Laparoscopic Fowler Stephens orchidopexy for intra-abdominal testis

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1. ABSTRACT

The authors reported their experience in the laparoscopic orchidopexy for intra-abdominal testis (IAT). Since 2003, 173 laparoscopy for NPT were performed for a total of 181 testicular units. In 75 patients cord structures entering the inguinal ring were observed, and 43 had an inguinal exploration. In 34 patients a blind ending vas and vessels were observed and 8 showed testicular agenesis: these patients were managed by laparoscopy only. In 62 cases an intra-abdominal testes (IAT) were found: 42 had a primary orchidopexy and 22, with high IAT, were managed by a laparoscopic Fowler-Stephens (FS) procedure. In 12 testes we performed a two stage procedure while 10 had one stage. There were no differences in hospitalisation and early surgical complications were not recorded. Follow up ranged from 1 to 5 years. Of 22 patients who underwent FS orchidopexy, testicular atrophy developed in 4; the remaining are in scrotal position, with normal consistency and well perfused at color doppler ultrasound. Laparoscopy is essential in the surgical and therapeutic management of non-palpable testis. FS orchidopexy is reserved to high intra-abdominal testes that have a distance more than 3 cm from the internal inguinal ring. There were no differences between the group managed by one or two step FS. The minimal morbidity with an high success rate prove to be a significant contribution to the intra-abdominal testis management.

2. INTRODUCTION

In the 1966 Cruz first proposed laparoscopy as an extension of cistoscopy. Cortesi in 1976 reported on the use of laparoscopy in the management of non-palpable testis (NPT). Since then this technique has been widely disseminated and is considered the first step in the surgical
management of impalpable testis, with the chance to be operative (1,2). A testis may be non-palpable because of intra-abdominal location, agenesis, intra-uterine demise, or inguinal location with a different grade of displasia or atrophy. 20% of all undescended testes will be non-palpable, and of those 25% will be absent (2,3). Although the use of laparoscopy has been principally diagnostic, there are some therapeutic applications that could improve the surgical approach to the intra-abdominal testis respect to the traditional open approach that begins with an inguinal exploration (1,2,4,5,6,7). Bloom initially reported on using laparoscopy for clipping and ligate spermatic vessels as stage 1 of the Fowler-Stephens procedure (8). Since then, laparoscopy orchidopexy has been widely adopted for surgical management of intra-abdominal testis (IAT), but criteria of its application has been long debated and not cleared. Therefore we report a retrospective review on Fowler–Stephens laparoscopic orchidopexy in the management of IAT.

3. MATERIALS AND METHODS

Since 2003 we performed laparoscopy in 173 patients with NPT. The range of age was 1 to 7 years with a mean of 3.2. The potential clinical settings based on laparoscopic findings include: testicular ectopia, a gonad present in the abdomen, completely absent, intra-abdominal blind ending and spermatic cord structures entering the internal inguinal ring. The laparoscopic procedure is carried out with the patient in the Trendeleburg position; a 5 mm trocar is introduced by an open approach into the umbilicus, and CO2 pneumoperitoneum induced according to the patient’s body weight and age (4). The inguinal ring is first studied with particular attention to its patency, and then the iliac areas and the pelvis are inspected. If intra-abdominal blind ending cord structures are found, no further exploration is performed. When we observe laparoscopically spermatic cord structures entering the internal inguinal ring, the direction, size, and width are carefully considered and compared with the normal side, if present (5). If spermatic cord structures are not found, a laparoscopic abdominal exploration is performed. When we observe laparoscopically spermatic cord structures entering the internal inguinal ring, the direction, size, and width are carefully considered and compared with the normal side, if present (5). If spermatic cord structures are not found, a laparoscopic abdominal exploration is performed. When we observe laparoscopically spermatic cord structures entering the internal inguinal ring, the direction, size, and width are carefully considered and compared with the normal side, if present (5). If spermatic cord structures are not found, a laparoscopic abdominal exploration is performed. When we observe laparoscopically spermatic cord structures entering the internal inguinal ring, the direction, size, and width are carefully considered and compared with the normal side, if present (5). If spermatic cord structures are not found, a laparoscopic abdominal exploration is performed. When we observe laparoscopically spermatic cord structures entering the internal inguinal ring, the direction, size, and width are carefully considered and compared with the normal side, if present (5). If spermatic cord structures are not found, a laparoscopic abdominal exploration is performed.

In the first stage a minimal dissection is performed around the spermatic vessel, as high it’s possible, for double clipping or ligature (Fig.2). In the step two, four-six month later, a wide dissection is performed in the area around the spermatic vessel, in order to preserve a broad peritoneal pedicle necessary for collateral testis blood supply: this is also obtained by minimal use of cautery. When the tests and the peritoneal pedicle are completely free (Fig.3), a transverse incision is performed at the base of the hemiscrotum. A subdartos pouch is created and a grasping forceps is then introduced in the abdominal cavity and the tests brought down into the scrotum through the inguinal canal or the medial reflection of the umbilical ligament (Prentiss manoeuvre) (6-9). In one step FS orchidopexy, the wide peritoneal pedicle is created first from the internal inguinal ring laterally to the umbilical ligament over the vas deferens medially. Once the peritoneal flap is isolated the spermatic vessels are divided and then orchidopexy is performed.

4. RESULTS

173 laparoscopy for NPT were performed for a total of 181 testicular units. In 75 patients cord structures entering the inguinal ring were observed. In 35 patients a blind ending vas and
vessels were observed and 8 showed testicular agenesis: these patients underwent laparoscopy only. In 64 cases an intra-abdominal testes (IAT) were found: 42 had a primary orchidopexy and 22, with high IAT, were managed by a laparoscopic FS procedure. In 12 testes we performed a two stage procedure, while 10 had one stage. There were no differences in hospitalisation and early surgical complications were not recorded in all the patients. Follow up ranged from 1 to 5 years. Of 22 patients who underwent FS orchiopexy, testicular atrophy developed in 4; the remaining are in scrotal position, with normal consistency and well perfused as revealed by color doppler ultrasound. No testicular atrophy was observed in patient treated with primary orchidopexy. Significant differences were not recorded between the FS groups. The laparoscopic surgical procedures are illustrated in the table 1.

5. DISCUSSION

Laparoscopy has gained a large consensus in the management of impalpable testis. Our data confirm that laparoscopy is a valuable tool in diagnosing and treating the great majority of cases of NPT. It provides precise location of the testis, direct surgical approach and avoids unnecessary inguinal or abdominal exploration. (10)

If an intra-abdominal testis is presented, respect to its position and development many different surgical strategies can be decided. If an high intra-abdominal testis is present we recommend a FS procedure. If the testis is located near the internal inguinal ring or it’s peeping a standard orchidopexy can be performed either laparoscopically (11,12). If a very small or displastic testis is present an orchiectomy can be performed. Thereby in these patients a diagnostic laparoscopy can be converted in operative.

If testis and cord structures cannot be identified a diagnosis of testicular agenesy can be made. If laparoscopic findings are consistent with vas deferens and spermatic vessels ending blindly above internal ring no further surgical exploration is necessary (1,2,3,10,13). When a vas deferens and spermatic vessels enter the internal inguinal ring, an inguinal exploration may be indicated to disclose an absent testis, displastic testis or ectopic testis.

Laparoscopy respects the primary goals of the surgical management of intra-abdominal testis that are (6): bring the testis out from the abdominal cavity, preserve the fertility and limit the cost.

The last aspect has been long debated in laparoscopy, but today with the large diffusion of reusable pediatric instruments the average cost of the laparoscopic treatment fell down.

The surgical procedures that we can perform today laparoscopically are: orchiectomy, primary orchidopexy, first stage and second stage Fowler-Stephens orchidopexy.

Laparoscopic orchiectomy is indicated (2,6) when a very small or displastic testis or with a significant ductal system abnormality is found. However in the majority of cases the endocrine function alone justifies attempts to place the intra-abdominal testis in the scrotum.

Jordan, Winslow and Docimo (7,14) reported the possibility of single staged laparoscopic orchidopexy directed primarily to the low intra-abdominal or peeping testis. Some advantages of this approach seem to be the possibility to achieve a large vascular dissection till the spermatic vessel source and to preserve the peritoneal bundle between the vas, the spermatic vessel and the testis. In fact no testicular atrophy was observed and this procedure was associated with a reduced morbidity.

The distinction between the patients with an intra-abdominal testis where a direct orchiopexy can be performed from those who require division of the spermatic vessels is of critical importance (1,2,6). The position of the intra-abdominal testicle is approximatively in the 32%
of the patients inlet or inside the pelvis, in the 28% in the iliac region and in the 40,5% near the inguinal ring (1,2,8,9,15).

So we can expect that 50% of intra-abdominal testes will be placed in the scrotum by a standard orchidopexy. Infact this procedure is reserved in the different studies to 45-54% of the intra-abdominal testes. These data are confirmed by our study. FS procedure was reserved only to high abdominal testes (10% of NPT – 29% of I.A.T.)

It may be appropriated to reserve a laparoscopic FS approach for those testes that have a distance from the internal inguinal ring more than three cm and/or short spermatic vessel. Since in 1959 Fowler and Stephens described the vascular anastomotic configuration called “The long loop vas” between the spermatic artery and the testis, this procedure was applied with a variable clinical success and with a lot of different technical strategies (16). Ransley et al. reported on a staged variation of the Fowler-Stephens procedure (15) that could be accomplished laparoscopically.(8)

To perform the FS procedure we use three ports, the third providing counter-traction to elevate completely the vessels from peritoneum for laparoscopic ligation. Six months later the first stage of the FS orchidopexy, the second stage can be performed laparoscopically (8,9,16,17).

Caldamone and then Jordan reported their experience with the second stage of the FS procedure performed laparoscopically with a 100% of success rate with a follow up of 16-18 months (7,9). The mean time at surgery was 55-135 minutes with a minimal post-operative morbidity. Equal success rate was reported by Franco and Lindgren with one stage FS (18). In this series we report 22 patients, with high IAT, who were managed by a FS procedure. In 12 testes we performed a two stage procedure, while 10 had one stage. There were no differences in hospitalisation and early surgical complications were not recorded. Follow up ranged from 1 to 5 years. Of 22 patients who underwent FS orchiopexy, testicular atrophy developed in 4 (18,18%); the remaining are in scrotal position, with normal consistency and well perfused as revealed by color doppler ultrasound. There were no difference between the patients where one and two step Fowler Stephens procedure were performed. Thereby the similar success rate of the two groups suggest that the one stage FS procedure could be preferable because avoids repeat anaesthesia and the difficult and extensive dissection occasionally required during re-operation. Furthermore to accomplish this surgical technique we believe that a normal and intact vascular testicular anatomy it’s necessary and in the presence of anomalies of the spermatic duct the vascular configuration of the vas, as having anastomotic arcades to the testis, could be not available (17) and therefore surgical auto-transplant advised. Moreover previous surgery represents a risk factor for testicular atrophy. (18)

We can conclude that laparoscopy is the first step in the diagnosis of non-palpable testis. In our experience it has the 100% of diagnostic accuracy. No intra-and post-operative complications occurred, with a minimal morbidity. It’s essential in the therapeutic planning, with the possibility to convert in an operative laparoscopy. Fowler-Stephens procedure seems to be an effective technique in the treatment of high intra-abdominal testis. One of the major advantages of the operative laparoscopic technique is the possibility to obtain a wide vascular dissection till the source of spermatic vessels. Through the laparoscopic magnification it is possible to visualise better the testicular and the spermatic vessel in order to preserve the anastomotic arcade to the testis necessary for the FS procedure. Furthermore the minimal morbidity of this technique with an high success rate prove to be a significant contribution to the surgical treatment of intra-abdominal testis.
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6. REFERENCES


