

Role of laparoscopy in the management of impalpable testis in children: a study in Bangladesh

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Abstract

Introduction: Treatment of the cryptorchid testicle is justified due to the increased risk of infertility and malignancy as well as the risk of testicular trauma and psychological stigma on patients and their parents. Approximately 20% of cryptorchid testicles are impalpable. In these cases, the laparoscopic technique is the method of choice for diagnosis and treatment. **Materials and Methods:** From 1 April 2009 to 31 October 2010, 37 testicles of 30 patients were submitted to diagnostic laparoscopy for impalpable testes. This was a prospective study seeking the diagnostic accuracy and therapeutic outcomes of use of laparoscopy in impalpable testes. Age, operative techniques, complications, the cosmetic aspect and outcomes were also recorded. **Results:** Mean age was 6.64 ± 3.96 years and 23% cases were bilateral. Twenty-one cases had primary orchiopexy, 9 had 1st stage Fowler-Stephens (FS) procedure, 3 had 2nd stage FS, 13 cases needed inguinal exploration and there was one vanishing testicles. Average operating time was 40 min for diagnostic laparoscopy, 90 min for unilateral and 120 min for the bilateral cases. Two of the patients had late postoperative complications e.g. one ureteral obstruction and one recurrence. **Conclusions:** In pediatric age group, the laparoscopic approach is safe and feasible. The purpose of study is to see whether the laparoscopic procedure presents excellent results in terms of diagnosis and therapy of the impalpable testis.

Key words: Impalpable testis; Cryptorchidism; Undescended testis.

INTRODUCTION

Cryptorchidism is the most common genitourinary anomaly in male children.¹ Its incidence can reach 3% in full-term neonates, rising to 30% in premature boys.² The treatment of the cryptorchid testicle is justified by the increased risk of infertility and malignancy, as well as an associated inguinal hernia and the risk of trauma to the ectopic testicle against the pubis. Furthermore, the psychological stigma of a missing testis for the patient, as well as the parents' anxiety are also factors that justifies this type of treatment.^{3,4} About 20% of cryptorchid testicles are nonpalpable.^{1,5} Due to increased risk of infertility⁶ and malignancy⁷ in imperfectly descended testes, early and proper treatment is necessary. Laparoscopy has become the

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modality of treatment for its diagnostic and therapeutic utility.^{1,8} We describe here the first report from Bangladesh on use of laparoscopy in the management of impalpable testes.

MATERIALS AND METHODS

This was a prospective interventional study carried out in the Department of Pediatric Surgery, Dhaka Medical College & Hospital (DMCH), Dhaka and Chattagram Maa-O-Shishu Hospital Medical College (CMOSHMC), Chittagong. This study was conducted between 1 April 2009 and 31 October 2010. Boys up to 16 years of age with impalpable testes were included in the study. Children with other severe congenital anomalies and/or co-morbid medical conditions were excluded. Purposive sampling technique was followed and among the 59 impalpable testes presented during study period, 30 cases were selected in this study.

Our hypothesis was 'laparoscopy presents excellent results in terms of diagnosis and therapy of the impalpable and sonologically undetected testis in children.' General objectives were to evaluate the efficacy of laparoscopy in diagnosis and treatment of impalpable testis whereas specific objectives were to compare between ultrasonogram and laparoscopy in detection of impalpable testes, as well as, to observe the outcome of laparoscopy in terms cosmesis and complications.

Ethical clearance was taken from ethical committee of Dhaka Medical College. Informed written consents were obtained from all the parents or legal guardians after proper counseling. Statistical analysis was performed using the Statistical Package for Social Science (SPSS) version 15.0. A descriptive analysis was performed for clinical features. χ^2 test and Fisher's exact test were used for categorical variables. All p-values were two sided and considered as statistically significant if <0.05 .

Bladder was evacuated just before anaesthesia. The patient was placed supine on the operating table. General endotracheal anaesthesia was used and patients were placed in Trendelenburg position. A U-shaped incision of 1 cm length was made just below the umbilicus and a 10 mm trocar was inserted into the abdominal cavity by open Hasson method⁸ and CO₂ was insufflated to achieve pneumoperitoneum at a pressure up to 15 mm Hg. A 5 mm 30° telescope was inserted with reducer and the abdominal organs were inspected. Two more 5 mm ports were placed at each flank.

On the affected side, vas, vessels and the testis (if present) were visualized. Descent of vas and vessels through the internal ring excluded the diagnosis of intra-abdominal testis. In

such cases, laparoscopy was terminated and inguinal canal was opened and the testes were explored. Blind-ended vas deferens and spermatic vessels were considered as vanishing testis. When the testes were in the abdomen, their size, appearance and mobility; the distance between the testes and the inguinal canal (Fig. 1a & 1b); the length of spermatic vessels and vas deferens were assessed to proceed. Vas deferens and spermatic vessels were clipped for 1st stage of two-stage Fowler-Stephens method (Fig. 2) and the second stage done after 6 months. For laparoscopic orchiopexy, a large artery forceps or 5 mm trocar was inserted through the scrotum to pull down the testis and fix it into the newly created dartos pouch.

In DMCH all the patients were discharged when feeding was tolerated after 4–6 hours of operation and in CMOSHMC patients were admitted in the hospital and were discharged on the following day. Follow up was done at 1 week, 1 month, 3 months and at 6 months.

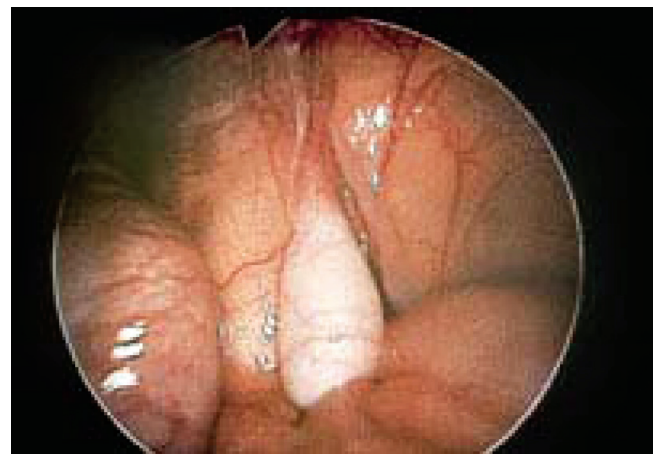


Figure 1a: Laparoscopic picture showing high intra-abdominal testis



Figure 1b: Laparoscopic picture showing low intra-abdominal testis

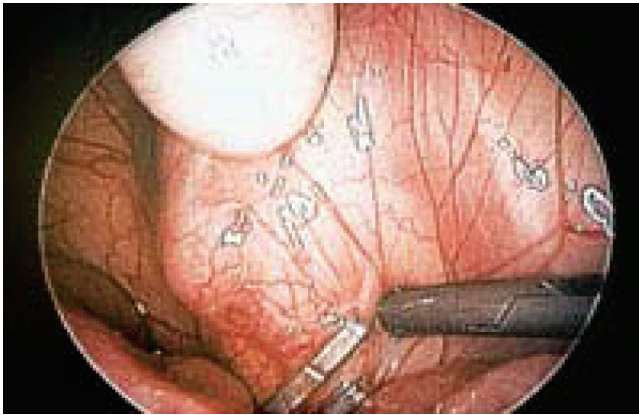


Figure 2: Clipping of vascular pedicle during 1st stage Fowler-Stephens technique

RESULTS

Age ranged from 1 to 13 years (mean 6.64 ± 3.96) and 23% cases were bilateral. In 13 impalpable testes (35.1%), vas

deferens and spermatic vessels were through the internal inguinal ring and in all these cases, inguinal region was explored. Following a surgical exploration, orchiopexy was performed in 11 testes (29.7%), and orchiectomy in 2 testes (5.4%). Bilateral blind-ending spermatic vessels were found in one case and considered as bilateral vanishing testes. Overall 21 (56.70%) patients had primary orchiopexy and 9 cases had 1st stage of Fowler-Stephens procedure and 3 of these had 2nd stage during study period (Table 1). Average operating time was 40 min for diagnostic laparoscopy, 90 min for unilateral and 120 min for the bilateral cases. Cosmesis was good and mean visual analog score was 91.92 ± 4.07 . Two of the patients had late postoperative complications e.g. one developed ureteral obstruction and the other had recurrence. Table 2 depicts different parameters relating to the study population and Table 3 shows the comparison between ultrasonogram and laparoscopy in the diagnosis of impalpable testes.

Table 1: Distribution of operative techniques by hospital

Fowler-Stephens	Name of the hospital		Total
	DMCH	CMOSHMC	
Single stage or primary orchiopexy	10 (62.5)	11 (52.4)	21 (56.7)
1st stage of two stage FS	6 (37.5)	3 (14.3)	9 (24.3)
2nd stage of two stage FS	0 (0.0)	3 (14.3)	3 (8.1)
Orchiectomy	0 (0.0)	2 (9.5)	2 (5.4)
Vanishing testes on laparoscopy	0 (0.0)	2 (9.5)	2 (5.4)
	16 (100.0)	21(100.0)	37 (100.0)
Inguinal exploration	4 (25.0)	9 (42.9)	13 (35.1)

Table 2: Distribution of parameters

Parameter	Frequency	Percent
Diagnostic accuracy	37	100.0
Decision making	37	100.0
Formulation of treatment protocol	37	100.0
Recurrence	1	2.7
Size of testis		
Normal	16	43.2
Atrophy	19	51.4
Absent (vanishing) testes	2	5.4

Table 3: Comparison of USG and laparoscopy in finding the testes

	USG findings	Laparoscopy	p value
Detected	3 (8.1)	37 (100.0)	0.001
Undetected	34 (91.9)	0 (0.0)	
Total	37 (100.0)	37 (100.0)	

Figures within parentheses indicate in percentage

DISCUSSION

Despite the recommendations for the treatment of the cryptorchid testes before 2 years of age, many of our patients were older, due to the socio-economic characteristics of the public health system in our country, the lack of parental information and difficult access to tertiary health care. Although fertility is already compromised in this age group, treatment is necessary not only for the risk of malignancy, but also for the satisfaction and improvement in the quality of the patient's life and parents' concern for their children's health.

Despite a sensitivity of 70–90% in the diagnosis of inguinal testes, ultrasonography (USG) is not useful in intra-abdominal cases.⁹ In our series we had done USG for all the patients and in only 3 cases detection of impalpable testis were evident as peeping testis where laparoscopy were necessary to conclude. Although presenting a better quality, both computed tomography and nuclear magnetic resonance lack sufficient sensitivity and specificity to be considered as gold standard diagnostic tools.¹⁰ More recently, the magnetic angioresonance was introduced with sensibility of 96% and specificity of 100%, but it is still a new method, with high costs, also requiring general anaesthesia in children.¹¹ A complementary human chorionic gonadotropine (hCG) stimulation test may be performed in bilateral impalpable testes. It is possible to detect whether there is functioning testicular tissue present or not by measuring serum testosterone levels.¹² On the other hand, the negative result of this test does not necessarily indicate absence of testicle. Regardless of the results of this test, laparoscopic exploration is an extremely important step in the diagnosis and treatment of the patients with impalpable testes.¹³ In relation to the treatment, the use of gonadotrophin for undescended testes presents a success rate of definitive descent to the scrotum of 21% to 56%, with better results in bilateral cases.^{9,14}

Laparoscopy was first used by Cortesi to diagnose impalpable undescended testes in 1976 and later Lowe reported a large series of diagnostic laparoscopy in cases of impalpable testes.^{15,16} Only after 1990, laparoscopy was used for the treatment of impalpable testes as the urologists gained experience with the method and since then laparoscopic orchiopexy and orchietomy have been increasingly used.^{17,18} In the literature, it was reported that the accuracy rate of laparoscopy in determination of the location of the testes was more than 95%,^{19,20} but we had reached 100% accuracy.

Blind-ending spermatic vessels obviate other investigational techniques and can be considered absence of testes.

Absence of testes is usually due to prenatal or perinatal torsion. When spermatic vessels are through the internal inguinal ring, is obligatory to assess the inguinal canal. These vessels may extend to a testis, which can be small, and the testis may contain remains of seminiferous tubules that must be removed. During an inguinal exploration, Satar et al. observed that two of 14 undescended testes (14.3%) were extremely atrophied. These patients underwent orchietomy. In our series, we had done orchietomy in two cases for the same reason. In order to prevent intra-operative complications, trocars can be placed with the open method described by Hasson,²¹ we had done all our cases by this method. The case in our series with postoperative ureteral obstruction was due to kinking by fibrous band and was managed by open method.

Limitations of the study is that the study period is short, so also is the follow up period. In addition, due to lack of availability of all cases of impalpable testis in one center within a given period, study was not possible to carry out in single center. Data was not collected by another responsible person to avoid any biasness. Failure to attend on exact day of follow up, due to problem of transportation, remote areas from the centers of study, standard follow-up schedule could not be maintained in all cases.

CONCLUSIONS

Laparoscopy is an important alternative in the diagnosis and treatment of impalpable testes because it has the advantages of an acceptable rate of complication, less postoperative pain, better cosmesis and shorter hospital stay.

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