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Laparoscopic orchiopexy without division of the spermatic vessels

Can it be considered the procedure of choice in cases of intraabdominal testis?

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Abstract
Background: Several surgical procedures have been described for the management of nonpalpable testis. Following a vast experience with a complete laparoscopic two-stage Fowler-Stephens procedure, we report our experience with laparoscopic orchiopexy performed without dividing the spermatic vessels.
Methods: Over a 24-month period, 70 boys with nonpalpable testes (72 overall) underwent laparoscopic diagnostic exploration. Twenty patients (27.8%) of this series who showed an intraabdominal testis underwent laparoscopic orchiopexy without sectioning the spermatic vessels. In seven cases, the testis was just proximal to the internal inguinal ring; in 13, it was in the high intraabdominal position. The technique consisted in sectioning the gubernaculum (when present), opening the peritoneum laterally to the spermatic vessels, and mobilizing the testicular vessels and the vas deferens in a retroperitoneal position for 8–10 cm. The testis was then brought down into the scrotum through the internal inguinal ring (11 cases), if this was open, or through a neo-inguinal ring (nine cases) created medially to the epigastric vessels. In every case, we closed the inguinal ring at the end of the operation using one or two detached sutures.
Results: Operating time ranged between 40 and 75 min (median, 55). All the testes were successfully brought down into the scrotum. We had only one (5%) intraoperative complication. In the second patient treated with this procedure, there was an iatrogenic rupture of the spermatic vessels due to excessive traction.
Conclusion: On the basis of our experience, we believe that laparoscopic orchiopexy without division of the spermatic vessels should be the treatment of choice in the management of nonpalpable testes, because it does not affect normal testicular vascularization and is minimally invasive. A blunt dissection and a delicate manipulation of the testis without excessive traction are the best ways to avoid any kind of complication.

Key words: Children — Fowler-Stephens procedure — Laparoscopy — Orchiopexy — Testis

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A number of therapeutic strategies have been employed for the management of nonpalpable testes (Table 1). For diagnosis of the condition, several authors have reported that the laparoscopic diagnosis is safer and more accurate than other diagnostic procedures [2, 3, 4, 9]. There is no general agreement over the operative approach and the technique to use. Some surgeons prefer to perform an open orchidopexy in the 1st year of life, others opt for microvascular transplantation, and still others recommend a two-step Fowler-Stephens procedure using the laparoscopic approach [5, 10, 11, 14]. Herein we report our preliminary experience in laparoscopic orchiopexy without dividing the spermatic vessels.

Patients and methods

Between June 1996 and June 1998, 70 boys aged 2 to 10 years (median, 4.4), with 72 nonpalpable testes underwent laparoscopy at our institutions. In 35 cases (48.6%), we found cord structures entering a deep inguinal ring that was closed; in these cases, the traditional inguinal approach revealed an atrophic intracanalicular testis. In 17 cases (23.6%), we found abdominal blind-ending cord structures; this finding corresponded to an atrophic intrabdominal testis—the so called vanishing testis. In 20 cases (27.8%) in which we found an intraabdominal testis, we performed a laparoscopic orchiopexy without sectioning their spermatic vessels. The laparoscopic findings are summarized in Table 2. In 14 patients, the nonpalpable testis was located on the right side; in six cases, it was on the left. None of these 20 boys was affected by bilateral pathology.

Table 1. Therapeutic strategies for the management of nonpalpable testes

Orchiopexy via an inguinal approach
Two-stage orchiopexy via an inguinal approach
Orchiopexy in the 1st year of life
Microvascular autotransplantation
Fowler-Stephens procedure via an open approach
Two-stage Fowler-Stephens procedure via an open approach
Two-stage Fowler-Stephens procedure with the first step done laparoscopically
Two-stage Fowler-Stephens procedure completely via laparoscopy
Laparoscopic orchiopexy without division of the spermatic vessels

All patients received general anesthesia with orotracheal intubation: A Foley catheter was placed to empty the bladder.

The pneumoperitoneum was created by means of open laparoscopy, positioning a 10-mm blunt-tip trocar at the umbilical level for a 10-mm 30° optic. Two more 5-mm trocars were positioned at the level of the right and left iliac region for insertion of the two operative instruments; the exact position of the trocars depended on the child's age.

In seven cases, the laparoscopic findings showed the testis to be in the internal inguinal ring (peeping testis). In 13 boys, the testis was in the high intraabdominal position; in nine cases, it was near the bladder, with the inguinal ring closed; and in four, it was located in the inguinal region, at 2 cm from the inguinal ring. In these cases, the inner inguinal ring was opened.

The technique consisted in sectioning the gubernaculum (when present), opening the posterior peritoneum laterally to the spermatic vessels, and mobilizing the testicular vessels and the vas deferens in a retroperitoneal position for 8–10 cm. The vessels were preserved by performing a blunt dissection with a peanut or grasping forceps. No type of coagulation was used. At the end of the dissection, the testis appeared free from adhesions to the posterior abdominal wall and pediculated onto the inner spermatic vessels and the vas.

At this point, if the inner inguinal ring was open, a grasping forceps was introduced from inside the abdomen through the internal inguinal ring into the scrotum; thus, after creating a dartos pouch, a 5-mm trocar was introduced from the scrotum into the abdomen using grasping forceps. If the inner inguinal ring was closed, a neo-inguinal ring was created medially to the epigastric vessels and, using the same procedure, a 5-mm trocar was introduced from the scrotum into the abdomen.

At the end of the procedure the testis was brought down into the scrotum through either an already open internal inguinal ring (11 cases) or a newly created inguinal ring (nine cases). We always close the inguinal ring at the end of the operation with one or two detached sutures.

Results

All the testes were successfully brought down into the scrotum. Operating time ranged between 40 and 75 min (median, 55). Pneumoperitoneum pressure was kept between 8 and 12 mm Hg. Median hospital stay was 2 days (ranges 1–3).

There was only one case (5%) of intraoperative complication. In the second patient treated with this procedure, there was an iatrogenic rupture of the spermatic vessels due to excessive traction. What was actually done in this case was a one-step Fowler-Stephens procedure.

Follow-up ranged from 8 to 32 months (median, 17). All patients underwent a simple clinical examination first at 1 week and then at 1 month after the surgery. In addition, between the 6th and 8th postoperative months, every patient had an ultrasonographic exam to control the structure of the testis and a power color Doppler exam using contrast means to verify testis vascularization. Nineteen of 20 testes were well positioned and viable in the scrotum and normally vascularized without signs of fibrosis, as compared with the contralateral ones. The testis in which there was an iatrogenic rupture of the spermatic vessel became atrophic 1 month after surgery. Moreover, additional clinical controls have been scheduled at 1 year from surgery and also each year for the first 5 postoperative years.

Table 2. Laparoscopic findings of 72 nonpalpable testes

35 cases (48.6%): cord structures entering the deep inguinal ring
17 cases (23.6%): abdominal blind-ending cord structures
20 cases (27.8%): intraabdominal testes

Discussion

The management of nonpalpable testis is a controversial issue [13, 19, 20, 21]. The wide variety of therapeutic strategies now used to treat intraabdominal testis indicates that the ideal technique to manage this type of pathology has not yet been found.

Some surgeons prefer to treat intrabdominal testes via open orchiopexy in the 1st year of life [5, 18]. This procedure is simple in the case of peeping testis, but for cases or true intraabdominal testis, a large inguinal incision is necessary. Moreover, when the testis is located near the bladder, it is very difficult to identify it using the inguinal approach. Other surgeons have advocated microvascular autotransplantation of the testis, but the scarcity of reports on this treatment indicate that large experience with this procedure is still wanting [8, 14]. In any case, this procedure requires extensive experience with microsurgical techniques and entails a rather lengthy surgical operation.

In recent years, laparoscopy has gained wide acceptance as a diagnostic procedure to identify the exact anatomy of intraabdominal testis [6, 8, 9, 23]. The Fowler-Stephens two-stage procedure has proven to be the most popular laparoscopic technique used to treat intraabdominal testis [1, 2, 9, 10, 11, 12]. However, it is our opinion—and that of other authors as well—that the large number of reports of operations using this procedure in recent years actually exceeds the number of real indications to perform the technique [11, 18]. This situation is probably the result, in part, of the initial enthusiasm over the use of laparoscopy in children; it may also be due to the extreme simplicity of the first stage of the Fowler-Stephens procedure.

On the basis of our wide experience with the complete two-stage Fowler-Stephens laparoscopic orchiopexy, we believe that this procedure has a success rate of 80%, which is 10% less than the rate we reported in a previous paper [11]. This discrepancy is explained by the longer follow-up of these patients using ultrasonography and power color Doppler with contrast means. These techniques have also helped us to identify, in certain patients, in which the testis was normally placed in the scrotum, the poor degree of vascularization compared to the contralateral testis, and the presence of fibrosis. These results—i.e., well-positioned but not well-vascularized testes—should be classified, in our opinion, as a poor outcome.

For these reasons, and based on other recently published findings, we have not been sectioning the inner spermatic vessels during laparoscopic orchiopexy, and to bring down

the testis into the scrotum via laparoscopy with a transperitoneal mobilization of the vessels and vas, as has also been described by other authors [7, 8, 15, 16, 17, 18]. In particular, a similar procedure has been reported by Youngson and Jones, who used the properitoneal open approach with good results at a mean follow-up period of 11 years [24].

In our opinion, if a surgeon prefers to opt for laparoscopy as the first diagnostic procedure in cases of nonpalpable testis, operative laparoscopy is a logical extension of this approach. The main advantages of laparoscopic orchiopexy without sectioning the spermatic vessels are that the testicular vascularization is unaffected and that it is an entirely minimally invasive approach.

Practically speaking, this intervention is similar to an open orchiopexy, but it has the added advantage that the dissection of the spermatic vessels is much higher and less traumatic for the testis. Moreover, if the inner inguinal ring is closed, it is possible to create laparoscopically a new inguinal ring medially to the epigastric vessels to allow the spermatic vessels and the vas deferens to follow a straight—and thus shorter—route, as was done in nine of our patients [17, 22]. The only disadvantage with this procedure is that the spermatic vessels become very fragile after mobilization; therefore, careful attention should be paid during orchiopexy to avoid vessel rupture, as happened with one patient in our series. Moreover, other authors have reported good results with this type of procedure; however, the number of patients was not very large and the follow-up not as accurate as ours [16, 18, 22]. In fact, we believe that a clinical examination is not sufficient to determine if a testis is viable, whereas ultrasonography and a power color Doppler examination with contrast means are fundamental tools to evaluate the structure and vascularization of a testis and thus assess the results of this surgical procedure. In regard to the extension of the laparoscopic orchiopexy without sectioning the spermatic vessels, we think that this procedure can be used both in cases of true intraabdominal testis and in cases of peeping testis, with the same advantages.

In conclusion, we believe that several of the surgical procedures used to perform orchiopexy can lead to good results in cases of intrabdominal testis. However, in our opinion, laparoscopy is the first and best diagnostic procedure to adopt for the management of children with nonpalpable testes.

For the therapeutic approach, we believe that the inner spermatic vessels should be spared whenever possible to guarantee a good vascularization of the testis, and laparoscopic mobilization of the spermatic vessels seems a good method to achieve this outcome. Our results suggest that, in expert hands, laparoscopic one-step orchiopexy without sectioning of the spermatic vessels is a reliable and feasible technique that should be considered a valid alternative to other surgical procedures in cases of intraabdominal testis.

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