

# Impalpable Testis and Laparoscopy: When the Gonad Is Not Visualized

A. Zaccara, MD, A. Spagnoli, MD, M. L. Capitanucci, MD, M. Villa, MD,  
M. C. Lucchetti, MD, F. Ferro, MD

## ABSTRACT

The diagnostic accuracy of laparoscopy for impalpable testis is well recognized. However, in some cases, laparoscopic findings may be misleading, and a viable gonad may be missed with significant medico-legal implications. From January 1993 to December 2000, 202 patients with 219 impalpable testes were evaluated. In 95 cases, the gonad was immediately visualized, and in 5, the presence of a testis was documented by inserting the scope into the processus vaginalis. In the 119 remaining cases, no gonad was seen while entering the abdomen with the laparoscope. All patients with documented vas and vessels exiting the inguinal ring were surgically explored. Ten testes were found, 8 ectopic, with significant changes in shape and position, and 2 were canalicular. In the absence of hormone stimulation, no testes were found while exploring patients with cord structures coursing a closed inguinal ring and with contralateral hypertrophy. In 1 patient with absent vas and vessels, the testis was found at the lower renal pole while removing a dysplastic kidney. Despite technical refinements and an increase in clinical practice, a small percentage of viable testes may be missed with laparoscopic findings consistent with absent/vanished inguinal testis. Therefore, inguinal exploration is mandatory in all these cases.

**Key Words:** Testis, Laparoscopic pediatric surgery.

## INTRODUCTION

Approximately 20% of undescended testes are truly impalpable, and laparoscopy is actually regarded as the gold standard for their localization; none of the currently available imaging techniques (ultrasound, computerized tomography, or magnetic resonance imaging) has proven to be 100% reliable in predicting the presence or absence of a testis.<sup>1</sup>

In this respect, not only can laparoscopy be considered the most reliable tool to provide information on the location of the testis but also to confirm its absence. However, although normal and abnormal pelviscopic anatomy has been extensively described,<sup>2</sup> some anatomical variants not corresponding to the actual anatomy have been reported over the years.

Although these cases are seen rather infrequently, they might have significant implications both from a clinical and a legal point of view because they may lead to missing a gonad.

## METHODS

The records of all patients with impalpable testis (IT) who underwent diagnostic laparoscopy from January 1993 to December 2000 were retrospectively reviewed.

Only testes that failed to be appreciated both during clinical examination and while the patient was anesthetized were considered truly impalpable. No diagnostic tests were deemed necessary for localization before the procedure; however, 83 patients had had a sonogram performed upon a pediatrician's request, and 41 had undergone a human chorionic gonadotropin (HCG) test.

Patients with unilateral IT were also clinically evaluated for contralateral hypertrophy (CH). This was defined as a marked (2DS) increase in testicular size as assessed by Prader orchidometer. Testes with a marked increase in consistency according to 2 independent examiners, whether or not coupled with an increase in size, were also considered hypertrophied.

Laparoscopy was performed in all instances with the Hasson technique through the umbilicus with the excep-

Andrology Surgery Unit, Department of Surgery, Bambino Gesù Children's Hospital, Rome, Italy (all authors).

Address reprint requests to: A. Zaccara, MD, Andrology Surgery Unit, Bambino Gesù Children's Hospital, Piazza S. Onofrio 4, 00165, Rome, Italy. Fax: 39 06 6859 2100, E-mail: zaccara@opbg.net

© 2004 by JSLS, *Journal of the Society of Laparoendoscopic Surgeons*. Published by the Society of Laparoendoscopic Surgeons, Inc.

tion of the first 11 cases in which a Veress needle was used to obtain pneumoperitoneum.

All patients with laparoscopic evidence of spermatic vessels and normal contralateral gonads were operated upon. Surgery consisted in all instances of exploration of the inguinal region; whenever present, testes were brought down.

Data were tabulated regarding laparoscopic and surgical findings. Vessels and gonads were defined as normal or hypotrophic, depending on the examiner's personal experience. Atrophy was confirmed in all instances by histologic evaluation.

**RESULTS**

Two hundred and two patients with 219 IT were recorded. The gonad was immediately visualized in 95 cases (43.7%); in the remaining 124 cases, no gonad was seen while entering the abdomen with the laparoscope. Of the 95 cases in which the testis was immediately visualized, 76 were truly abdominal and 19 were "peeping." Laparoscopic findings in the 124 cases in which a testis could not be demonstrated are shown in **Table 1**.

The patient with absent vas and vessels underwent surgical exploration for associated cystic dysplasia of the kidney; a severely dysmorphic gonad, not identified on ultrasound, was found at the lower renal pole and was removed.

Twelve patients had vasa, vessels, or both of these, exiting an open inguinal ring (IR). Insertion of the lens into the processus vaginalis allowed visualization of gonads in 5 patients (4 were normal and 1 was hypotrophic). All gonads were brought down into the scrotum.

In the remaining 7 patients, the gonad was not visualized. On exploration, 6 normal testes in an ectopic position

and 1 remnant were found. Of the ectopic testes, 3 were in a preperitoneal position, above the anterior iliac spine, and 3 had an interstitial location (**Figures 1 and 2**). In the 84 cases of vasa, vessels, or both exiting the IR, laparoscopy revealed a closed processus vaginalis.

Spermatic cord vessels were deemed normal in 21 cases. On exploration, testicular atrophy was found in 18 patients, normal testes with preperitoneal ectopia in 2, and a canalicular gonad in one.

Vessels were reported small in the remaining 63 cases. In 30, a normal contralateral gonad was palpated in the scrotum, and in the other 33, CH was found. The cases with normal contralateral gonad were all explored. Atrophy was found in 29 cases and a canalicular testis in one, which was brought down into the scrotum. No action other than laparoscopy was undertaken in cases with CH. One testis was reported to be subsequently palpated by a primary care provider.

Regarding blind ending vas and vessels, in 7 patients only vas was present, and both structures were found in the remaining 20. Seven patients were explored when positioning a testicular implant, and a scrotal nubbin was found and excised at the same time. The remaining 20 patients are currently awaiting prosthesis placement.

**DISCUSSION**

Although the laparoscopic approach to IT is still controversial, near general agreement exists that its diagnostic accuracy is far superior to that of any other modality both in localizing the testis and in confirming its absence.

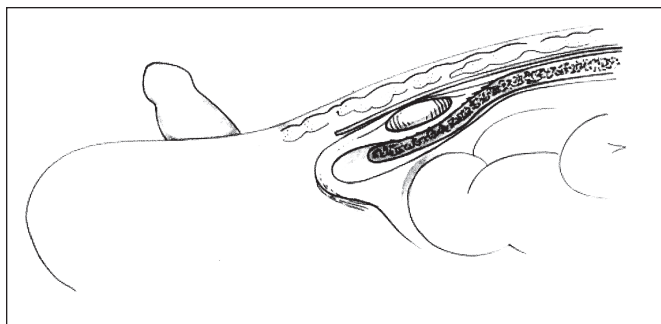
Using this procedure, we were able to visualize 95 gonads immediately and a further 5 by inserting the lens into a patent processus vaginalis. Of interest, in 3 of these cases, only the vas was visualized exiting the IR. Although these findings can be easily explained by the different embryological origins of cord structures, they caution against laparoscopic closure of processus vaginalis, whether or not amenable to lens insertion.

Regarding the cases in which the testis was seen neither immediately nor after inspection of the processus vaginalis, surgical exploration revealed 11 additional testes.

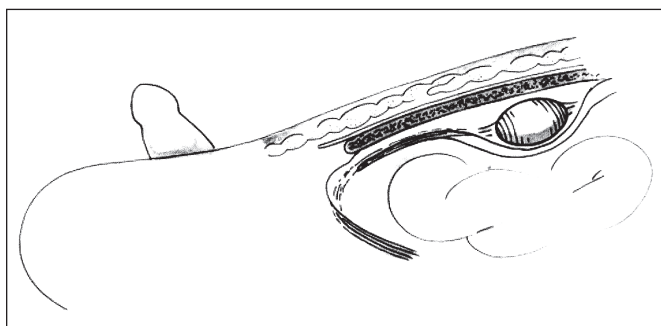
As previously mentioned, in 1 case, the laparoscopic appearance was that of absent vas and vessels; however, the association with multicystic dysplastic kidney allowed us to surgically explore the retroperitoneal

Vas and/or vessels exiting internal inguinal ring	96
Blind ending vas/vessels	27
Absent vas and vessels	1*

\*Multicystic Kidney associated.



**Figure 1.** Testis in interstitial ectopia.



**Figure 2.** Testis in preperitoneal ectopia.

region where the gonad was found at the lower renal pole and removed.

The management of such patients is still a matter of contention and literature reports are scant. Failure to locate vas and vessels laparoscopically has been reported to be associated with an intraabdominal testis in 2 of 3 cases,<sup>3</sup> while in another report<sup>4</sup> the patient suffered from Prader-Willi syndrome where excess adiposity in the abdomen made spermatic vessels nondemonstrable on laparoscopy.

Our policy of surgically exploring all cases without clear evidence of a testis on laparoscopy led us to trace 10 gonads, 6 in which vas and vessels were exiting an open IR and 4 in which the IR was closed. However, in a tertiary referral center, evaluation of CH can be a useful adjunct to the diagnosis of inguinal testicular atrophy; in our experience, this was particularly helpful in cases with hypotrophic vessels and closed IR. Evaluation by experienced pediatric urologists as well as no previous hormone treatment are obvious prerequisites.

The problem of whether or not surgically exploring the

inguinal region in IT cases with cord structures in such anatomical situations has also received much attention in the literature. Some have questioned such a necessity especially in thin children;<sup>5</sup> other authors<sup>6</sup> did not find any testicular tissue in spermatic cord structures removed during exploration. On the contrary, Plotzker et al<sup>7</sup> advocate surgical exploration on the grounds of microscopic islands of viable tubular epithelium within the small nubbins of tissue residing in the inguinal canal.

In our series, of the 10 testes discovered with vas and vessels exiting the IR, only 2 were inguinal while the remaining 8 were in a very unusual ectopic position. Interestingly enough, in 4 cases, we found a preperitoneal ectopia, with the testis residing above the anterior iliac spine, a region which is infrequently palpated while evaluating a patient for IT. In the other 4 cases, the testes were located in an interstitial position, which had rendered them rather flattened, thus easily missed on palpation also in thin boys. Regarding the 2 other inguinal testes that would have been missed without exploration, our data are consistent with that of other authors' series,<sup>8,9</sup> of somewhere less than 5% of missed intraabdominal testes.

In addition, we believe that the finding of inguinal, blind ending vas and vessels is not, per se, an indication for surgery because risk of future malignancy is negligible and no cases have been reported so far. More importantly, in our country, this problem is easily overcome by the patients' request to have a testicular implant positioned in early adolescence, when inguinal exploration can be carried out with the same anesthetics.

Concerning blind ending vas and vessels, we found 7 cases of vas only and 20 cases with both structures. A scrotal nubbin was present in the scrotum in the 7 patients in whom a testicular implant was positioned. These data confirm the view of Belman<sup>10</sup> who considers this situation a scrotal event, with perinatal torsion occurring after descent but before fixation of tunica vaginalis.

**CONCLUSION**

Eleven testes would have been missed in our series with laparoscopic findings consistent with absent/vanished testis. Therefore, we fully agree with Ng<sup>11</sup> who considers vasa and vessels blind ending above the IR as the only finding that would benefit from laparoscopy only. All other anatomical situations would ultimately require a

surgical exploration in order to avoid significant clinical and legal complications at long-term follow-up.

Diagnostic laparoscopy is to be regarded as an indispensable preoperative maneuver, provided, "it is carried out by well-trained laparoscopists with extensive knowledge of cryptorchidism and orchiopexy."<sup>12</sup> Whether or not open surgical procedures may in the future be completely replaced by laparoscopic orchiopexy<sup>13</sup> is still to be determined.

### References:

1. Hrebinko RL, Bellinger MF. The limited role of imaging techniques in managing children with undescended testis. *J Urol*. 1993;150(2 pt 1):458-460.
2. Bloom DA, Guiney EJ, Ritchey ML. Normal and abnormal pelviscopic anatomy at the internal inguinal ring in boys and the vasal triangle. *Urology*. 1994;44:905-908.
3. Elder JS. Laparoscopy for the non palpable testis. *Semin Pediatr Surg*. 1993;2:168-173.
4. Arnbjornsson E, Mikaelsson C, Lindhagen T, Ivarsson SA. Laparoscopy for nonpalpable testis in childhood. Is inguinal exploration necessary when vas and vessels are not seen? *Eur J Pediatr Surg*. 1996;6:7-9.
5. Guiney EJ, Corbally M, Malone PS. Laparoscopy and management of impalpable testis. *Br J Urol*. 1989;63:313-315.
6. Castilho LN. Laparoscopy for the non palpable testis: how to interpret the endoscopic findings. *J Urol*. 1990;144:1215-1218.
7. Plotzker ED, Gil-Rushton H, Belman AB, Skoog SJ. Laparoscopy for non palpable testis in childhood: is inguinal exploration also necessary when vas and vessels exit the inguinal ring? *J Urol*. 1992;148:635-638.
8. Gill SI, Ross JH, Sung GT, Kay R. Needlescopic surgery for cryptorchidism: the initial series. *J Pediatr Surg*. 2000;35:1426-1430.
9. Peters CA. Laparoscopy in pediatric urology. *Urology*. 1993; 41(suppl):33-37.
10. Belman AB, Rushton HG. Is the vanished testis always a scrotal event? *BJU International*. 2001;87:480-483.
11. Ng WT. Undescended testis and laparoscopy. Presented at: 8th Overseas Meeting of the Royal College of Surgeons of Edinburgh; October 27-30, 1996; Hong Kong.
12. Perovic S, Janic N. Laparoscopy in the diagnosis of non palpable testes. *Br J Urol*. 1994;73:310-313.
13. Argos Rodriguez MD, Unda Freire A, Ruiz Orpez A, Garcia Lorenzo C. Diagnostic and therapeutic laparoscopy for nonpalpable testis [Epub ahead of print]. *Surg Endosc*. June 25, 2003.

---

This paper was presented at the 11th International Congress and Endo Expo, SLS Annual Meeting, September 11-14, 2002, New Orleans, Louisiana, USA.