Original Article

Laparoscopy-assisted orchiopexy versus laparoscopic two-stage fowler stephens orchiopexy for nonpalpable testes: Comparative study

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Abstract

Background/Purpose: To assess the outcome of the primary laparoscopy-assisted orchiopexy (LAO) and the laparoscopic two-stage Fowler Stephens orchiopexy (FSO) for managing patients with nonpalpable testis in terms of safety, feasibility and efficacy.

Materials and Methods: This study included 94 patients (110 nonpalpable testes) who underwent laparoscopy at King Khalid University Hospital, Riyadh between July 1998 and June 2012. Patients were evaluated postoperatively to check the location and size of testes and to exclude any other complications.

Results: Mean age at presentation was 24+/−19 months (9-96 months). Orchiectomy was done for 5 atrophic testes. 36 open orchiopexy was done for 29 canalicular testes and 7 peeping testes. 35 LAO were done for 1 canalicular testis, 5 peeping testes, 16 low intraabdominal testes and 13 high intraabdominal testes. 34 FSO were done for 23 high intraabdominal testes, 9 low intraabdominal testes and 2 peeping testes. Median follow up was 12 months (1-84 months) and 6 patients were lost to follow up. The overall success rates for LAO and FSO were 88% and 63%, respectively. Overall testicular atrophy rates were 3% and 30% for LAO and FSO, respectively (OR 0.08 [95% CI, 0.01-0.69], $P = 0.006$). For high intraabdominal testes, the atrophy rates were 3% and 20% for LAO and FSO, respectively (OR 0.14 [95% CI, 0.02-1.21, $P = 0.049$). Testicular displacement rates were 9% and 7% for LAO and FSO, respectively (OR 1.5, 95% CI, 0.24-9.59, $P = 0.514$).

Conclusions: Laparoscopy provides a safe and accurate modality for diagnosing and managing patients with nonpalpable testes. LAO appears to be feasible and effective in management of high intraabdominal testes. Further well-conducted comparative studies are needed.

Key Words: Cryptorchidism, impalpable testis, laparoscopy, nonpalpable testis, orchidopexy, orchiopexy

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INTRODUCTION

Cryptorchidism is one of the most common congenital anomaly affecting male infants, with an incidence of 1-2% at the age of six months.[1] Around 20% of undescended testes cases are reported as nonpalpable.[2] Laparoscopic technique was first used to identify the location of a nonpalpable testis in 1976 by Cortesi *et al.*[3] Laparoscopy remained a diagnostic

modality for many surgeons till the report of spermatic vessel clipping for a first-stage Fowler Stephens procedure by Bloom in 1991.[4] Three years later, Jordan and Winslow had reported the single-stage laparoscopy-assisted orchiopexy.[5]

The aim of this study is to compare the outcome of laparoscopy-assisted orchiopexy with the two-stage Fowler Stephens procedure for nonpalpable tests at our institute.

MATERIALS AND METHODS

We reviewed the medical records of all patients who underwent laparoscopy for nonpalpable testes at King Khalid University Hospital between July 1998 and June 2012. Ethical approval was obtained for the study. Their case notes were retrospectively reviewed for demographic, operative and outcome data. At operation, 106 patients with 124 nonpalpable testes underwent an examination under anesthesia. Twelve patients with 14 testes were palpable under anesthesia and were excluded from the study. Laparoscopy was performed for 110 nonpalpable testes.

The standard laparoscopic procedure was carried out with the patient in Trendelenburg's position; 5 mm umbilical camera port was placed and a 30-degree laparoscope was introduced for exploration. Two additional 3 mm or 5 mm working ports were placed in the right and left lower abdomen for further management if needed. Laparoscopic findings were classified into three groups. The vas deferens and spermatic vessels were either blind ending with a closed deep inguinal ring, entering the deep inguinal ring or ending onto an intraabdominal testis. For blind ending cord structures, the procedure was terminated.[6] Canalicular testes underwent either groin exploration or laparoscopy-assisted orchiopexy.[7] Peeping testes underwent laparoscopy-assisted orchiopexy or two-stage Fowler Stephens procedure or groin exploration and open orchiopexy for normal testes and orchiectomy for the atrophic ones. If an intraabdominal testis was found, it was identified as low or high according to whether or not the testis could be pulled over to reach the contralateral deep inguinal ring and/or its distance from the ipsilateral deep inguinal ring (3 cm). All intraabdominal testes underwent either two-stage Fowler Stephens procedure or laparoscopy-assisted orchiopexy or orchiectomy for the atrophic or vanished testes.[8] The size of the testes was documented in each case and a second-stage Fowler Stephen's procedure was carried out after 6 months where a large peritoneal flap was created around the testis and gubernaculum was divided. Then the testis was pulled down via deep inguinal ring or via a neoring in Hesselbach's triangle.

Postoperatively, patients were reviewed in the surgical outpatient clinic by a consultant or registrar. The position and size of the testes were documented after clinical examination for each visit.

SPSS computer software program (version 20.0 for Windows) was used to compile the statistics. Fisher's Exact test and Student's *t* test were used for categorical and continuous variables, respectively, and *P* values of less than 0.05 were considered statistically significant.

RESULTS

106 patients with 124 nonpalpable testes underwent an examination under anesthesia [Figure 1]. Twelve patients with 14 testes were palpable under anesthesia and were excluded from the study. Laparoscopy was performed for 110 nonpalpable testes in 94 patients aged between 9 months and 8 years (mean 23.62+/−18.68 months).

Five patients (5 testes) underwent orchiectomy for atrophic intraabdominal testes. Twenty eight patients (36 testes) underwent open orchiopexy after initial diagnostic laparoscopic exploration which revealed 29 canalicular testes and 7 peeping testes.

Sixty one patients (69 testes) underwent a therapeutic laparoscopic procedure whether one-stage laparoscopy-assisted orchiopexy or laparoscopic two-stage Fowler Stephens procedure. Of the 61 patients, 31 patients (35 testes) underwent laparoscopy assisted orchiopexy. The remaining 30 patients (34 testes) underwent laparoscopic two stage Fowler Stephens procedure.

Age at laparoscopy, laterality of nonpalpable testis, and other co-morbidities are presented in Table 1.

Table 1: Patient characteristics

	Primary laparoscopy assisted orchiopexy	Laparoscopic two-stage fowler stephens orchiopexy	*P* value
No. of patients	31	30	
No. of nonpalpable testis	35	34	
Mean age +/- SD (median, range)	15.43+/−4.98 (14, 9–25)	32.06 +/−23.42 (24, 9–96)	<0.0001
Median follow-up (range)	12 (2–60)	15 (1–84)	0.235
Laterality of nonpalpable testis (%)			0.618
Right	14 (40)	10 (29.4)	0.356
Left	13 (37.1)	16 (47.1)	0.404
Bilateral	8 (22.9)	8 (23.5)	0.947
Location of nonpalpable testis (%)			0.072
Canalicular	1 (2.9)	0 (0)	0.507
Peeping	5 (14.3)	2 (5.9)	0.226
Low intraabdominal	16 (45.7)	9 (26.5)	0.096
High intraabdominal	13 (37.1)	23 (67.6)	0.011
Associated anomalies (%)			0.019
Syndromic/ chromosomal	3 patients (9.7)	4 patients (13.3)	0.49
Neurological (CP/MR)	0 (0)	5 patients (16.7)	0.011

SD: Standard deviation, CP: Cerebral palsy, MR: Mental retardation

Follow up ranged from 1 month to 7 years (median 1 year). Six patients (6 testes) were lost to follow up (2 out of primary laparoscopy assisted orchiopexy and 4 out of laparoscopic staged FS procedure groups) and were excluded from the study. On follow up, the testes were normal sized and well positioned in the scrotum in 29/33 and 19/30 testes in the primary laparoscopy assisted orchiopexy and the laparoscopic staged Fowler Stephens procedure groups, with an overall success of 88% and 63% respectively. Testicular displacement with proximal migration at superficial inguinal ring occurred in 3 and 2 testes in the primary orchiopexy and staged FS procedure groups, respectively, which were successfully managed by testicular mobilization down to the scrotum. Testicular atrophy was found in 1 and 9 testes in the primary orchiopexy and staged FS procedure groups, respectively [Table 2].

There were no complications in the immediate or postoperative periods from the laparoscopy. No port-site hernias were detected at follow up.

DISCUSSION

Laparoscopy has been established as the gold standard for management of nonpalpable testes.[9,10] The recommendation of the action committee of the American Academy of Pediatrics to perform orchiopexy before the age of one year was to achieve the optimal result in term of preserving spermatogenesis.[11]

Table 2: Outcome of laparoscopic orchiopexy

Outcome	Primary laparoscopy-assisted orchiopexy (%)	Laparoscopic-staged FS procedure (%)	*P* value	OR (95% CI)
Testicular displacement	3/33 (9)	2/30 (6.7)	0.514	1.5 (0.24–9.59)
High intraabdominal testis	2/13 (6)	1/23 (3.3)	0.511	2.0 (0.17–23.14)
Low intraabdominal testis	1/16 (3)	1/9 (3.3)	0.746	0.97 (0.06–16.17)
Testicular atrophy	1/33 (3)	9/30 (30)	0.006	0.08 (0.01–0.69)
High intraabdominal testis	1/13 (3)	6/23 (20)	0.049	0.14 (0.02–1.21)
Low intraabdominal testis	0	3/9 (10)	0.114	2.13 (1.65–2.75)

FS: Fowler stephens procedure

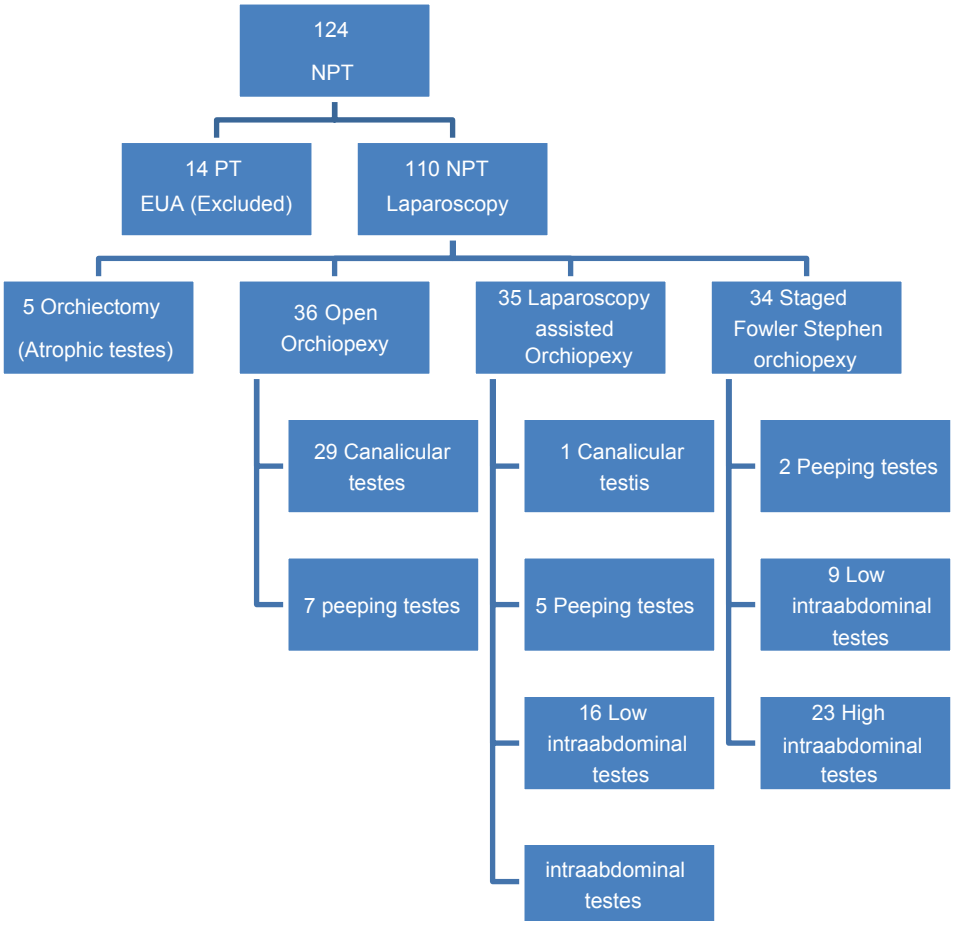

Figure 1: Laparoscopic management of nonpalpable testes NPT: Nonpalpable testis; EUA: Examination under anesthesia

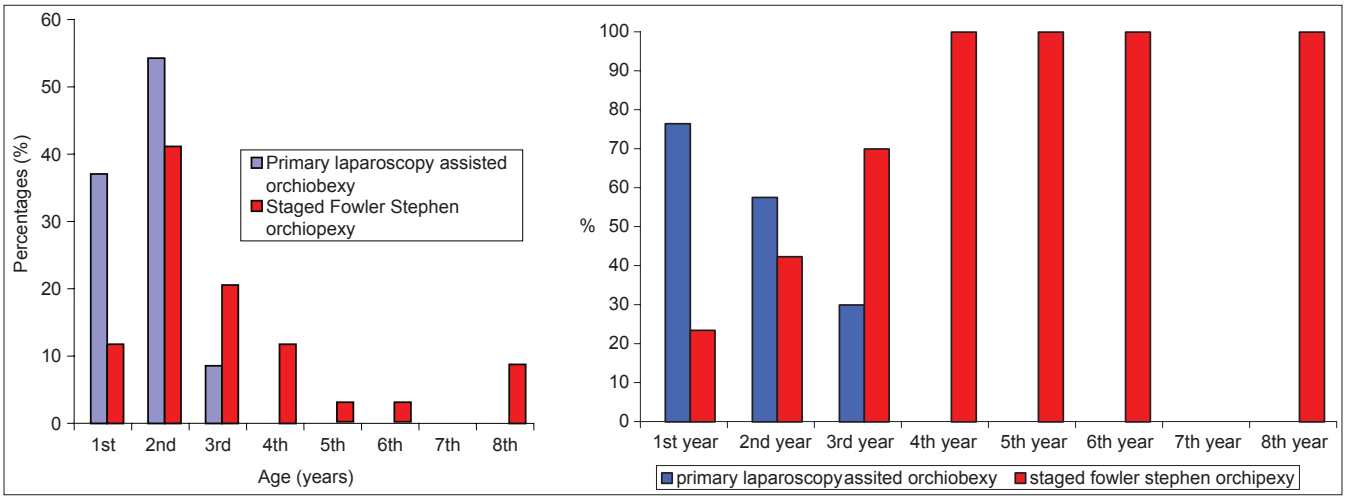

Figure 2: Age distribution for different techniques of boys with nonpalpable testes

Only 16 (26%) of the children in our series were operated before the age of one year [Figure 2]. This is attributed to the late referral in most children and associated co-morbid conditions in a few of the children. Ongoing regional study has been undertaken to address the factors that lead to late referrals and propose solutions for it at national level.

Up to now, the best operative intervention for high intraabdominal testes has not been standardized.

In our series, testicular atrophy rate for high intraabdominal testes is 1/13 and 6/23 testes (7.7% and 26.1%) in the primary orchiopexy and staged FS procedures, respectively. Most of the boys in our series at age of 3 years and above underwent staged FS procedure.

Our success rate for primary laparoscopy-assisted orchiopexy is 88%, which is slightly lower to that in the literature ranging from 97% to 100%.[10,12-14] This could be attributed to 13/35 testes (37.1%) who were at a high intraabdominal position and yet only one testis (3%) from the primary orchiopexy group got atrophied.

In contrast, the overall success rate for laparoscopic-staged FS procedure is 63%, which is slightly lower to that in the literature (ranging from 76% to 93%).[10,13-16] The success in older children more than 2 years of age has not been encouraging and this might have skewed our success rate to a lower value.

We do acknowledge interobserver variability and bias affecting the results, as the patients were reviewed in the clinic by a registrar or the operating consultant.

In our series, the statistical analysis have shown a significant difference in the outcomes for the high intraabdominal testes in favor of the primary laparoscopy assisted orchiopexy (testicular atrophy rate of 3% versus 20%, *P* value 0.049, OR 0.14 (0.02-1.21). We do acknowledge the limitations of our relatively small sample size comparative study, which have included a broad range of ages for orchiopexy.

CONCLUSION

Our preferred method for orchiopexy will be the primary laparoscopy assisted orchiopexy without division of spermatic vessels whenever it is feasible even under tension and with significant scrotal skin indrawing. Further well-conducted comparative studies are needed to confirm our findings especially in management of relatively high intraabdominal testis.

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