

Laparoscopy in the Management of Impalpable Testis (Series of 64 Cases)

Khalid A. Ismail, Mohamed H. M. Ashour, Mahmoud A. El-Afifi, Amel A. Hashish, Nagay E. El-Dosouky, Mohamed Negm, Mohamed S. Hashish

Department of General Surgery, Section of Pediatric Surgery, Tanta University Hospital, Tanta, Egypt

Abstract

Background: The undescended testis represents one of the most common disorders of childhood. Laparoscopy has been widely used both in the diagnosis and treatment of non-palpable testis. In this study, we investigated and evaluated the usefulness of laparoscopy in the diagnosis and treatment of no palpable testis. **Patients and Methods:** From January 2003 to January 2008, we used laparoscopy in the management of 64 patients with 75 impalpable testes. Their ages varied from 1 to 15 years (median age = 4.6 years). The site and the size of the testes were localised by abdominopelvic ultrasonography in all 64 children for accurate diagnosis. One stage laparoscopic orchiopexy was performed in 26 testes, staged Fowler-Stephens orchiopexy was undertaken in 17 testes, while laparoscopic orchidectomy was done in 5 testes. Follow-up by clinical examination and colour Doppler ultrasound was performed in every patient who underwent orchiopexy. **Results:** There were 11 patients with bilateral non-palpable testes. The overall diagnostic agreement of ultrasound with laparoscopy was seen in only 16 out of 75 testes (21.3%). The results of diagnostic laparoscopy were varied and showed various pathological. Conditions and positioned of the testes, such as 20 low intra-abdominal testes (26.6%), 17 testes were high intra-abdominal (22.7%), and 18 testes (24%) entered the inguinal canal. Associated inguinal hernia was present in 4 patients. After a mean follow-up period of 26 months (6 months – 5 years), all testes were in the bottom of the scrotum except 3 testes were retracted to the neck of the scrotum and atrophy of the testis occurred in 2 patients (2.7%). **Conclusion:** Laparoscopy has proven to be the only diagnostic modality where the findings provide a clear dependable direction for the definitive management of impalpable testes, so it allows an accurate diagnosis and definitive treatment in the same sitting.

Keywords: Impalpable testes, laparoscopy, orchiopexy

INTRODUCTION

The undescended testis is one of the most frequently seen malformations in the field of paediatric surgery. The most problematic aspect of undescended testis is the diagnosis and treatment of non-palpable testis. Non-palpable testes have been reported to account for approximately 20% of undescended testes.^[1-3] The aim of surgery for impalpable undescended testis is to locate the testicle when present and bring it to the scrotum when possible. This gives it the best chance to function in an endocrine capacity, contribute towards fertility and help early detection in case of malignancy.^[4-6]

Laparoscopy is commonly used in the management of patients with an impalpable testis for localisation and to help plan subsequent surgical management. Laparoscopy was introduced as a diagnostic technique for the impalpable testis by Cortesi *et al.* in 1976^[7] and Scott had reported the first series in children in 1982.^[8]

Of all the available diagnostic modalities, diagnostic laparoscopy has proven to be the only modality that provides an accurate visual diagnosis and may avoid additional intervention in treating non-palpable testes. It also has the advantage of being able to carry out therapeutic procedures like laparoscopic orchiopexy or orchidectomy.^[3,9-11]

In their study Cortes *et al.*^[12] they found that impalpable testes account for 20% of cases of undescended testes. These testes can be intra-abdominal, intracanalicular, vanished or absent. Each of these conditions requires different treatment. This study was undertaken to evaluate the diagnostic and therapeutic value of laparoscopy in the management of impalpable testes.

Address for correspondence: Dr. Mohamed S. Hashish,
2 Elshayati Street, El-Malka Building, 5th Floor, Apartment 15, Tanta, Egypt.
E-mail: dr_mohamed_hashish@yahoo.com

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Ismail KA, Ashour MH, El-Afifi MA, Hashish AA, El-Dosouky NE, Negm M, *et al.* Laparoscopy in the management of impalpable testis (Series of 64 Cases). Afr J Paediatr Surg 2017;14:65-9.

Access this article online

Quick Response Code:



Website:
www.afripaedurg.org

DOI:
10.4103/ajps.AJPS_103_08

PATIENTS AND METHODS

The study protocol was fully approved by our hospital Institutional Ethical Approval (ethical approval 2007, no: 3100654). From January 2003 to January 2008, laparoscopy was used in the management of 64 patients with 75 impalpable testes, at the Paediatric Surgery Unit, Department of General Surgery, and Tanta University Hospital.

Our protocol consisted of:

- Full history taking.
- Thorough complete clinical examination.
- Pre-operative routine laboratory investigations.
- Abdomino-pelvic ultrasonographic (U/S) to detect the site and the size of the impalpable testis, and to compare the accuracy of U/S in comparison to laparoscopic findings.
- All patients with undescended testis were examined under a general anaesthetic with muscle relaxation. On the affected side, the scrotum was palpated for the testis or gubernacular structures. If the testis remained impalpable an effort was made to 'milk' the testis down from the inguinal canal with one hand while the other blocked retraction. If no testis (64 patients) was palpable laparoscopy was performed.

Definitive treatment according to diagnostic laparoscopic findings:

1. One stage laparoscopic orchiopexy: This technique was performed in 26 testes (20 low intra-abdominal and 6 at the deep inguinal ring) [Figures 1-3]. The testicular vessels were freely dissected from peritoneal attachment to get adequate length, and the testes were brought into the scrotal sac without tension through a direct route (one stage laparoscopic-assisted orchiopexy) in 14 impalpable testes [Figure 3] and the testes were delivered through a scroto-peritoneal port and fixed in a dartos pouch (12 testes) [Figure 4].
2. Staged Fowler-Stephens orchiopexy: This technique was performed in 17 high intra-abdominal testes. In the first stage, metal clips were applied to the testicular vessels 3 cm above the testis without any mobilisation. In the second stage (6 months later), the vessels are severed between clips and the testes were brought down on the artery to the vas with a wide base of peritoneal attachment to the scrotal sac through the direct route.
3. Open orchiopexy [Figure 5] (8 testes).
4. Laparoscopic orchidectomy [Figure 6] was done in 5 abdominal atrophic testes with hypoplastic vessels.
5. Excision of atrophied remnants of testes through inguinal exploration and histopathology of the removed specimen [Figure 7] (4 atrophied testes).

In a follow-up period between 6 months and 5 years by clinical examination and colour Doppler ultrasound in every patient who underwent orchiopexy.

RESULTS

Laparoscopy was performed for 75 impalpable testes in 64 patients. The patients were between 1 and 15 years with a mean age of 4.6 years. Eleven patients were presented with bilateral impalpable testes (17.2%) according to the side of testis 41 on rights sided and 34 left sided.

According to the U/S results in comparison to the laparoscopic findings.

40 testes were located by U/S, 27 of which were incorrectly located. While out of the 35 testes not located by U/S, 32 were found to be present on laparoscopy. Thus, the overall diagnostic agreement of U/S with laparoscopy was seen in only 16 out of 75 testes (21.3%).

Laparoscopy was performed as a diagnostic and a therapeutic tool. The results of diagnostic laparoscopy [Table 1] were: 3 testes (4%) were absent, 18 (24%) were inside the upper part of the inguinal canal [Figure 1], 14 of them were viable and with adequate size and calibre of spermatic

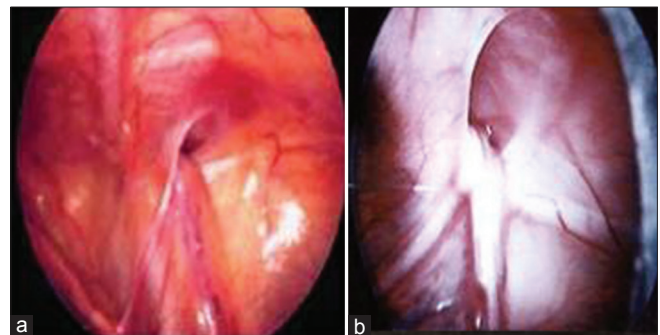


Figure 1: (a and b) The vas and vessels entering the internal ring

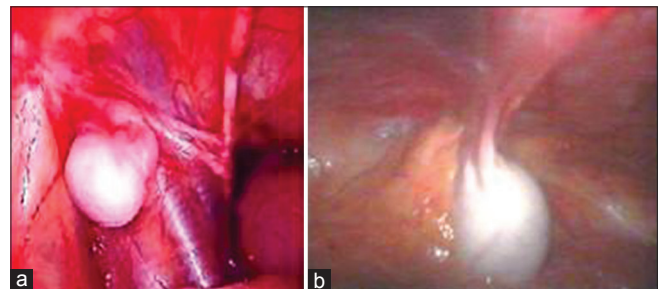


Figure 2: (a and b) Low intra-abdominal testes

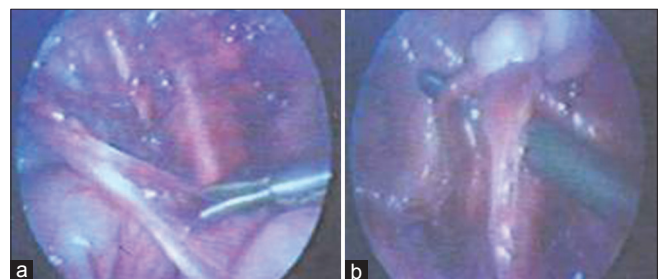


Figure 3: (a and b) One stage laparoscopic orchiopexy

vessels and vas. 8 testes entered the deep inguinal ring, managed by open orchiopexy [Figure 5], while 6 testes were seen at the deep inguinal ring [Figure 3] and one stage laparoscopic orchiopexy was done for them, while 4 testes were atrophic with hypoplastic vessels, and they were excised through inguinoscopy and histopathology was done for them [Figure 7]. Twelve testes (16%) were diagnosed as vanished testes (intra-abdominal blind ended vessels and vas at

the internal ring). No further intervention was done for them as the finding was confirmatory of absent testis. The remaining 42 impalpable testes were intra-abdominal, 5 were atrophic (6.7%) and laparoscopic orchidectomy [Figure 6] was done for them, 17 testes (22.7%) were high intra-abdominal >3 cm from the deep inguinal ring, so staged Fowler-Stephens was done. 20 testes (26.6%) were low intra-abdominal [Figure 2] with acceptable size and adequate length of spermatic vessels and



Figure 4: Laparoscopic orchiopexy with scroto-peritoneal port



Figure 5: Open orchiopexy

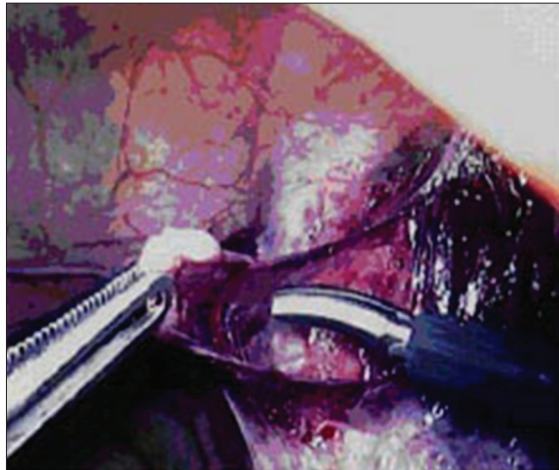


Figure 6: Laparoscopic orchidectomy

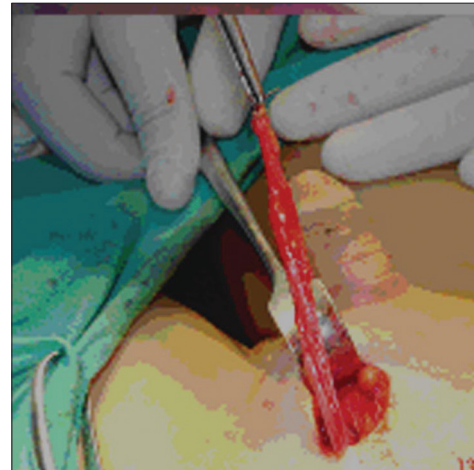


Figure 7: Excision of atrophied testes through inguinal exploration

Table 1: Diagnostic and therapeutic findings of laparoscopy in impalpable testes

	Diagnostic laparoscopy	Laparoscopic orchiopexy	Laparoscopic orchidectomy	Open orchiopexy	Excision of atrophic testes	Absent testis
	<i>N (%)</i>					
Vas and vessels entering the inguinal ring	18 (24)	6 (one stage)		8	4	
Low intra-abdominal testis	20 (26.6)	20 (on-stage)				
High intra-abdominal testis (>3 cm from inguinal ring)	17 (22.7)	17 (staged Fowler-Stephens)				
Atrophic intra-abdominal testis	5 (6.7)		5			
Vanished testis (blind ended vessels and vas)	12 (16)					12
Absent testis	3 (4)					3
Total	75 (100)	43 (57.4)	5 (6.7)	8 (10.6)	4 (5.3)	15 (20)

vas, managed by one stage laparoscopic orchiopexy [Figure 3]. There were no major complications in any of the procedures.

Associated inguinal hernia was present in 4 patients (3 on the same side and one on the other side) and repaired in the same sitting.

Forty-eight (75%) children were treated as 1 day case procedure, 10 (15.6%) stayed overnight, whereas 6 (9.4%) stayed for 2 days in hospital.

A mean follow-up period of was 26 months (6 months – 5 years), one stage laparoscopic fixed testes were of good size, viable and of good scrotal position (detected by clinical examination and colour Doppler ultrasound), but 3 testes (4%) were at the neck of the scrotum.

The laparoscopic staged orchiopexy testes showed atrophy in 2 (2.7%) and all were in the bottom of the scrotum.

DISCUSSION

A widely accepted approach to management of the impalpable testis remains controversial. Various approaches to identify the impalpable testis, including laparoscopy and open inguinal exploration, have been proposed. Laparoscopy has been established as the most reliable diagnostic modality for the management of impalpable testes. It clearly demonstrates the anatomy and provides visual information upon which a definitive decision can be made.^[13] Both internal inguinal rings can be inspected, the location and size of the testis, their blood supply and the nature, course and termination of the vas and epididymis can be determined.

All of these anatomical landmarks individually or collectively have a bearing on operative management of the impalpable testis.^[14] In our study, laparoscopy has been used as a diagnostic and a therapeutic tool in 75 non-palpable testes in 64 patients during a period of 8 years (2000–2008) and had an important role in the management as laparoscopic orchiopexy either one or two stages was done in 43 testes (57.4%), while laparoscopic orchidectomy in 5 (6.7%) atrophic intra-abdominal testes.

In one series^[15] of cases of non-palpable testes, 64% had vascular pedicles long enough to reach the scrotum without dividing the vessels and without tension. In another series,^[16] 11% were located in the vicinity of the inguinal ring and were subjected to an immediate one stage laparoscopic assisted orchiopexy without difficulty. In our study, one stage laparoscopic orchidolysis and orchiopexy was done successfully in 26 testes (34.7%). We have noticed that, the wider the opening of the deep ring, the more developed are the testes and the better are the chances for one stage descent without division of the testicular vessels.

Some authors advocated a medial displacement of the testicular vessels as an important principle for a successful operation of high undescended testis, involving the division of the fascia transversalis, but this was not favoured by other surgeons as it is more invasive.^[17]

Some surgeons suggested the use of a fourth (scroto-peritoneal) port to facilitate a complete laparoscopic orchiopexy, a step which is safe and easy to perform.^[18] In our series, we used the scroto-peritoneal port in 12 cases. It allowed a meticulous extraction of the dissected testis under vision without trauma to the testis and without the need of inguinoscopy.

Over the past years, many imaging modalities have been used to detect impalpable testes. These include U/S, magnetic resonance imaging and more invasive procedures like orchidography and venography.^[19-21] However, none of these investigations has acceptable accuracy to detect the actual position or absence of the testis.

Ultrasonographic is considered to be an inexpensive and the least invasive form of imaging; however, in this study, the overall diagnostic agreement of U/S with diagnostic laparoscopy was seen in only 16 out of 75 testes (21.3%), which was agreed by some studies which conclude that ultrasound has proved accurate to identify the intracanalicular impalpable testis, but the sensitivity for intra-abdominal testis (0–9%) and vanishing testis (0–33%) is poor.^[22-24]

Laparoscopic staged Fowler-Stephens procedure must be performed for high intra-abdominal testes with short vessels and vas.^[25,26] In our study, 17 impalpable testes (22.7%) underwent staged, laparoscopic orchiopexy. The second stage was done 6 months later. Our criteria for diagnosing vanished testes are to see the vas and vessels ending blindly at or above the closed internal ring. Seeing the vas alone entering the canal and ending into what looks like a nubbin of cord remnants does not diagnose absent testis.

CONCLUSION

Laparoscopic examination of non-palpable testes has considered the most effective, rapid, accurate and least invasive procedure to localise impalpable testes, and make sure or preclude the location of the gonad. It is the only exploratory procedure that is accurate enough to enable the diagnosis of non-palpable testis and also allow the surgical treatment to be done in the same setting. However, we strongly recommend careful exploration of the abdomen tracing the vas and vessels before labelling impalpable testis as absent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Williams EV, Appanna T, Foster ME. Management of the impalpable testis: A six year review together with a national experience. *Postgrad Med J* 2001;77:320-2.
- Gatti JM, Ostlie DJ. The use of laparoscopy in the management of nonpalpable undescended testes. *Curr Opin Pediatr* 2007;19:349-53.
- Barqawi AZ, Blyth B, Jordan GH, Ehrlich RM, Koyle MA. Role

- of laparoscopy in patients with previous negative exploration for impalpable testis. *Urology* 2003;61:1234-7.
4. Rosito NC, Koff WJ, da Silva Oliveira TL, Cerski CT, Salle JL. Volumetric and histological findings in intra-abdominal testes before and after division of spermatic vessels. *J Urol* 2004;171:2430-3.
 5. Kucheria R, Sahai A, Sami TA, Challacombe B, Godbole H, Khan MS, *et al.* Laparoscopic management of cryptorchidism in adults. *Eur Urol* 2005;48:453-7.
 6. Chew G, Hutson JM. Incidence of cryptorchidism and ascending testes in trisomy 21: A 10 year retrospective review. *Pediatr Surg Int* 2004;20:744-7.
 7. Cortesi N, Ferrari P, Zambarda E, Manenti A, Baldini A, Morano FP. Diagnosis of bilateral abdominal cryptorchidism by laparoscopy. *Endoscopy* 1976;8:33-4. Quoted from *BJM Int* 2001;87:490-3.
 8. Scott JE. Laparoscopy as an aid in diagnosis and management of the impalpable testis. *J Pediatr Surg* 1982;17:14-6.
 9. Alam S, Radhakrishnan J. Laparoscopy for nonpalpable testes. *J Pediatr Surg* 2003;38:1534-6.
 10. Argos Rodriguez MD, Unda Freire A, Ruiz Orpez A, Garcia Lorenzo C. Diagnostic and therapeutic laparoscopy for nonpalpable testis. *Surg Endosc* 2003;17:1756-8.
 11. Baker LA, Docimo SG, Surer I, Peters C, Cisek L, Diamond DA, *et al.* A multi-institutional analysis of laparoscopic orchidopexy. *BJU Int* 2001;87:484-9.
 12. Cortes D, Thorup JM, Lenz K, Beck BL, Nielsen OH. Laparoscopy in 100 consecutive patients with 128 impalpable testes. *Br J Urol* 1995;75:281-7.
 13. Tennenbaum SY, Lerner SE, McAleer IM, Packer MG, Scherz HC, Kaplan GW. Preoperative laparoscopic localization of the non palpable testes; a critical analysis of a 10-year experience. *J Urol* 2000;164:154-5.
 14. Chang B, Palmer LS, Franco I. Laparoscopic orchidopexy: A review of a large clinical series. *BJU Int* 2001;87:490-3.
 15. Cisek LJ, Peters CA, Atala A, Bauer SB, Diamond DA, Retik AB. Current findings in diagnostic laparoscopic evaluation of the nonpalpable testis. *J Urol* 1998;160:1145-9.
 16. Lotan G, Klin B, Efrati Y, Bistrizter T. Laparoscopic evaluation and management of nonpalpable testis in children. *World J Surg* 2001;25:1542-5.
 17. Ayub K, Williams MP. A simple alternative technique of orchiopexy for high undescended testis. *Ann R Coll Surg Engl* 1998;80:69-71.
 18. Jawad AJ. Scroto-peritoneal port for laparoscopic orchidopexy. *Pediatr Surg Int* 1998;13:460-1.
 19. Malone PS, Guiney EJ. A comparison between ultrasonography and laparoscopy in localising the impalpable undescended testis. *Br J Urol* 1985;57:185-6.
 20. Elder JS. Ultrasonography is unnecessary in evaluating boys with a nonpalpable testis. *Pediatrics* 2002;110:748-51.
 21. Siemer S, Humke U, Uder M, Hildebrandt U, Karadiakos N, Ziegler M. Diagnosis of nonpalpable testes in childhood: Comparison of magnetic resonance imaging and laparoscopy in a prospective study. *Eur J Pediatr Surg* 2000;10:114-8.
 22. Desireddi NV, Liu DB, Maizels M, Rigsby C, Casey JT, Cheng EY. Magnetic resonance arteriography/venography is not accurate to structure management of the impalpable testis. *J Urol* 2008;180:1805-8.
 23. Yeung CK, Tam YH, Chan YL, Lee KH, Metreweli C. A new management algorithm for impalpable undescended testis with gadolinium enhanced magnetic resonance angiography. *J Urol* 1999;162:998-1002.
 24. Cain MP, Garra B, Gibbons MD. Scrotal-inguinal ultrasonography: A technique for identifying the nonpalpable inguinal testis without laparoscopy. *J Urol* 1996;156:791-4.
 25. Yu TJ, Lai MK, Chen WF, Wan YL. Two-stage orchiopexy with laparoscopic clip ligation of the spermatic vessels in prune-belly syndrome. *J Pediatr Surg* 1995;30:870-2.
 26. Radmayr C, Oswald J, Schwentner C, Neururer R, Peschel R, Bartsch G. Long-term outcome of laparoscopically managed nonpalpable testes. *J Urol* 2003;170:2409-11.