

# Outcome of bilateral laparoscopic Fowler-Stephens orchidopexy for bilateral intra-abdominal testes

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**Introduction:** To evaluate the outcome of bilateral laparoscopic Fowler-Stephens orchidopexy (BLFSO) for bilateral intra-abdominal testes.

**Materials and methods:** Prospectively, all patients with bilateral intra-abdominal testes between 2006 and 2010 were included in this study. Patients' data were analyzed for age, procedure whether single stage or staged Fowler-Stephens, intraoperative and postoperative complications, and follow up results.

**Results:** BLFSO was performed in a total of 48 testes in 24 boys with a median age of 31.6 months (range 12

to 150). All procedures were performed on an outpatient basis. Of the 24 boys, six were managed with a single stage BLFSO. The remaining 18 patients were managed with staged Fowler-Stephens orchidopexy. Testicular position after laparoscopy was the mid lower scrotum in 43 testes, the remaining five testes retracted to the inguinal canal in three (required inguinal approach for orchidopexy) and to the neck of scrotum in two. Testicular atrophy was encountered in two testes with a follow up of 18 months postoperatively.

**Conclusions:** Outpatient single stage or staged bilateral laparoscopic Fowler-Stephens orchidopexy were successful in managing boys with bilateral intra-abdominal testes.

**Key Words:** intra-abdominal testis, orchidopexy, Fowler-Stephens, laparoscopy

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## Introduction

Undescended testis is considered as one of the most common pediatric congenital anomalies of the genitourinary tract.<sup>1</sup> It can affect up to 3% of full term male newborns.<sup>2</sup> A non palpable testis accounts for up to 24% of all patients with undescended testes.<sup>3</sup>

For the non-palpable testis, diagnostic laparoscopy provides the most rapid (7-10 minutes) and accurate means for testicular localization. It also enables the surgeon to develop a planned approach to the condition with data collected at laparoscopy.<sup>4,5</sup>

The length of testicular vessels is considered as the main limiting factor for testicular descent. Several procedures have been described for the surgical management of the non-palpable testis utilizing laparoscopic orchidopexy as an extension of diagnostic laparoscopy for the evaluation of the non palpable testis.<sup>6,7</sup> Spermatic vessel ligation (Fowler-Stephens) aims at allow for the maximum distal mobility of

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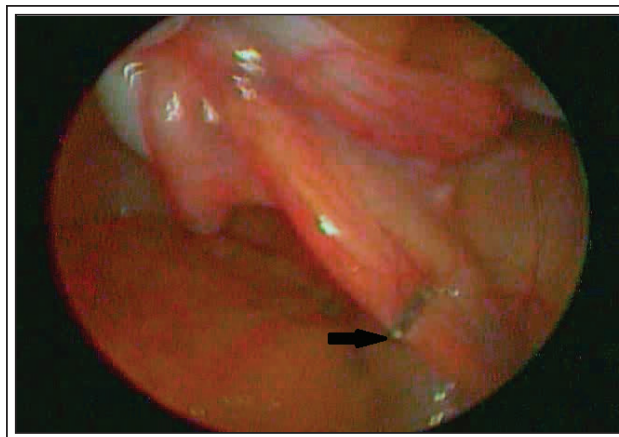
the testis to be placed within the scrotum and can be performed in a single or two stage procedure. Also, Fowler-Stephens orchidopexy can be performed in either open or laparoscopic fashion.<sup>8</sup>

There is limited literature on laparoscopic Fowler-Stephens orchidopexy for bilateral intra-abdominal testes performed simultaneously.<sup>9</sup> Herein, we evaluated the outcome of simultaneous bilateral laparoscopic Fowler-Stephens orchidopexy (BLFSO) for the management of bilateral intra-abdominal testes.

## Materials and methods

A total of 24 boys with bilateral intra-abdominal testes were prospectively included in our study from July 2006 to June 2010 after institutional review board approval. All patients had normal phallus and male karyotype 46, XY. All patients were subjected to diagnostic laparoscopy, Figure 1, after failure to palpate both testes under general anesthesia. Inclusion criteria for our study included all boys with bilateral non-palpable intra-abdominal testes that cannot be manipulated to the contralateral internal ring after diagnostic laparoscopy. Steps of staged BLFSO are as follows:

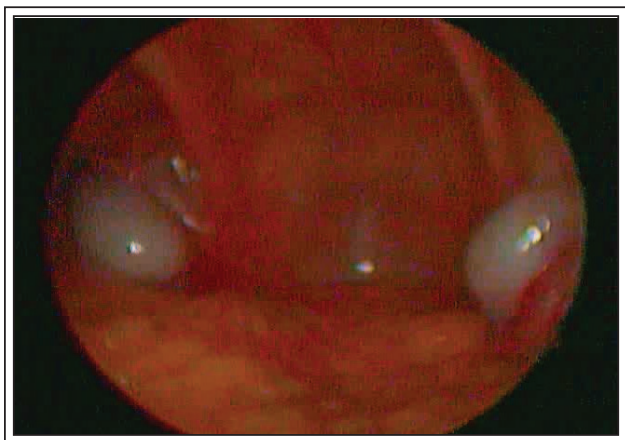
*First stage:* After general endotracheal anesthesia, the bladder was emptied using an 8 Fr catheter and the child was placed in Trendelenburg position. The initial (camera) 5 mm port was placed through the umbilical scar instead of the infra-umbilical crease for better cosmesis. Pneumo-peritoneum was created with CO<sub>2</sub> gas insufflation at a flow rate of 8-10 L/min and the pressure was maintained at 8-10 mmHg. Testicular location was assessed and the decision to proceed to staged BLFSO was based on the distance of the testis from the internal inguinal ring. If the distance was



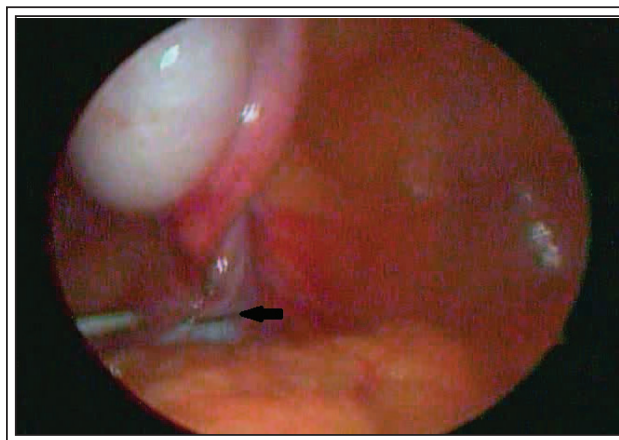
**Figure 2a.** Right testis with arrow pointing to ligating clip.

more than 2.5 cm as measured by the distance between the tip of the grasper jaws or if the testis cannot be brought to the contralateral internal ring, then a staged procedure was performed using ligating clips through a 5 mm or 10 mm port placed just above both testes<sup>10</sup> Figure 2a, 2b.

*Second stage:* BLFSO was performed 6 months after the first stage, Figure 3. The gubernaculum was freed at the level of the internal ring to be used for manipulation instead of grasping the testis. Then the spermatic vessels were divided in between the ligating clips. A peritoneal incision was made wide and lateral to the distal spermatic vessels. A second peritoneal incision was made distal to the vas deferens. Thus, the testis can be mobilized on a wide triangular peritoneal layer while preserving the vasal artery and collaterals. A subdartos pouch was created and the testis was manipulated from the pelvic cavity medial to the obliterated umbilical artery and was secured in the



**Figure 1.** Both testes visualized on diagnostic laparoscopy.



**Figure 2b.** Left testis with arrow pointing to ligating clip.



**Figure 3.** Second stage bilateral laparoscopic Fowler-Stephens orchidopexy with both testes reaching the scrotum.

scrotum in the subdartos pouch. The procedure was repeated for the contralateral testis in the same setting.

Patients' data were analyzed for age, procedure whether single stage or staged Fowler-Stephens, intraoperative and postoperative complications, and follow up results. Testicular viability was assessed by comparing testicular size and texture to the contralateral testis. If testicular atrophy was suspected, scrotal color Doppler ultrasonography was performed.

## Results

BLFSO was performed immediately after presentation in a total of 48 testes in 24 boys with a median age of 31.6 months (range 12 to 150). All procedures were performed on an outpatient basis. Testicular distance from internal inguinal ring ranged from 2.2 cm-3.1 cm (mean 2.7 cm) under laparoscopic assessment. Of the 24 boys with 48 testes, six boys with 12 (25%) testes

**TABLE 2. Testicular atrophy after single stage and staged bilateral laparoscopic Fowler-Stephens orchidopexy (BLFSO)**

	Single stage BLFSO	Staged BLFSO	Total (%)
Testicular atrophy	2	--	2 (4.2%)

were managed with a single stage Fowler-Stephens orchidopexy. Of these 12 testes, five were with long looping vas through the internal inguinal ring. The remaining 36 (75%) testes in 18 boys were managed with staged Fowler-Stephens orchidopexy. The total laparoscopic sessions performed was 42. Operative time including diagnostic laparoscopy ranged from 42 to 89 minutes (median 62 minutes).

Intraoperative complication occurred in one patient from extraperitoneal insufflation on the initial port inserted during the second stage BLFSO with no requirement for termination or conversion to open procedure. No cases reported with bleeding or intestinal injury. Testicular position after laparoscopy was the mid lower scrotum in 43 (89.6%) testes, Figure 2 and Figure 3, the remaining five testes retracted to the inguinal canal in three (6.2%) who required inguinal approach for orchidopexy and to the neck of scrotum in two (4.2%). Success rate for single stage BLFSO was 83.3% and 91.6% for staged BLFSO, Table 1. Testicular atrophy was encountered in two (4.2%) unilateral testes in two different patients who underwent single stage procedure that were located at 2.5 cm from the internal inguinal ring in both testes, Table 2. The remaining 10 testes that were managed by single stage procedure were < 2.5 cm from the internal inguinal ring (mean 2.3 cm). Testicular atrophy was confirmed by scrotal color Doppler ultrasonography. Patients were followed up from 10 to 18 months postoperatively regarding testicular position and viability using color Doppler

**TABLE 1. Testicular location after single stage and staged bilateral laparoscopic Fowler-Stephens orchidopexy (BLFSO)**

		Single stage BLFSO	Staged BLFSO	Total (%)
Postoperative testicular location	Scrotal	10	33	43 (89.6%)
	Inguinal	2	1	3 (6.2%)
	Neck of scrotum	--	2	2 (4.2%)
Total (%)		12 (25%)	36 (75%)	48 (100%)

examination with no difficulty in obtaining testicular blood flow as being performed by an experienced radiologist.

## Discussion

The management of non-palpable intra-abdominal testis is still controversial among pediatric urologists and surgeons. Daher et al treated 23 boys with non-palpable intra-abdominal testes (bilateral in 5) through an inguinal orchidopexy without division of the spermatic vessels with all testes normal in size in the scrotum. They concluded that Fowler-Stephens procedure is not indicated anymore in the management of non-palpable intra-abdominal testes.<sup>11</sup> On the other hand, Dhanani et al reported a success rate of 98% in 55 testes in 47 children managed with staged Fowler-Stephens orchidopexy with one case of testicular atrophy at 1 year follow up.<sup>12</sup>

There are small number of studies with few cases reporting the use of BLFSO for bilateral intra-abdominal testes. Kaye and Palmer performed BLFSO in four out of 42 testes in 21 boys. Testicular atrophy occurred in two out of the 42 testes, including one boy managed with single stage BLFSO and one with non Fowler-Stephens orchidopexy.<sup>9</sup> Our study included the largest series of patients who underwent BLFSO for bilateral non-palpable intra-abdominal testes (48 testes) with testicular atrophy occurring in two (4.2%) testes.

On evaluation of factors predicting success of orchidopexy for intra-abdominal testes, Stec et al retrospectively reviewed 156 consecutive orchidopexies for intra-abdominal testes with one stage Fowler-Stephens orchidopexy in 27 testes and staged Fowler-Stephens orchidopexy in 37 with success in 63% and 67.6%, respectively. They concluded patient selection remains a critical factor on deciding which procedure should be done.<sup>13</sup> Our study was conducted prospectively with proper procedure selection based on testicular distance from the internal inguinal ring. Whenever the testicular distance from the internal ring was less than 2.5 cm, then a single stage Fowler-Stephens orchidopexy was chosen. Our overall success rate was 89.6%. In a systematic review of published studies to determine whether single stage or staged Fowler-Stephens orchidopexy resulted in better testicular viability, Elyas et al concluded that success rate was 85% for staged procedure and 80% for single stage. There was no difference in the success rate between laparoscopic and open techniques in either single stage or staged Fowler-Stephens orchidopexy.<sup>14</sup> Our study had a success rate of 83.3% for single stage BLFSO and 91.7% for staged BLFSO.

Lindgren et al performed laparoscopic Fowler-Stephens orchidopexy in 14 boys with 18 intra-abdominal testes. Of these, five were managed with two stage procedure and 13 with single stage orchidopexy. They reported hospitalization postoperatively for prolonged ileus in two patients.<sup>15</sup> In our study, all procedures were performed on an outpatient basis with no hospital admission or operative complications apart from extraperitoneal insufflation in one patient with no need for termination of procedure or conversion to open surgery.

For staged Fowler-Stephens orchidopexy, Agrawal et al used bipolar diathermy to cauterize the testicular vessels in the first stage with no testicular atrophy on the second stage and on follow up. They concluded that transaction of vessels with bipolar diathermy is a very safe and cost-effective method.<sup>16</sup> Moreover, Abouzeid et al used monopolar diathermy as an alternative to clip ligation in laparoscopic Fowler-Stephens orchidopexy.<sup>17</sup> In our study, we used ligating clips through a 5 mm or 10 mm port.

For assessment of testicular viability, El-Anany et al used technetium-99m on postoperative follow up.<sup>18</sup> In our series, testicular atrophy was suspected on physical examination regarding testicular size and texture in comparison to the contralateral testis. However this can be considered as a limitation of our study since patients with bilateral testicular atrophy would be missed on follow up. To overcome this defect, confirmation of testicular atrophy was achieved by scrotal color Doppler ultrasonography as shown in two testes.

## Conclusions

Outpatient single stage or staged bilateral laparoscopic Fowler-Stephens orchidopexy were successful in managing boys with bilateral intra-abdominal testes. Careful patient selection for either single stage or staged procedure is critical to maintain testicular viability and limiting single stage procedure to testes < 2.5 cm proximal to the internal inguinal ring. □

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