCTION

Laparoscopy is increasingly used by surgeons for impalpable testes, with immediate orchiopexy successful if the testis can be pulled to the opposite internal inguinal ring. A staged Fowler-Stephens operation is straightforward and has promising early results. In the first stage, laparoscopic localization allows for decision-making about orchiopexy versus orchiectomy. If orchiopexy is considered, simple ligation of testicular vessels can be performed.^[1]

The localization of a non-proliferative testicular tumor (NPT) can now be done using laparoscopy instead of magnetic resonance imaging or ultrasound. Because of their excellent success rates, the two-stage (FS) surgery and laparoscopy-assisted orchiopexy (LAO) have been gaining popularity quickly.^[2] A laparoscopy should always come after the clinical evaluation performed while under general anesthesia in all NPT situations.

Based on the results of a laparoscopy, the surgeon can quickly choose the best surgical approach.^[3]

Three main findings are found during a diagnostic laparoscopy: an intra-abdominal atrophic testis (37%), abdominal blind-ending cord structures (14%), and cord structures entering the internal ring (IIR) (49%). There is no requirement for an open inguinal investigation when blind-ending cord structures are present. An inguinal exploration is required to search for an ectopic or intra-canalicular atrophic testis, or a non-palpable but normal testis, when cord structures penetrate the IIR.^[4,5]

The two-step FS technique for IAT entails a blunt dissection laterally to the internal spermatic arteries, collateral vascularization generated from the vas deferens, and inserting clips on intra-abdominal spermatic vessels 3–4 cm distant proximally to the testis.

A peritoneal flap connected to the perideferential peritoneum supports the testis.^[6,7]

Assisted Laparoscopy to do orchidopexy without dividing the spermatic vessels, the gubernacular attachment is sectioned, the posterior peritoneum is opened laterally to the spermatic arteries, and the testicular and vas deferens vessels are mobilized for 8–10 cm in a retroperitoneal position. Less than 5% of cases following orchidopexy should result in complications, with testicular vascular injury being the most common cause for concern.^[2,8,9]

Aim of the study

To evaluate the outcome of laparoscopy in the management for impalpable testes in pediatric age group.

PATIENTS AND METHOD

In the Pediatric Surgery Center at Al-Khansaa Teaching Hospital, 44 children who had diagnostic laparoscopy between January 2013 and January 2015 were the subjects of a prospective research. Following rigorous and repeated exams, all patients exhibited bilateral or unilateral impalpable testes. A patient's age, the side that was afflicted, the testis's position during the laparoscopy, the procedure itself, any difficulties, and the time it took to discharge the patient are among the details that were gathered.

Preoperative preparation

On the day of the procedure, all patients were admitted to the hospital and underwent hepatitis screening, a complete blood count, and a kidney function test. Depending on the patients' ages, a fasting time of 4–6 hours was needed.

Operation

Using endotracheal intubation, the procedure was carried out under general anesthesia. We did a typical orchiopexy if the youngsters were completely relaxed, but if they were impalpable, we moved on to a laparoscopy. A careful inspection was then conducted to the inguinal area of the afflicted side.

The patient was only catheterized if the bladder was palpable after the bladder was first palpated. Next, create an open incision (either supra- or infra-umbilical) to initiate pneumoperitoneum using a 5-mm trocar. The patient was placed in the Trendelenburg position, and the abdomen was filled with carbon dioxide at a pressure of 10–12 mm Hg. Next, a 4.7-zero angle telescope was used to examine the abdomen, paying close attention to landmarks such as the location of the testis and its vessels, the length of the vas deferens, the internal inguinal ring (IIR), and the iliac vessels of the patient.

In the event that an intra-abdominal testis was found, one or two ports were inserted—the first in the contralateral iliac region in the mid-clavicular line, below the line of umbilicus by about 3–4 cm, and the other in the opposite

side. Based on the results of the stretching test, which involved stretching the testis with its cord from the affected side to the other side—one stage orchidopexy or two stages of the Fowler-Stephens procedure was chosen, if it was successful in reaching that goal. If not, two stages of the FS procedure were chosen.

When a single stage laparoscopic orchiopexy was the best option, either diathermy or scissors were used to cut the peritoneum covering the iliac arteries. The peritoneum was also incised to the IIR, and this was done with extreme caution to avoid damaging any of the essential structures (spermatic vas, iliac vessels, and vessels) that may be damaged by the laparoscopic instruments. The peritoneum and the underlying testicular cord were swept toward the pelvis from the initial incisions using a combination of blunt and sharp dissection techniques.

At this stage, the ipsilateral scrotum was cut by 5 mm, and soft tissue dissection was performed up to the pubic tubercle. This allowed for the creation of a tunnel that allowed the testicle to be transposed from its intraabdominal location into the scrotum, where it was sutured using 3-0 absorbable suture material.

Following a period of 6–12 months of observation to allow for the enlargement of the secondary collateral vessels to the testis, a two-stage surgery including the clipping of the testicular vessels cephalic to the testis was carried out. Once this time frame had passed, a second laparoscopy was carried out, followed by an orchidopexy to the proper location in the scrotum. The umbilical incision was closed by approximating the umbilical fascia and suturing the skin, followed by the application of a sterile dressing when the treatment was completed and demonstrated adequate hemostasis.

Postoperative management

Patients were kept on parental antibiotics till discharge from hospital at the second day. Feeding was started 6–10 hours after the procedure. Also, dressing removed after two days from surgery. The stitches removed on the sixth post-operative day. Follow up was continued for six months after surgery.

RESULTS

The age of patients involved in the current study was ranged 1 – 10 years, and the distribution of age was shown in table (1):

Table (1): Age at operation.

Age(years)	Number	Percentage
Below 2 years	21	48.0%
After 2 years	23	50.0%
Total	44	100.0

Of 50 impalpable testes involved in the study, 24(48%) were left, 14(28%) right, and 12(24%) bilateral as shown in figure (1).

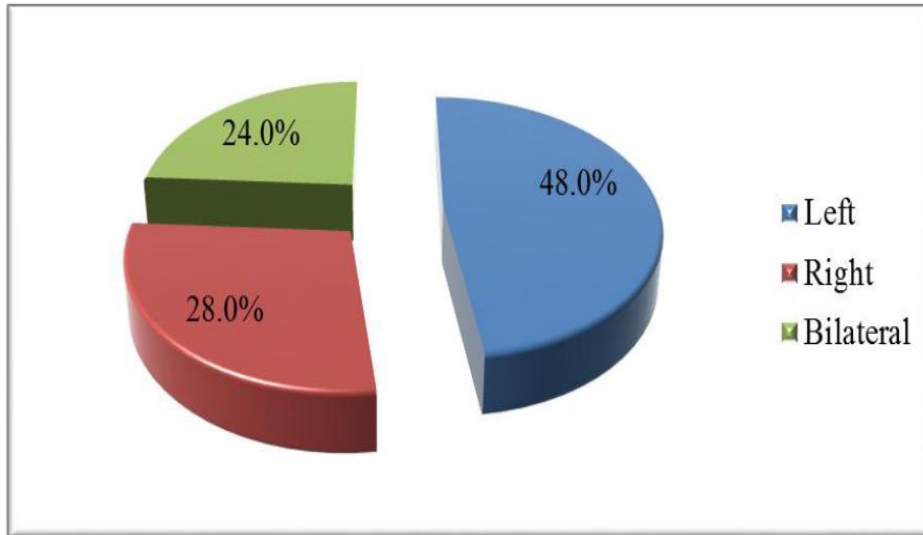


Figure (1): Localization of the testes.

The surgical findings of the 50 impalpable testes are summarized in the following points

- i. 10(20%) testes were palpated after induction of anesthesia in 5 obese patients with bilateral impalpable testes, so direct orchiopexy done and no need for laparoscopy.
- ii. Inguinal exploration was performed for 6 (43%) patients, and a tissue sample was obtained for

biopsy, which revealed the absence of testicular tissue. As a result, this group is known as vanishing testes. 14 (28%) patients did not have testes identified intra abdominally, and primitive vessels with attenuated testicular vessels that end blindly at a closed IIR as shown in figures (2):

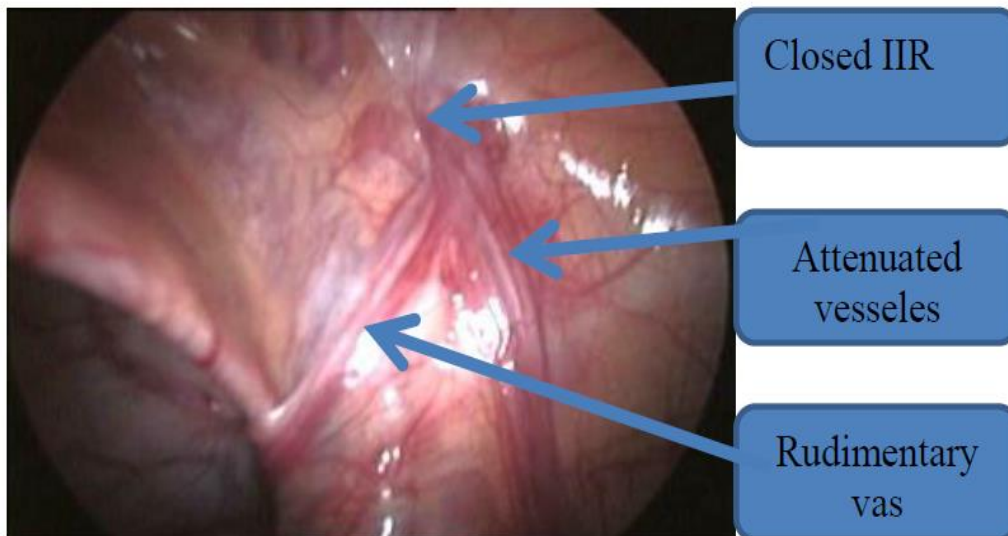


Figure (2): Vanished testis (Al-khansaa T.hospital).

- iii. In the remaining 26(52%) the testes were identified intra-abdominally at different sites: Eight(16%) are identified near the IIR and passing inside the canal and this group is named as intra-canalicular, so

direct orchiopexy done to a normal scrotal position with no tension as shown in figure (3):

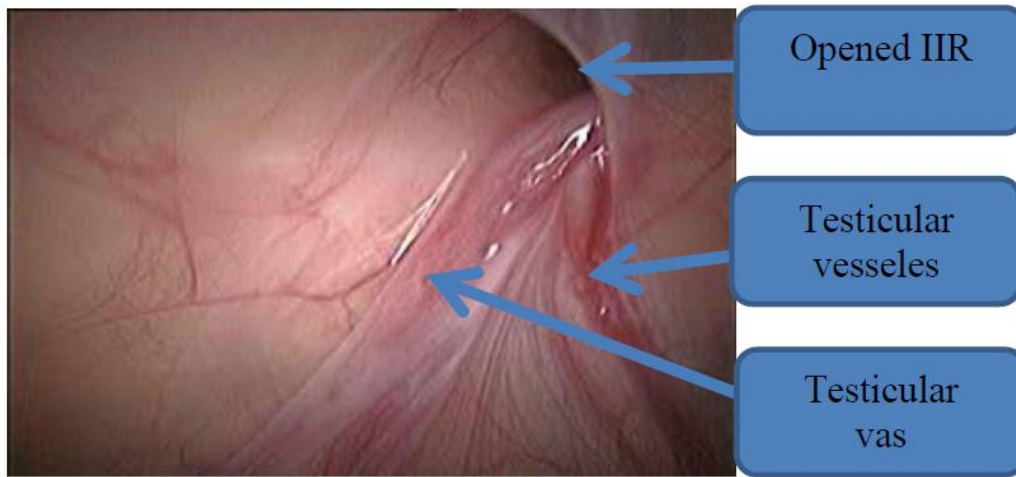


Figure (3): Intra-canalicular testis (*Al-khansaa T.hospital*).

Following significant intra-abdominal cord release from the peritoneal reflection, six (12%) testes were located

high in the abdomen and attached to the mid scrotum as shown in figure (4).

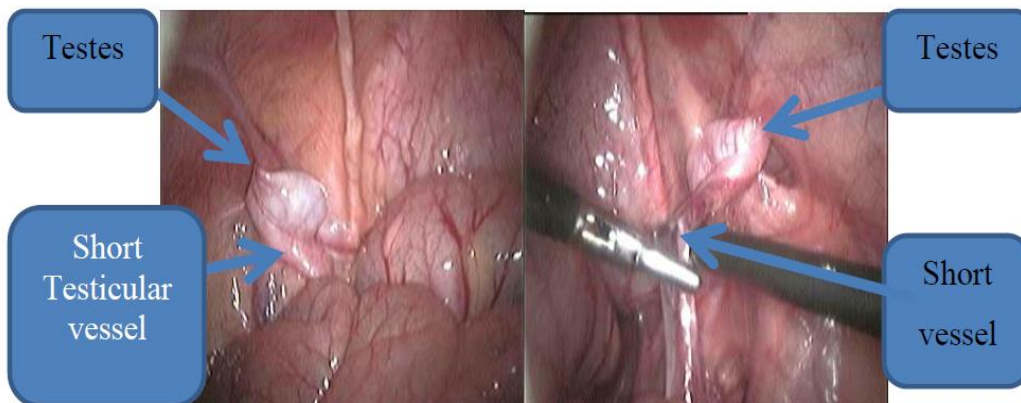


Figure (4): Intraabdominal testis (*Al-khansaa T.hospital*).

There were eight (16%) short vessel cases found in the belly near the IIR. These cases required a thorough dissection from the peritoneal reflection along with the separation of the testicular vasculature, and the testes

were secured to the upper scrotum reliant on the vas vessels, which supply the testes' primary blood supply as shown in figure (5):

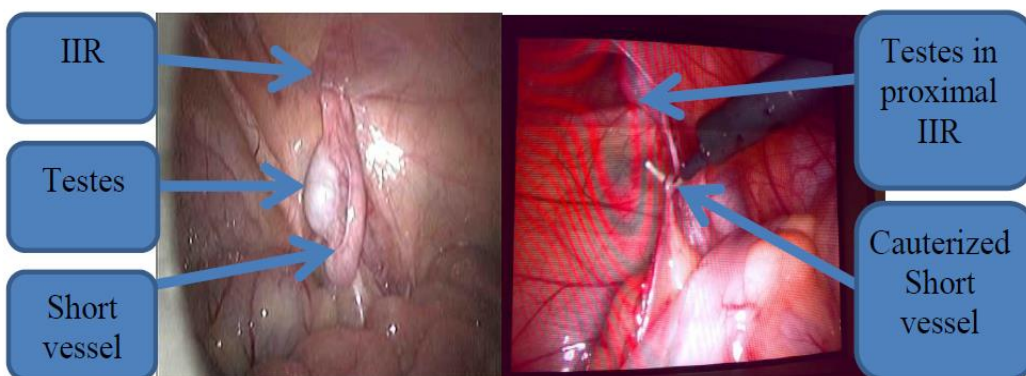


Figure (5): Intra -abdominal testes with short vessels (*Al-khansaa T.hospital*)

After a 6-month period, another laparoscopy was performed and the testes were fixed to the mid-scrotum without tension using the Fowler-Stephens technique (FS). Four (8%) of the patients were also found intra-

abdominally to have very short vessels (the stretching test was negative) as shown in figure (6):

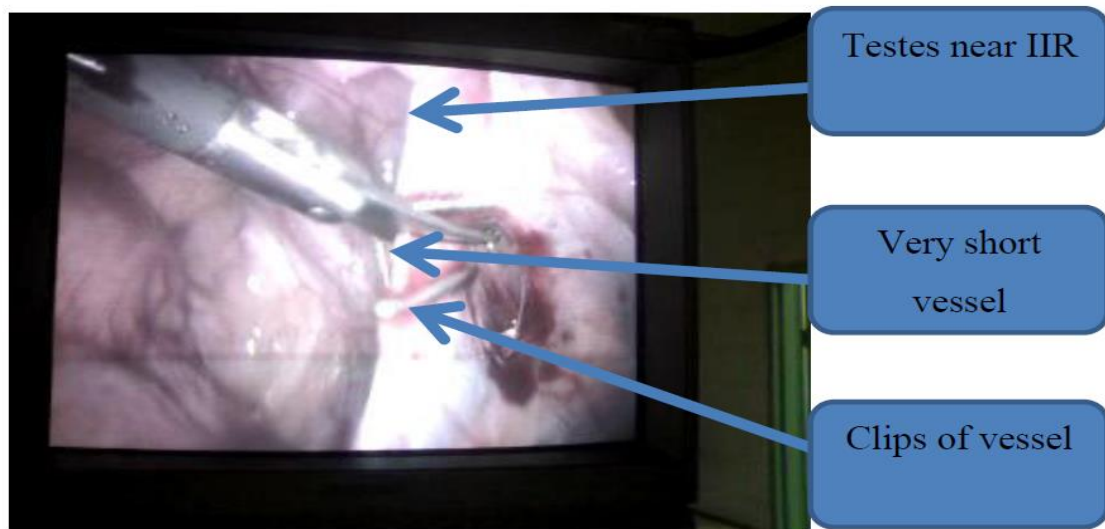


Figure (6): FS technique (Al-khansaa T.hospital).

Table (2): Intra-operative findings and procedures.

Palpated under G.A Orchiopexy to normal position	Vanish testes Biopsy taken for 6 patient	IC Orchiopexy to normal position	IA (high intra-abdominal) Orchiopexy to mid scrotum	IA short vessel orchiopexy to upper scrotum One stage FS	IA Very short vessel 2 stage FS
10	14	8	6	8	4
20.0%	28.0%	16.0%	12.0%	16.0%	8.0%

Table (3) displays the patients' hospital discharges, with five patients out of twelve being released from the hospital following their recovery from anesthesia and treatment with direct orchiopexy (the testes were palpated following anesthesia). The remaining 39(88%) were released from the hospital the day following the laparoscopic procedure that corrected these testes.

Table (3): Hospital discharge.

Hospital discharge Time	No. (%)
Day zero (direct orchiopexy)	12.0%
Day 1 (Laparoscopy)	88.0%

The testes were located in a normal scrotal position in eight (or 30.8%) of the patients; four of these were managed by cutting the testicular vessels, two were fixed after extensive intra-abdominal dissection, and two were Fowler Stephens. There were no intra-operative complications or immediate post-laparoscopic complications. The patients had a minimum follow-up of six months. Also there was 2(7.7%) testis had a higher scrotal position which was fixed to the scrotum after extensive intra-abdominal dissection as shown in Table (4).

Table (4): 6 Months Post-operative size and position of laparoscopically fixated testes.

		Fixated testes by laparoscopy (26 testes)	
		No.	%
Position of testes (in scrotum after 6 months)	normal	24	92.3%
	High in scrotum	2	7.7%
Size of testes (after 6 months)	normal	18	69.2%
	Small	8	30.8%

DISCUSSION

Before laparoscopy became available, diagnosis and definitive surgical treatment involved groin exploration followed by either laparotomy or extra peritoneal

exploration. However, if an open technique is used, diagnostic laparoscopy can be performed prior to groin exploration with minimal additional operating time and no complications.^[10]

According to Baillie *et al.*,^[10] the site of impalpable testes is more common on the left and it was about double in incidence. Also John study^[11] reported that the commonest site of impalpable testes was the left side in which the left sided impalpable testes were about triple in number than the right, these results were similar to the findings of the current study.

According to El-Johary, the age at operation was ranged from 1-13 years.^[12] While in another study the age at operation was ranged from 1.4 - 15.4 years.^[10] In respect, the current figures show some similarity regarding the minimal age at operation, but the maximum age in the present study was 10 years and this may be due to the small sample of patients, short study period and early interference at time of receiving the patients.

This study's findings are similar to El-Gohary's study,^[12] which found that out of 189 patients with impalpable testes, 19 patients had their testes in the superficial inguinal pouch, 11 of whom were obese boys, and 6 of whom had emerging testes with complete hernia sacs allowing the testes to pop in and out of the abdominal cavity. Of the patients in the present study, 5 (20%) had bilateral UDT and were examined after full relaxation and testes palpated in the inguinal region. All of these patients were obese, so direct orchiopexy was performed to a normal scrotal position.

According to the present data, the most frequent laparoscopic finding was the presence of intra-abdominal testes, which was found in 26(52%) cases. These findings are comparable to those of the Shah and Shah research,^[13] which found 58% of cases, and the Satar *et al.* study^[14] which found 66.6% of cases.

The incidence of vanished testes was higher in this study than in previous studies; it was 14.3% in Satar *et al.*,^[14] and 25% in Baillie *et al.*,^[10] The precise cause of the phenomenon is unknown; it could be attributed to genetic factors, weather variations, conventional hormonal treatment, patient delay in seeking advice, or it could go unnoticed. More research is required to fully understand this result.

While inguinal exploration is not deemed necessary in patients with vanished testes,^[15] it was performed in 6 patients with vanished testes who had testicular agenesis in order to reduce the possibility of cancer in the remaining testicular stroma.^[16] This procedure is met with significant controversy. While there has been debate regarding the necessity of inguinal exploration, it is likely prudent given the possibility of a malignant transformation of the testicular stroma. According to other research, hypoplastic vessels entering the ring are linked to either hypo-plastic testicular remnants or testicular absence.^[10,17-19]

Despite the fact that another study claimed that blind ending spermatic tubes can be interpreted as the lack of

testes and eliminate the need for additional investigative procedures, it is still necessary to evaluate the inguinal canal once the spermatic arteries pass through the inguinal canal.^[14]

The inguinal region was explored in 6 (43%) of the patients in the current study who had vanished testes; a nubbin of tissue was removed and sent for histopathological examination, which revealed no seminiferous tubules. Based on these findings, if an attenuated vas and vessels end found at a closed IIR, there is no need for further inguinal exploration; however, if the vas and vessels end at or in an opened IIR, then it is necessary to explore the inguinal region to rule out intra-canalicular vanished or atrophic testes in order to remove any abnormal testicular tissue and thereby reduce the risk of malignancy. This is in line with a previous study conducted in the present center four years ago.^[20]

When the testes were palpated during the current study's anesthesia, direct orchiopexy was used to treat them, and the patients were released from the anesthetic when they had recovered. The next day, the laparoscopic patients were released from the hospital. This is comparable to other study findings that reported patients who had laparoscopic orchiopexy or orchiectomy were released from the hospital within the first 24 hours following the procedure and that good outcomes were obtained in accordance with internationally recognized guidelines.^[21] Compared to a another research by Shah and Shah study,^[13] where 75% of children had bilateral orchiopexy as a day case surgery and were sent home the same day, 20% of the children stayed overnight, and 5% of the children stayed for two days.

A diagnostic laparoscope rarely causes problems in cases of impalpable testicles, but children may be more susceptible to complications from laparoscopy due to their thinner anterior abdominal wall than adults. This means that if an inappropriate Veress needle is used, the intestine and vessels may be damaged during peritoneal insufflation or during needle insertion.^[14,21] The pneumoperitoneum technique used in this study is the open approach as reported by Hasson study^[22] since it is the safest in the pediatric age range, resulting in minimum CO2 leakage and no intestinal or vascular damage.

The current study included a minimum follow-up of six months, and the outcomes were outstanding, showing testicular growth that was comparable to preoperative size, excellent cosmeses in the scrotum and abdominal wounds, and The results are comparable to those of previous research, one of which said that the cosmeses had good testicular size and was excellent^[11] In contrast, one testis was positioned higher and three testes were smaller than those on the opposing side in another investigation with 65 impalpable testes^[23] For individuals with impalpable testes, laparoscopic treatment is the

most effective approach, with good outcomes and minimal morbidity.

CONCLUSIONS

Laparoscopy is an important method in the diagnosis and treatment of impalpable testes and Laparoscopic management of impalpable testes is quick and easy in dealing with all varieties of impalpable undescended testes. It can direct the surgeon to choose the proper technique for orchiopexy, with no mortality and very low morbidity.

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