

# Clinical Study and Role of Diagnostic Laparoscopy in the Management of Undescended Testis: Our Experience

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## Abstract

**Introduction:** Surgery for undescended testis is indicated to increase the chances of fertility, to reduce the chances of malignant degeneration or at least increases the chances of early detection of malignancy. Diagnostic laparoscopy has gained wide acceptance as a diagnostic procedure for identifying the exact anatomy of impalpable testes and adnexae. Ultrasonography (USG) with a high frequency (7.5-10 MHz) transducer has become the imaging modality of choice for examination of scrotum. Although there is no proof that orchidopexy reduces the risk of testicular cancer, it is performed to ease detection through testicular self-examination. Incidence of testicular cancers in cryptorchid patients is estimated to be 3-5 times higher than in the general population.

**Objectives:** To study the clinical profile and role of imaging when compared to diagnostic laparoscopy in detection of intra-abdominal and impalpable testes.

**Materials and methods:** This study included 40 cases of undescended testis admitted and treated in Department of General Surgery, Vydehi Institute of Medical Sciences and research centre, Bangalore. The study period was from November 2015 to September 2017. Patients with clinically palpable testis and intracanalicular testis confirmed by ultrasound were subjected to orchidopexy. Patients with impalpable testis were subjected diagnostic laparoscopy followed by laparoscopic orchidopexy.

**Results:** Ultrasound of the inguinoscrotum and abdomen showed 100% correlation between the intra operative findings and USG findings in cases of intracanalicular testis and testis located superficial inguinal ring. This study showed ultrasound was inaccurate in case of intra-abdominal and impalpable cases. In this study, showed sensitivity and specificity of ultrasound are 72.5 and 50 respectively in cases of impalpable testis. Diagnostic laparoscopy had 100% sensitivity and 91% specificity.

**Conclusion:** Ultrasonography is not a reliable investigation due to low sensitivity and operator dependence in cases of impalpable testis. Diagnostic laparoscopy was found to be ideal investigation as it has high sensitivity and specificity.

## Keywords:

Testis; Ultrasonography; Laparoscopy; Orchidopexy

## Introduction

Isolated cryptorchidism is the most common congenital anomaly of the male genitalia, affecting almost 1% of the full term infants at the age of 1 year [1]. Incidence of testicular cancers in cryptorchid patients is estimated to be 3-5 times higher than in the general population [2]. About 20 percent of testicular tumors in men with unilateral cryptorchidism occur on the side with the normally descended testicle [3]. This finding supports the argument against indiscriminate removal of undescended testes.

Although there is no proof that orchidopexy reduces the risk of testicular cancer, it is performed to ease detection through testicular self-examination [4]. Ultrasonography (USG) with a high frequency (7.5-10 MHz) transducer has become the imaging modality of choice for examination of scrotum [5]. Diagnostic laparoscopy has gained wide acceptance as a diagnostic procedure for identifying the exact anatomy of impalpable testes and adnexae [6].

Surgery for undescended testis is indicated to increase the chances of fertility, to reduce the chances of malignant degeneration or at least increases the chances of early detection of malignancy, reduce the incidence of strangulation of associated hernias and also reduce the risk of torsion. Besides this it may also prevent psychological problems associated with an empty scrotum in later life [7].

The current study is being carried out to identify the various clinical presentations of undescended testis, to analyze the reliability of ultrasonography and diagnostic laparoscopy in identification of undescended testis and the efficacy of various surgical modalities for management of undescended testes.

## Objectives

- To study the clinical profile of patients with undescended testes.
- To study the location of clinically impalpable testes.
- To find out sensitivity of ultrasonography and diagnostic laparoscopy in detection of intra-abdominal and impalpable testes.

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- To study the different surgical modalities for the treatment of undescended testes at various sites.

## Methodology

### Source of data

This study included 40 cases of undescended testis admitted and treated in the Department of General Surgery, Vydehi Institute of Medical Sciences and research centre, Bangalore. The study period was from November 2015 to September 2017.

### Sample size

Total numbers of patients studied were 40. Out of 40 patients 7 cases were bilateral, so final statistics were performed for 47 cases.

### Inclusion criteria

Patients coming to Vydehi Institute of Medical Sciences, Bangalore above the age of six months with history of absent testis in the scrotum either unilateral or bilateral.

### Exclusion criteria

- Patients unfit for general or spinal anaesthesia.
- Patients of undescended testis of age less than 6 months.
- Intersex disorder.
- Patients with retractile testes.

### Treatment

All the patients were admitted and subjected to standard operative treatment. Preoperative fitness for anaesthesia and surgery were taken. Operative procedure and findings were recorded. Patients with clinically palpable testis and intracanalicular testis confirmed by ultrasound were subjected to orchidopexy. Patients with impalpable testis were subjected diagnostic laparoscopy followed by laparoscopic orchidopexy. One patient presented with mass per abdomen was subjected to exploratory laparotomy.

### Diagnostic laparoscopy

Diagnostic laparoscopy is done in patients in whom testes was impalpable and not located on Ultrasonography and examination under general anaesthesia.

### Methods of data collection

Demographic details of the patient were recorded as per proforma. The details of the presenting complaints were recorded in chronological order. Past surgical history and family history of the patient were recorded. Routine investigations for the fitness for surgery included complete blood count, renal function tests, blood sugar, serology, urine chemistry and microscopy and chest X-ray. Specific investigations in the study were ultrasound of the inguinoscrotal region and abdomen, MRI abdomen and pelvis in selected cases of impalpable testis, diagnostic laparoscopy in cases of impalpable testis. Histopathological study of orchidectomy specimen was done and recorded.

There were three distinct possible findings:

- Blind ending vessels above the internal ring suggestive of vanishing testes.
- Cord structures entering into the internal ring suggestive of viable intracanalicular testes or intracanalicular or scrotal atrophic testes.
- Intra-abdominal testes.

## Results

Ultrasound of the inguinoscrotum and abdomen showed 100% correlation between the intra operative findings and USG findings in cases of intracanalicular testis and testis located superficial inguinal ring. This study showed ultrasound was inaccurate in case of intra-abdominal and impalpable cases (Tables I and II).

In this study, showed sensitivity and specificity of ultrasound are 72.5 and 50 respectively in cases of impalpable testis. Diagnostic laparoscopy had 100% sensitivity and 91% specificity (Figures 1-4).

Conventional orchidopexy was performed in 72.3% of cases. All cases of impalpable testis and intra-abdominal testis underwent laparoscopic orchidopexy (25.5%). One case of malignancy underwent orchidectomy (2.1%).

In this study, 5.8% of conventional orchidopexy patients had wound infection. 2.9% patients had scrotal hematoma. Only one patient (8.3%) in laparoscopic orchidopexy had hemorrhagic complications.

## Discussion

In this study, the mean age of presentation was 8.9 yrs  $\pm$  7.48 years. Illiteracy, poor awareness and poverty may be the reason for late presentation of cases.

Table I: Age incidence.

| Age of presentation (years) | Number of patients | Percentage |
|-----------------------------|--------------------|------------|
| 0.6 to 5                    | 19                 | 47.5%      |
| 5 to 10                     | 08                 | 20%        |
| 10 to 15                    | 03                 | 7.5%       |
| 15 to 20                    | 05                 | 12.5%      |
| 20 to 25                    | 04                 | 10%        |
| 25 to 30                    | 01                 | 2.5%       |
| Total                       | 40                 | 100%       |

Table II: Sensitivity and specificity of USG and diagnostic laparoscopy in impalpable testis.

| Test                   | Sensitivity | Specificity |
|------------------------|-------------|-------------|
| Ultrasound             | 72.5        | 50          |
| Diagnostic laparoscopy | 100         | 91          |

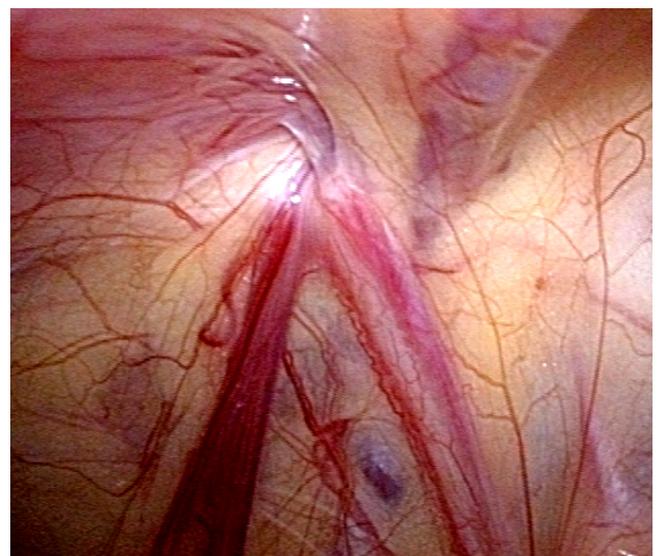


Figure 1: Laparoscopic findings of a normal vas deferens and spermatic vessels exiting the internal inguinal ring. The vas deferens and vessels clearly meet at the ring.

### position of undescended testis by USG

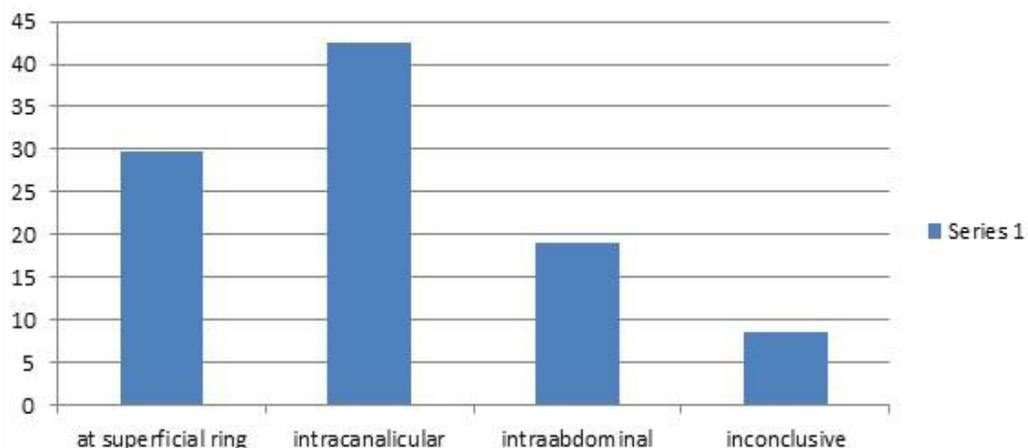


Figure 2: Position of testis by ultrasound examination.

### Intra op findings

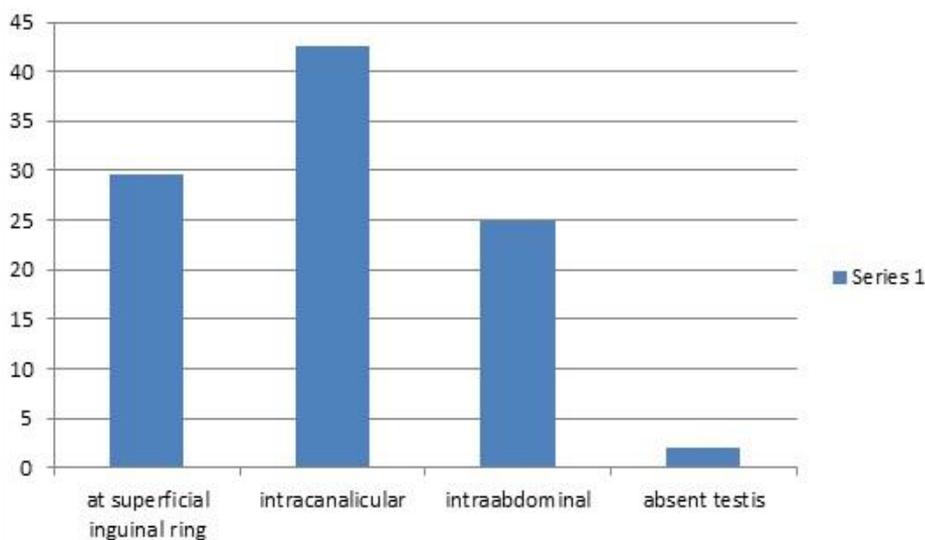


Figure 3: Position of testis as per intra op findings.

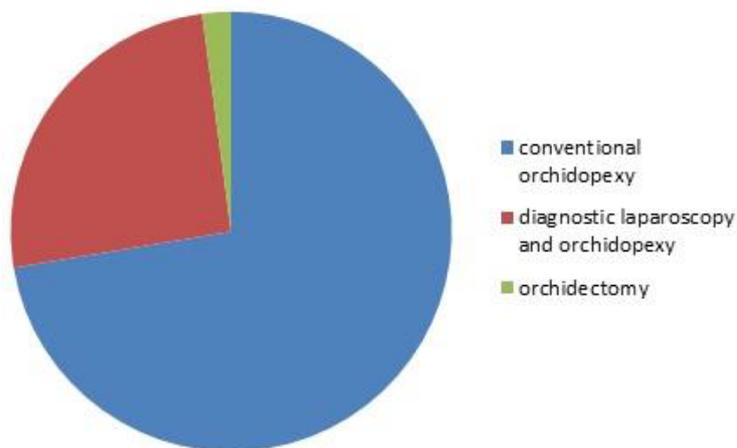


Figure 4: Surgical management of undescended testis.

According to Mohamed and Mahdi [8], the mean age of presentation was 3.8 years. According to Seung CJ et al. [9], the mean age of presentation was  $31.1 \pm 12.5$  years.

Most of the cases presented with symptom of absence of testis in scrotum (95%). The next common symptom was the swelling in the groin and pain. These symptoms overlapped with each other in the presentations. Besides these some presented with complications like hernia and one case presented with mass per abdomen which was proved to be malignant later. Mohamed and Mahdi [8] and Seung Chan Jeong et al. [9] also described similar results in their study.

The commonest position of undescended testis was intracanalicular followed by superficial inguinal ring. Intra-abdominal testis was the least position of undescended testis.

Mohamed and Mahdi [8] and Seung et al. [9] also showed similar results in their study.

According to Graham and Glenn [10] the position of undescended testis as follows, absent in 3 to 4%, intra-abdominal 10%, and high scrotal or ectopic 50 to 70%, intracanalicular 16 to 37%.

In this apart from routine investigations, the specific investigation mainly included Ultrasonography of the inguinoscrotum and abdomen, MRI of abdomen and pelvis.

All cases underwent ultrasound of the abdomen and pelvis. Position of undescended testis was confirmed by USG in all palpable cases. One case of intracanalicular positioned testis which was impalpable clinically was detected by USG.

In case of impalpable testis USG detected 9 out of 13 cases (i.e. 69%). MRI of abdomen and pelvis was done in 5 cases, which confirmed intra-abdominal position of testes. Rest of the cases MRI was not done due to patients personal reasons. We subjected all the USG inconclusive and intra-abdominal testes patients to diagnostic laparoscopy followed by orchidopexy. Diagnostic laparoscopy confirmed intra-abdominal position of testes in 11 out of 12 cases. In one case, absence of testes noted.

In this series, sensitivity of USG was found to be 69.2 and specificity was 50. The sensitivity and specificity of diagnostic laparoscopy were 100 and 90 respectively.

According to Chowdhary et al. [11], ultrasound scanning, computed tomography and MRI are able to locate testis in only 76% of undescended testis cases.

Tariq et al. [12] Ultrasound is not reliable in the preoperative assessment of patients with impalpable testes. Sonography localized only 6 of the 26 (23%) testes.

In this study, no medical treatment was given to any patient. All patients were subjected to surgical treatment. This included conventional orchidopexy with dartos pouch creation, orchidectomy and laparoscopic orchidopexy.

Orchidopexy was done in single stage in all the cases. This series showed orchidopexy procedure had good results in cases of intracanalicular and high scrotal positioned testes as all patients had consequent scrotal testis. Patients with inguinal hernia and patent processus vaginalis were treated simultaneously. 2 out of 34 cases developed wound infection which was managed conservatively. One case developed scrotal hematoma. Follow up was done in 22 cases after 3 months. Rest of the patients missed the follow up. Three month follow up following surgery showed that testes retained its position and size.

12 cases of impalpable testes underwent diagnostic laparoscopy and orchidopexy. In one case absence of testes noted. In 10 out of 11 cases laparoscopy was done in single stag. One case required 2 stage

Stephen fowlers technique. One case developed severe haemorrhagic complications on immediate postoperative period which required re-exploration. Bleeding from one of the testicular veins noted. No other complications were observed in these series of patients.

One case presented with mass per abdomen who underwent exploratory laparotomy. Orchidectomy along with retroperitoneal lymph node dissection was done in this patient. It was diagnosed with seminoma testes following histopathological analysis.

According to Bloom et al. [13] diagnostic laparoscopy has now become the preferred modality in the majority of centers. It has an accuracy of 88-100% in determining the presence, position, size and structure of the testis in various series.

Lakhoo et al. [14], studied 22 non-palpable testes in 18 boys with history of previous negative inguinal exploration in all patients and demonstrated 13 of the 22 testes to be present at laparoscopy.

According to Mohamed and Mahdi, of the 88 patients, none developed testicular atrophy, one (1%) had wound dehiscence, and four (5%) had a scrotal hematoma.

There was no statistically significant difference between the testicular size at baseline and that during the follow-up. All the patients were advised the importance of self-examination of testes and the need for regular follow up.

## Conclusions

The clinical presentation of undescended testis as regards to age, symptom, side and position are variable. As per this study incidence is common in the age group of 0 to 5 years.

Absence of testis in the scrotum was the commonest presenting complaints. The most common side of presentation was right side. Secondary sexual character development in post pubertal patients was normal. Underdevelopment of scrotum on the affected side was present in majority of cases. Majority of undescended testis located intracanalicular. Majority of the impalpable testes were located in intra-abdominal position.

Ultrasonography is not a reliable investigation due to low sensitivity and operator dependence in cases of impalpable testis. Diagnostic laparoscopy was found to be ideal investigation as it has high sensitivity and specificity. Therapeutic procedure can be carried out in the same setting. High cost, invasiveness of the procedure and long learning curve are the limiting factors.

## Conflict of Interest

The authors have no conflict of interest to disclose.

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