

# Role of Laparoscopy in Diagnosis and Management of Nonpalpable Testes

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## ABSTRACT

There is still a lot of controversy among urologists with regard to the treatment of nonpalpable (intra-abdominal) testes. This is a prospective randomized comparative study between open and laparoscopic orchidopexy for abdominally located testes. It is an assessment of the usefulness of laparoscopy in the diagnosis and definitive treatment of nonpalpable (abdominally located) testes.

**Methods:** For a span of 5 years, orchidopexy was performed for 64 patients between the ages of 1 to 15 years (mean age of 4.6 years) with nonpalpable (intra-abdominal) testes. In all, 75 testes were involved in the study during which some had laparoscopic and open Fowler-Stephens orchidopexy while others had laparoscopic orchidectomy.

One stage Fowler-Stephens orchidopexy was performed laparoscopically for 28 testes; 17 had two stage Fowler-Stephens orchidopexy. Laparoscopic orchidectomy was done for five testes. Postoperative follow-up consisted of clinical and color Doppler ultrasonography. This was done for all who underwent orchidopexy.

**Results:** The diagnostic convergence of US and laparoscopy was 16 out of 75 testes (21.3%). Laparoscopically 20 testes were located low intra-abdominally (26.6%), 17 were in the category of high intra-abdominal testes (22.7%). 18 testes had entered the inguinal canal (24%). Four of the patients had associated hernia. Mean follow-up period was 26 months (1 month to 5 years) during which the testes were found in their respective hemiscrotums except for two testes which had atrophied and three which were retracted up the scrotum.

**Conclusion:** Laparoscopy can provide accurate diagnosis of nonpalpable testes and thereby enabling a simultaneous, comparable definitive treatment.

**Keywords:** Laparoscopy, Nonpalpable (intra-abdominal) testes, Orchidopexy, Hemiscrotum.

## INTRODUCTION

Cryptorchidism (undescended testes), according to independent investigators (Scorer and Farrington, 1971; Berkowitz et al, 1993; Thong et al, 1998) is the most common congenital anomaly found at birth and affects 3% or more of full term male newborns. Approximately 80% of undescended testes are clinically palpable and 20% nonpalpable (intra-abdominal).<sup>1-3</sup> Intra-abdominal testes can be located anywhere between the lower pole of the kidney (cephalad) and caudally, the internal ring. Rarely, they are found in the perihepatic and perisplenic regions. The consequences of cryptorchidism include infertility, neoplasm, testicular torsion, hernia. The aim of surgery is to avert these consequences and give the testes better endocrine function.<sup>4-7</sup> The modalities employed in the diagnosis of cryptorchidism include US, computed tomography, magnetic resonance imaging, angiography among others. Many of these techniques are associated with false-negative and false-positive results.

Diagnostic laparoscopy was first introduced by Cortesi et al<sup>8</sup> and first series in children was described by Scott.<sup>9</sup> The use of laparoscopy for the management of nonpalpable testes was first described by Jordan et al in 1992. It has since proven to be versatile and is used widely now for the purpose of diagnosis and definitive management of undescended testes.<sup>10,11</sup>

## PATIENTS AND METHODS

In accordance with our hospital's protocol all patients underwent the following:

(1) History taking; (2) Clinical examination of a relaxed patient in the supine position with warm examining hands. Other common sites for testicular ectopia also inspected; (3) Routine laboratory examinations and (4) Ultrasonography to locate testes. Testes which were not palpable even after attempts to get them down the inguinal canal were considered nonpalpable (intra-abdominal). Laparoscopy was performed for these testes (75) in 64 patients. Based on laparoscopic findings, the testes were categorized according to their location and following definitive management were carried out:

1. One stage laparoscopic Fowler-Stephens orchidopexy. Of the patient who underwent this technique, 20 testes were in lower abdomen and six located at the deep inguinal ring (in all 26). The testicular vessels of 14 testes were dissected free from the peritoneum for an adequate length and in a tension free fashion brought down to the respective hemiscrotums. Twelve testes had to be delivered through a scrotal peritoneal port. All testes were housed in a sub dartus pouch.
2. Two stage Fowler-Stephens orchidopexy. This technique was employed for 17 testes. Second stage was performed 6 months after the first.

3. Open orchidopexy was performed for 8 testes (Figs 1A to 2B).

Laparoscopic orchidectomy was done in two instances of atrophied testes.

## RESULTS

Laparoscopy was done for 64 patients with 75 nonpalpable testes. Eleven patients presented with bilateral nonpalpable testes (17.2%) with 41 of the testes on the right and 34 on the left.

### Ultrasonography and Laparoscopy Diagnosis Compared

Ultrasound could find only 40 of the 75 testes and the location of 27 of these correctly described. Using laparoscopy, 72 of the 75 testes were found and their locations accurately described and viability determined. The diagnostic convergence of US and laparoscopy was only 16 out of 75 testes (21.3%).

### Laparoscopic Categorization and Treatment

Using laparoscopic findings testes were categorized according to location and viability:

*Category 1:* Testes located in inguinal ring were 18 (24%) with four of them being atrophic.

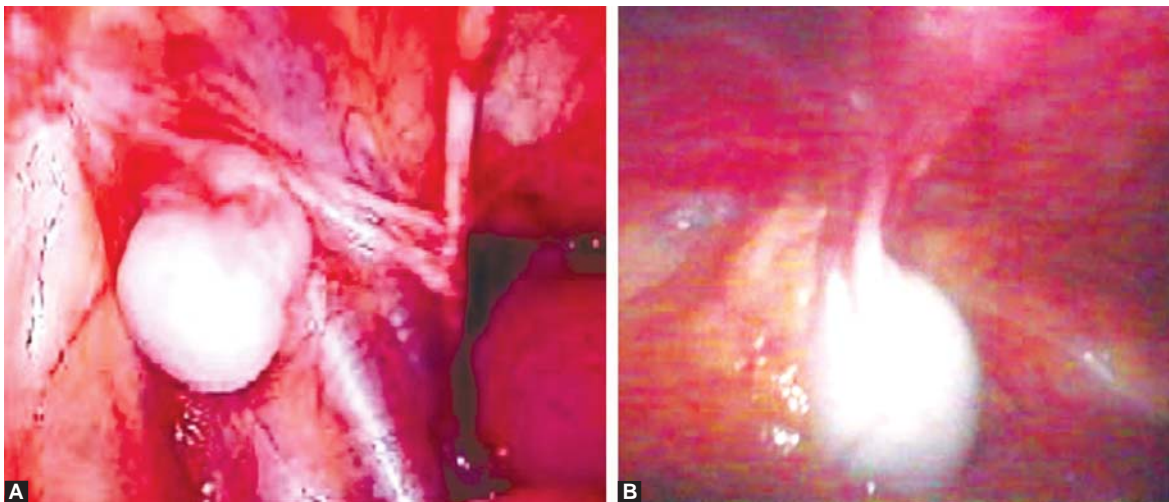
*Category 2:* Testes located less than 3 cm from inguinal ring (low intra-abdominal) were 20 (26.6%).

*Category 3:* Testes located more than 3 cm to inguinal ring (high intra-abdominal) were 22 (29.4%) with five of them atrophic.

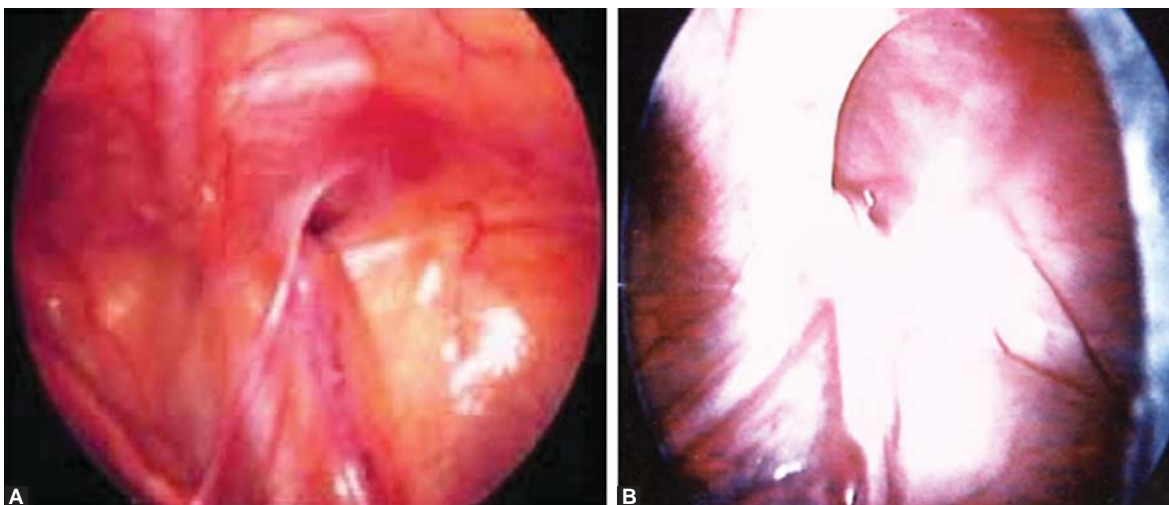
*Category 4:* Testicular vessel and vas seen ending blindly (vanishing testes). These were 12.

*Category 5:* Three testes were not seen, 26 testes in category 1 and 2 were subjected to laparoscopic one stage Fowler-Stephens orchidopexy, eight had open orchidopexy and the four atrophied testes were excised.

In category 3, 17 testes had two stage Fowler-Stephens procedure while laparoscopic orchidectomy was done for five. Associated hernias which were four in number, were repaired simultaneously.



Figs 1A and B: Mobilization of intra-abdominal testes



Figs 2A and B: Undescended testes with deep ring and triangle of doom anatomy

## Hospital Stay

Basically, this was a day procedure and patients were discharged home except for 10 (15.6%) who stayed overnight and six (9.4%) stayed for 48 hours.

## Follow-up

For a period of 6 months to 5 years patients had follow-up during which each patient who underwent orchidopexy had clinical examination and Doppler ultrasound scan. All testes which underwent one stage laparoscopic orchidopexy were located in their respective hemiscrotums and are of good size with Doppler confirming their viability. Two were, however, retracted high up the scrotum. Only two of the testes which had orchidopexy by a two stage Fowler-Stephens procedure were found atrophic. The rest were normally placed in the scrotum.

## DISCUSSION

Since the first reported case of laparoscopy in the diagnosis and management of nonpalpable testes was reported over 25 years ago, there are thousands of documented cases now showing the impact of laparoscopy in the management of nonpalpable (intra-abdominal) testes. The principles of surgery has been enhanced as exposure, lighting and magnification, which are crucial to the success of pediatric procedures, are achieved. Besides accurate assessment of testicular position in the abdominal cavity as well as their viability, which are essential to good surgical outcomes, are taken care of.<sup>12,13</sup> Moore et al and Tennenbaum et al in 1994, reported the accuracy of testicular localization by laparoscopy to be greater than 95%. Radiographic imaging studies according to Hrebinko and Bellinger (1993) and Siemer et al (2000) carry unacceptable false-negative and false-positive rates and are more invasive.<sup>14,15</sup> Some authors even report that abdominopelvic ultrasonography rarely locates intra-abdominal testes and in only 18% cases correctly identifies testes located in the inguinal canal. Bakr and Kotb (1998) found that magnetic resonance imaging detected only 37% of cases.

Laparoscopic management of nonpalpable testes has gained considerable acceptance since it was first described by Jordan et al in 1992. Chang et al (2001) reported 85% success rate for one stage or two stage Fowler-Stephens procedure with 4% failure rate. This technique is now being used in many centers. Potential major complications include vascular injury, bowel injury and bladder perforation. Fortunately with an open Hasson technique of trocar placements these complications are rare. Other minor complications, such as hematoma, subcutaneous insufflations do not require conversion to open technique.

In our series, laparoscopy was used as a tool for diagnosis and definitive management of nonpalpable (intra-abdominal) testes in 64 patients over a period of 5 years (2003-2008). Laparoscopic Fowler-Stephens orchidopexy was performed for 43 testes (57.4%) and eight (10.6%) by open orchidopexy.

We describe testes as vanishing if the vas and vessels end blindly either in the abdomen or close to the internal ring. These

are not considered as absent testes. Approximately 36 to 64% of children with nonpalpable would actually be monorchid. In our series three testes were not seen. To have accurate intraoperative assessment of the viability of the testes it is suggested that in future intraoperative Doppler scan of the testes could be done. We believe this, combined with improved technique good patient selection (appropriate age for orchidopexy should be between 6 to 12 months) would give better outcomes.

## CONCLUSION

Laparoscopy has proven to be an effective and accurate method of diagnosis of nonpalpable (intra-abdominal) testes as it enables accurate determination of anatomical localization as well as viability. It is also comparatively an effective tool for definitive management of nonpalpable testes in which case the simultaneous surgical correction of the anomaly makes it more acceptable. This minimal access technique makes open exploration of the abdomen difficult-to-find testes unnecessary.

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