

Diagnostic and Therapeutic Management of Impalpable Testis in the Era of Laparoscopy

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Abstract

Undescended testis is one of the common urogenital abnormality encountered. Annandale was the first person to perform orchidopexy in 1877. At present single stage, Stephen-Flower's staged, procedure is being carried out for impalpable intra-abdominal undescended testis with open and laparoscopy techniques with various modifications including testicular autotransplant. Cortesi et al¹ were the first to do diagnostic laparoscopy for cryptorchidism in 1976. Jordan et al² described laparoscopic orchidopexy in 1992. Since then laparoscopic method has been gaining popularity, with advances in the field of laparoscopy. In this study, recent articles of impalpable intra-abdominal testis were reviewed to see the use of laparoscopy in the diagnosis and management.

Conclusions: Diagnostic laparoscopy has become the gold standard for the diagnosis of impalpable testis. Laparoscopy for surgical correction is gaining popularity in pediatric as well as adult group with more and more surgeons opting for laparoscopic treatment. It can also benefit the patient and is logical if both diagnosis and surgical correction are combined at one time.³

Keywords: Laparoscopy, impalpable, orchidopexy, high, cryptorchidism, impalpable, undescended, testis.

INTRODUCTION

This condition has been first described by Hunter in 1786. The prevalence of imperfect descent of one or both the testis in boys at 1 year of age is 1%, in full-term male infants it is 3%, and in premature male neonates it is 33% at birth. Spontaneous descent is possible until 6 months of age (Fig. 1).⁴ Nonpalpable testis account for approximately 20% of the undescended testis.⁴

The aim of the surgery is to mobilize the testis to its normal position. There is a need for reposition the testis early into the scrotum to reduce the risk of infertility but the subject is still controversial.⁵⁻⁷ The incidence of testicular cancer in males with undescended testis is 40 times more than those without undescended testis.⁸ Ten percent of testicular cancer patients are those with undescended testis.^{9,10}

There is still a lot of controversy regarding the method to be adopted for the mobilization of the testis (single stage or two stage Flower-Stephen, autotransplant) and the results of the various authors vary accordingly. But as our aim in this study, was to know about the use of laparoscopy in this procedure, and its benefits from the articles. We strictly adhered to this protocol by not commenting on the surgical technique.

AIMS AND OBJECTIVES

- Review the recent articles to check the use and efficacy of laparoscopy in the diagnosis and management of impalpable testis

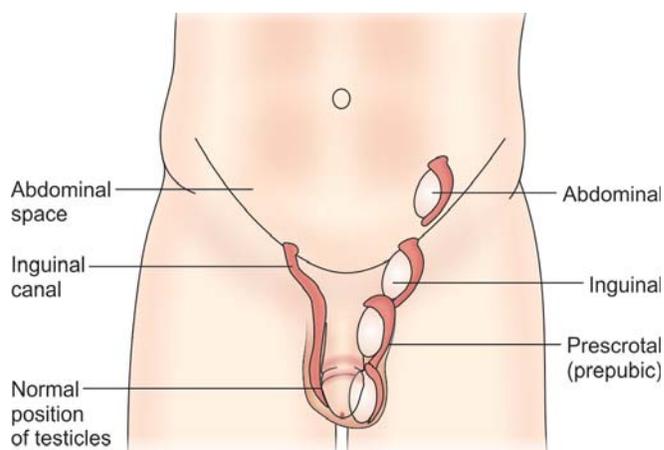


Fig. 1: Sites of ectopic testis

- The use of laparoscopy as a diagnostic tool
- Know the benefits of using laparoscopy in this surgery
- The outcome of the surgery with the use of laparoscopy
- The opinion of the surgeon about the use of laparoscopy in impalpable testis.

MATERIALS AND METHODS

A systematic review of the literature was conducted using search engine, PubMed, google and highwire. All the recent articles were collected which have done laparoscopic surgery for impalpable intra-abdominal testis irrespective of the age

of the patient and the type of operation done by laparoscope (i.e. single or two stage Stephen and Flower or autotransplant of testicle). We also examined the results of the procedures performed. We also selected articles where diagnostic laparoscopy was done for undescended testis to see if it is superior to ultrasound, and MRI. We have selected articles from various hospitals around the world where operations have been done by general surgeon, pediatric surgeon and specialist pediatric urologist. This was done to know the popularity of laparoscopy among different specialist surgeons around the world, and also to see if they have recommended for using laparoscopy for diagnosis and management for impalpable abdominal testis.

RESULTS

We arbitrarily classified the results of surgery from the articles we reviewed as excellent, very good, good, average,

and poor, success in this surgery is defined as no testicular atrophy and intrascrotal position (Table 1).

> 90%	Excellent
80-90%	Very good
70-80%	Good
60-70%	Average
< 60%	Poor

And for diagnosis we have mentioned (***) if the diagnosis was accurate and (**) if diagnosis could not be made. We have mentioned as (***) for all the cases where the therapeutic procedure was done as it is logical that diagnostic laparoscopy will be done before therapeutic procedure is carried out.

DISCUSSION

All the literature which we have reviewed suggests that laparoscopy is the best method for the diagnosis of

Table 1: Results of laparoscopic surgery for impalpable testis

S no.	Author	*Diagnostic/Therapeutic	**No of patients	Results	Comment on use of laparoscopy by the author
1.	Battaglino F, Pesce C, et al ¹¹	TD	74(86)	Excellent***	Author advocates the use of laparoscopy in all patients with nonpalpable testis
2.	Chang B, Palmer, et al ¹²	TD	80(101)	Excellent***	Author states "LO is an effective method for managing intra-abdominal testis"
3.	Argos Rodriguez MD, et al ¹³	TD	46(53)	Excellent***	Author concludes "Laparoscopy is the only exploratory procedure that is accurate enough to enable the diagnosis of nonpalpable testis and allow the surgical setting to be done in the same setting"
4.	Samadi AA, Palmer LS, et al ¹⁴	TD	173(203)	Excellent***	Author states "LO has become the standard for diagnosis and treatment"
5.	Radmayr C, Oswald J, et al ¹⁵	TD	84(108)	Excellent***	Author states "The laparoscopic approach allows not only the diagnosis, but also therapy regardless of the procedure carried out for orchiopexy"
6.	Bittencourt DG, Mirinda, et al ¹⁶	TD	51(75)	Very good***	The author concludes " Videolaparoscopy is a safe and effective method for diagnosis and treatment of nonpalpable testis"
7.	Leung MW, Choas NS, et al ¹⁷	TD	18(18)	Excellent***	The author states "LMTV is a safe and efficient adjunctive step in orchidopexy for impalpable or redo undescended testes"
8.	Corvin S, Sturm W, et al ¹⁸	TD	8(8)	Excellent ***	The author concludes "These results demonstrate the suitability of laparoscopy for the treatment of cryptorchidism in the adult population"
9.	Satar N, Bayazit Y, et al ¹⁹	TD	13(21)	Excellent***	The author concludes "Diagnostic laparoscopy is very helpful technique in the diagnosis of impalpable testis especially when ultrasound and CAT scan are not informative"
10.	Abolyosr A ²⁰	TD	82(87)	Excellent***	The author concludes "Although the results for both open and laparoscopic are fairly comparable. However laparoscopy provides significantly less morbidity"

Contd...

S no.	Author	+Diagnostic/ Therapeutic	++No of patients	Results	Comment on use of laparoscopy by the author
11. X	Ishida K, Harada Y, et al ²¹	TD	28(32)	***	Author states that laparoscopy can be safely performed to assess the location of the non-palpable testes
12. XX	Lintula H, Kokki, et al ²²	TD	35	Very good	Author states "Although marginally longer in duration primary LO appears to be feasible and safe technique"
13.	Denes FT, Saito FJ, et al ²³	TD	90	Very good	Author concludes "Laparoscopic orchiopexy presents excellent results in terms of diagnosis and therapy of the impalpable testis"
14.	Kaye JD, Palmer LS ²⁴	TD	21(42)	Excellent	Author concludes that bilateral intra-abdominal testes, single setting bilateral LO can be performed safely on an outpatient basis with a high degree of success
15.	Agarwal A, Joshi M, Mishra P, et al ²⁵	TD	13(17)	Excellent	Author states "There were no complication of related to laparoscopy
16.	Lindgren BW, Darby EC, et al ³	TD	36(44)	Excellent	Author states "The low incidence of complications and 93% success rate underscore the feasibility of this procedure"
17.	Burjonrappa SC, Al Hazmi, et al ²⁶	TD	15(17)	Excellent	Author concluded "Two stage laparoscopic orchidopexy is a fairly easy surgical procedure with minimum morbidity"

X Mainly diagnostic laparoscopy done with orchidectomy for atrophic testis

XX Comparative studies done between open and lap orchidopexy

*** Diagnosis was accurate

** Could not be diagnosed

+ T only therapeutic, TD for both therapeutic and diagnostic

++ (x) indicates the number of testicles

unpalpable intra-abdominal testis and some consider it as a gold standard. Therapeutic procedure also gives excellent results with different approaches, but it does require laparoscopic skills, and every surgeon has his own learning curve.

The study conducted by Desireddi NV et al²⁷ have found that the overall accuracy of magnetic resonance imaging alone and magnetic resonance arteriography/venography for identifying a viable testis or testicular nubbin was 62% and 57%, respectively. The accuracy of magnetic resonance imaging and magnetic resonance arteriography/venography for identifying a viable testis was 74% and 67%, respectively.

Another study by Khalid Ismail et al²⁸ found the overall diagnostic agreement of ultrasonography with laparoscopy was 21.3%.

In another series conducted by Onal²⁹ have found that the incidence of a contralateral patent process vaginalis is considerable in patients presenting with a unilateral nonpalpable testis and this can be easily recognized during laparoscopy, which is an additional benefit of using laparoscopy.

One study conducted by Hay SA et al,³⁰ has done laparoscopic classification of testis to facilitate decision

making during the laparoscopy, according to the position of the impalpable testis and in the relation of the spermatic vessels and vas deferens to the internal ring, with a management protocol based on this classification. In this Type I: no testis visualized; Type II: testis seen at the internal ring with the vas and vessels looping to the internal ring; Type III: testis at the ring, with vas and vessels going to the testis directly; and Type IV: intra-abdominal testis not related to the internal ring. This will help to plan the procedure.

The accuracy of diagnostic laparoscopy is the best when compared with the results of the above studies. Thus it can be stated that diagnostic laparoscopy is the best modality available for the diagnosis of nonpalpable testis and planning the operative procedure.

In the series where comparative study of laparoscopic orchidopexy vs open orchidopexy were carried out by two different authors Abolyosr A²⁰ and Lintula et al.²² The first author had fairly similar results with both LO and OO, but he agrees that the morbidity was significantly less with LO. In the series of Lintula H there was no difference in the length of hospital stay between the LO and OO group the author feels LO is a safe feasible technique and in staged Flower-Stephen LO is more safe than primary LO in cases with high intra-abdominal testis.

In the series of Agarwal A et al²⁵ which carries out staged Flower-Stephen procedure, where both the stages were carried out by laparoscopy. The results were almost 100%.

In the study conducted by Espasito C et al,³¹ they followed-up the cases that had undergone LO by staged Flower-Stephen technique for more than 10 years postoperatively, and they had more than 83% success rate. These results clear the doubts about the long-term results of the use of laparoscopy.

In the study conducted by Kaye JD²⁴ they performed bilateral LO in single setting as an outpatient basis for 42 testis on 21 boys with a median age of 9 months and their overall result was 91%. This looks very interesting as the entire patient were treated as OPD patients with such excellent results. This study shows that morbidity is very less with laparoscopic in particular surgery and also holds the same in general for all the laparoscopic procedures.

It can be said that laparoscopy because of its magnification and illumination gives a more clear picture of the anatomy and visualization of vessels compared to open procedure. Another advantage is that it can help in better dissection in places where it is difficult to approach in open surgery. But we have to definitely agree that complex laparoscopic procedures require more skills to perform, which can only be achieved with more advance training and dedication.

CONCLUSION

Laparoscopic management of impalpable testis had rapidly gained popularity in the last decade. Diagnostic laparoscopy for impalpable testis has become Gold standard. Diagnostic and therapeutic procedure can be performed at one sitting with less morbidity, excellent results, short stay in hospital and better cosmetic outcome. After the review of the recent articles and their results it looks like a consensus of opinion is emerging among the surgeons for accepting laparoscopic orchidopexy as a standard procedure for the management of impalpable testis.

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