

## Original Research Article

# Laparoscopy and the impalpable testes: diagnosis, treatment options and the literature

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## ABSTRACT

**Background:** Laparoscopy is the best available tool and method to manage impalpable undescended testes; management of the impalpable testis often pose a significant diagnostic and therapeutic challenge to a surgeon. The aim of this work was to elucidate and present the sensitivity and the value of laparoscopy, as a surgeon's tool, for the diagnosis and treatment of the impalpable testis.

**Methods:** From November 2015 to December 2018, 56 patients with 60 impalpable testes were operated upon by laparoscopic approach by a single surgeon. One-stage Fowler-Stephens laparoscopic orchidopexy was performed in 14 cases, while two-stage Fowler-Stephens laparoscopic orchidopexy was performed in 16 cases and Vessel-Intact Laparoscopic Orchidopexy (VILO) was done in 22 cases. In 2 cases vessel and vas was entering through deep ring and inguinal orchidopexy was done. Blind ending vessel/vas was noticed in 4 cases (vanishing/absent testes). Laparoscopic orchidectomy was required in 2 patients for nubin. No case of disorder of sexual dysfunction was (DSD) was found.

**Results:** Laparoscopy was successfully completed in all the cases. 34 testicles were impalpable on right side, 18 on left side and other 4 cases (8 testicles) were bilaterally impalpable. Laparoscopic orchidopexy was carried out for 36 testes at the same. 16 needed a staged procedure. Orchidectomy was done in 2 cases/testes. In 4 cases testes was absent/vanishing. In 2 cases testes was canalicular, standard inguinal orchidopexy was done. The mean operative time was 48 minutes. Patients were allowed oral fluids 6 hours of the operation and were discharged at one day after the procedure. None of the patients had wound infection. Patients were followed up for a mean period of 12 months. At follow-up, all but one of the testes were well down in the bottom of the scrotum. In one patient, the testis was in a high scrotal position. All testes were of normal size, no atrophy was seen so far and no malignant change is suspected in any case so far. No severe morbidity or death was observed in our study.

**Conclusions:** Laparoscopy offers surgeons a safe and reliable diagnostic and therapeutic option to patients with impalpable testes. No other imaging investigation is required, if well versed with basic laparoscopy. Intra-abdominal dissection allows more testes to be brought down to the scrotum. Even when open orchidopexy is being done for intra-canalicular testes in a child, it is advisable to be ready with laparoscopy if necessary, at the same time, in case open surgery fails to mobilize the testicular vessels adequately. The procedure is best viewed as laparoscopy-assisted; as Orchidopexy has to be done in a conventional manner.

**Keywords:** Laparoscopy, Orchidopexy, Undescended testes

## INTRODUCTION

About one third of premature boys have a UDT at least on one side, compared to 2-8% incidence in full-terms

boys, which makes cryptorchidism the most common anomaly in boys.<sup>1</sup> Congenital UDT descend spontaneously mostly during the first months of life. Between 2 and 4 months of age pituitary gonadotropins stimulate a sudden increase in testosterone secretion which peaks at about 3-6 months. This brief surge of gonadotropins and androgens is known as a mini-puberty.<sup>2,3</sup> Thus, a lower incidence of 1-2% is reported from 3 to 12 months of life.<sup>1</sup> According to the literature, spontaneous descent of the testis after 6 months of age occurs very rarely; therefore the watchful waiting strategy is not justified in these boys.<sup>4,5</sup> Unilateral UDT is four times more common than bilateral.<sup>6</sup>

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. Laparoscopy has proved to be the best available procedure for diagnosis and management of impalpable undescended testes.<sup>7-12</sup> Laparoscopy was used by many as a method for the localization of the impalpable testes prior to exploration.<sup>13,14</sup> The recent surge of laparoscopic surgery encouraged surgeons to use laparoscopy for both the diagnosis and treatment of impalpable testes.<sup>15-17</sup>

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

## METHODS

From November 2015 till December 2018, 56 patients (60 undescended testes) were included in this study.

### Inclusion criteria

- Patients of age groups ranging from 6 months to 12 years.
- Patients having impalpable testis on clinical examination.
- Patients having unilateral and/or bilateral undescended testis.

### Exclusion criteria

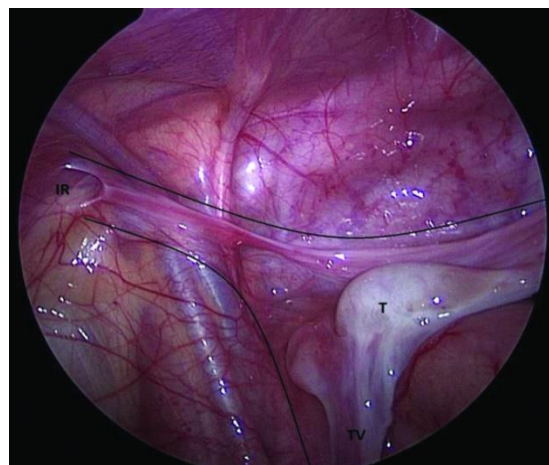
- Patients having associated anomalies like hypospadias or epispadias were excluded from the study.

The mean age in this study was 2.7 years. Fifty two of these patients had clinically suspected unilateral undescended testes, 34 on the right side and 18 on the left side. Four patients had clinically suspected bilateral undescended testes.

In all patients the testes were not palpable at thorough examination, even under general anesthesia. None of the patient was subjected to any form of pre-operative imaging investigation.

All these patients were directly subjected to diagnostic laparoscopic and then appropriate intervention was done.

Under general anesthesia, the first port for the telescope was placed through the umbilical tube by open technique by sub-umbilical transverse incision. Two 5 mm ports were used on either side in the lower quadrants at the level of umbilicus along the mid clavicular line. Careful laparoscopy was done to locate the testis and the spermatic cord structures from the internal inguinal ring and proximal to it. Figure 1 Search was usually carried out up the lower pole of the kidney. Gentle pressure on the inguinal region was exerted to force testes just inside the internal ring proximally, if a canalicular testes was suspected. If the testis was found, it was assessed. The testis was considered normal in relation to the other testis (in unilateral cases) or according to the expected size at that age (in bilateral cases). If no testis or spermatic cord structures were found, the testis was assumed absent and procedure was terminated at this stage. If an abnormal testis or blind ending cord were found, orchidectomy was performed, removing the abnormal testis or nubbin of tissue at the end of spermatic cord structures. This was considered a vanished (atrophic) testis. If a normal testis was found, orchidopexy was carried out. Accessory ports, each 5 mm in diameter, were inserted in both the right and left upper quadrants.



**Figure 1: Intra-abdominal testicle**

The spermatic cord was carefully mobilized. Through a small scrotal incision, a curved hemostat was guided into the peritoneal cavity medial to the inferior epigastric vessels. The gubernaculum was grasped and pulled through the new inguinal ring into the scrotum and the procedure called as vessel intact orchidopexy (VILO). The testis was placed in a subcutaneous pouch taking care to avoid twisting of the spermatic cord. However, if the undescended testis was closer to the internal ring or is of peeping type, one-stage orchidopexy was carried out. But, if the testis was situated closer to the iliac vessels than the internal ring, two-stage Fowler -Stephens orchidopexy was planned. Presence of hernia sac on affected as well as unaffected side were always looked

for. If the testis was inguinal in position, as evidenced by spermatic cord structures entering the internal ring, traction was exerted assisted by external pressure on the inguinal region. If the testis could be delivered through the internal ring, the gubernaculum was divided, used for traction, and the procedure was completed laparoscopically. If this was not possible, a small inguinal incision was done to complete the procedure.

In techniques described by other authors, electro cautery is commonly used and a trocar and cannula is passed through scrotal base into the abdomen through neohiatus to grasp the testes to bring it down. We direct an instrument through the scrotum inside the abdomen, either through deep ring or through neo-hiatus, to grasp the testes and pulled into the scrotum and kept in sub-dartos pouch.

Wounds were closed by subcuticular 4/0 absorbable sutures.

## RESULTS

End-point observations and results were for duration of surgery, level to which testis was brought down, time to discharge from the hospital, immediate complications for wound, testicular viability as per size of the testis after orchidopexy and any malignant change.

Laparoscopy was successfully completed in all the cases. Table 1 shows the laparoscopic findings in these cases. Thirty-four testicles were impalpable on right side, 18 on left side and other 4 cases (8 testicles) were bilaterally impalpable.

**Table 1: Laparoscopic findings of our 56 cases/60 impalpable testes.**

Normal	Hypoplastic	Absent	Inguinal
52	2	4	2

**Table 2: Demographic characteristics of this cases.**

Total no. of cases	56
Total no. of Impalpable testes	60
Bilateral testes	8
Right impalpable UDT	34
Left impalpable UDT	18
Absent/Vanishing testes	4
Nubin	2
Inguinal (post laparoscopy)	2

Laparoscopic orchidopexy was carried out for 36 testes at the same sitting (i.e., single stage Fowler-Stephens orchidopexy or vessel-intact orchidopexy). Sixteen testes needed a staged procedure because, after mobilizing the spermatic cord structures, the testis could not be brought to the bottom of the scrotum (Table 2).

The second stage was performed in a conventional manner six months later, and the testis was moved to the scrotum successfully in all cases. Orchidectomy was done in 2 cases/testes, both having hypoplastic testicle.

In 4 cases testes was absent/vanishing; no testes, no vas deferens and no spermatic vessels could be visualized during laparoscopy up to the lower pole of the kidney (Table 3).

**Table 3: Nature of procedure and frequency.**

Procedure	No. of testicles
Single stage fowler-stephens	14
Two stage fowler-stephens	16
Vessel intact orchidopexy	22
Orchidectomy	2
Termination/Absent gonads	4
Inguinal orchidopexy	2

The testis was assumed absent and the procedure was terminated. In 2 cases testes was canalicular, which were missed during physical examination; standard inguinal orchidopexy was done. The mean operative time was 48 minutes (range 35-78). Patients were allowed oral fluids 6 hours of the operation and were discharged at one day after the procedure. None of the patients had wound infection. Patients were followed up for a mean period of 12 months. At follow-up, all but one of the testes were well down in the bottom of the scrotum. In one patient, the testis was in a high scrotal position, who is still under close follow-up. All testes were of normal size, no atrophy was seen so far and no malignant change is suspected in any case so far. No severe morbidity or death was observed in our study.

## DISCUSSION

Undescended testis is one of the most common genitourinary anomalies in male infants.<sup>18,19</sup> Non-palpable testes offer a greater diagnostic and therapeutic challenge for the radiologist and the surgeon than palpable undescended testes. The key to success in the management of high intrapelvic testis relies basically on understanding testicular blood supply. The testis becomes more dependent on collateral blood supply after division of testicular artery. The ideal imaging method to localize impalpable testes has not been found. Ultrasonography, computerized tomography (CT), gonadal angiography and magnetic resonance imaging (MRI) have all been used to localize the impalpable testis with limited success.<sup>20</sup>

Laparoscopy is most specific and sensitive diagnostic procedure for impalpable undescended testis. The ability of laparoscopy to visualize the spermatic vessels and vas deferens means a vanished (atrophic) or absent testis will not be missed. Abdominal testes comprised 53.5% of the impalpable ones. It is this group of patients that benefit

more from the laparoscopic approach. None of the imaging modalities gives such result. So, in case of impalpable undescended testis, there is no need to use any special imaging modality. Laparoscopy in a child is very useful in locating the intra-abdominal testis because of the minimally invasive approach and magnification. Mobilization of the testicular vessels by dissecting the peritoneum off the testicular vessels is also easy, even in children who have small abdominal cavity, and laparoscopy avoids the need for long incision besides being more successful than open surgery.<sup>21</sup> The aim is to place the undescended testis in a normal intra-scrotal position or to remove it. The remote possibility of malignancy should always be born in mind. There is evidence that nubbin of tissue found at blind ending cord structures may contain testicular remnant and, hence, an inguinal exploration and orchidectomy may be justified. Preliminary reports about the use of laparoscopy to diagnose and complete orchidopexy are encouraging.<sup>22-24</sup> Orchidopexy could be successfully completed in all viable testicles and the procedure was completed laparoscopically. None of our patients needed narcotic analgesics following the procedure. Patients were able to resume oral intake at the night of the procedure and enjoyed a short 1-day hospital stay. Apart from its superior diagnostic and therapeutic potential, laparoscopy has a cost advantage.

## CONCLUSION

Laparoscopy is the best way to diagnose impalpable undescended testes. No other imaging investigation is required. Laparoscopic orchidopexy is a logical extension of the diagnostic procedure. Single-stage Fowler-Stephens or vessel-intact laparoscopic orchidopexy for low-level undescended testis has very good results. For high level undescended testis and when one-stage mobilization is difficult, two-stage Fowler-Stephens orchidopexy has excellent results. Minimum 6 months should separate first and second stage of laparoscopic Fowler-Stephens procedure. Even when open orchidopexy is being done for intra-canalicular testes in a child, it is advisable to be ready with laparoscopy if necessary, at the same time, in case open surgery fails to mobilize the testicular vessels adequately.

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