The Value of Laparoscopy in the Localization of the Impalpable Testis

Saud A., Taha, MD, Facharzt; Abdul-Aziz Al-Quorain, MD, Facharzt; Baher A. Kamal, MD, FRCS; Raymond M. Anikwe, MD, FRCS

Objective: To determine the value of laparoscopic findings in localizing the impalpable testis, and more particularly, which laparoscopic findings render exploration and therapeutic operation unnecessary.

Design: A prospective laparoscopic study of patients with impalpable testes.

Setting: King Fahd Hospital of the University, Al-Khobar, Saudi Arabia.

Subjects: Over a period of 5 years, 28 consecutive patients with 38 non-palpable testes were introduced into the study.

Results: The technical success rate of laparoscopy was 92.8%. A higher incidence of impalpable testis was observed on the right side than on the left, a marked departure from earlier reports in the literature. The testis was present in 73.7% of cases and absent in 26.3%. All but one testis was intra-abdominal. There was complete correlation between findings at laparoscopy and exploration.

Conclusions: Laparoscopy is a safe and valuable procedure in localizing the impalpable testis. Laparoscopic finding of blind-ending testicular vessels in isolation or in association with a blind-ending vas deferens (vanishing testis) was the only factor, in our experience, which reflects the absence of a testis and, therefore, should render exploration and therapeutic operation unnecessary.

Keywords: Laparoscopy. Impalpable testis. Non-palpable testis. Vanishing testis.


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Abdul-Aziz Al-Quorain, MD

King Fahd Hospital of the University

Al-Khobar, Saudi Arabia

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About 0.7% of the male population above the age of 1 year have cryptorchidism,1 20% of these undescended testes being impalpable.2 The impalpable testis has a higher risk of epididymal malformation, infertility, malignant transformation and unsuccessful treatment in relation to the palpable testis.3 It presents the surgeon with the dual problems of localization (or demonstration of absence) and management.

There is no uniformity in the literature about the definition of the impalpable testis. Most investigators adopt the criterion of unsuccessful palpation of the testis while the patient is awake.4-6 A few authors, however, add the
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criterion of unsuccessful confirmatory palpation under general anaesthesia.7-9

A prior knowledge of the precise location of the impalpable testis enables the surgeon to determine the most appropriate access and therapeutic operation.2 Demonstration of testicular absence is of utmost importance since it obviates the need for operation. A variety of localization techniques for the non-palpable testis have been in use pre-operatively in order to avoid unnecessary extensive inguinal surgical exploration and laparotomy. These include vascular techniques such as spermatic arteriography,10 and gonadal venography;11 imaging techniques such as ultrasonography,12 computed tomography,13 magnetic resonance imaging:14 and visualization techniques such as laparoscopy.15 Vascular and imaging techniques currently in use are not consistently reliable and are often difficult to perform particularly in the young child. Laparoscopy, on the other hand, has been reported to be a safe and valuable technique for the preoperative localization of the non-palpable testis.4-9,15 Considerable controversy still exists, however, as to which laparoscopic findings reflect the absence of the testis and, therefore, render exploration and therapeutic operation unnecessary.7-9 We present our experiences with respect to the value of laparoscopic findings in the localization of the impalpable testis and in determining the patients with absent testes who, therefore, require no exploration and therapeutic operation.

Materials and Methods

A consecutive series of 28 patients, 2 to 37 years old (median age 20 years), with 38 impalpable testes were studied prospectively over a 5-year period from August 1987 to July 1992. The criterion for non-palpable testis used is the unsuccessful palpation of the testis while the patient is awake and while under general anaesthesia prior to laparoscopy.

None of the patients had a previous inguinal exploration or laparotomy. Laparoscopy was carried out should the testis still remain impalpable under general anaesthesia. The bladder was emptied, when found distended. Pneumoperitoneum was produced by means of carbon dioxide at a pressure of less than 20 mmHg. The range of increase in intraperitoneal pressure in the earlier 2 years of this study was 12–18 mmHg, and 12–15 mmHg in the later 3 years. The peritoneal cavity was inspected with the patient in the Trendelenburg position.

Laparoscopy is considered to be technically successful when there is a clear visualization of the peritoneal cavity. Since the procedure entails a successful creation of pneumoperitoneum, the introduction of the laparoscope into the peritoneal cavity and its clear visualization, failure in achieving any of these steps is regarded as a technical failure.9

Following laparoscopy, and still under the same general anaesthesia, the appropriate confirmatory exploration is carried out, the access being determined by laparoscopic findings.

Results

Eighteen patients (64.3%) had unilateral non-palpable testes consisting of seven on the left and 11 on the right side, a left/right ratio of 0.64:1. The remaining 10 patients (35.7%) had bilateral non-palpable testes. Laparoscopy was technically successful in 26 of 28 patients (92.8%) with 34 testes (Table 1). It was technically unsuccessful in one patient on account of instillation of CO2 into the lumen of the bowel early in our study, and in the other patient on account of intestinal adhesions. There was complete correlation between findings at laparoscopy and exploration (Table 2), the differences in the frequency of laparoscopic and surgical findings in Tables 1 and 2 being as a result of the effects of technically unsuccessful laparoscopy in two patients with bilateral impalpable testes. Exploration in these patients demonstrated two abdominal testes located between the internal inguinal ring and the external iliac vessels and two instances of combined absence of testicular vessels, vas deferens and testis.

All the intra-abdominal testes identified at laparoscopy were between the internal inguinal ring and external iliac vessels. Of the three laparoscopic visualization of the testicular vessels and vas deferens entering the internal ring, exploration showed a canalicular testis in one and blind-ending structures in

| Table 1 |
| Laparoscopic findings |
| Site | No. (%) |
| Intra-abdominal testes | 25 (73.5) |
| low | 21 |
| high | 4 |
| Vanishing abdominal testis | 1 (2.9) |
| No testicular vessels or vas | 5 (14.7) |
| Testicular vessels and vas entering ring | 3 (8.8) |
| Total | 34 (100) |

| Table 2 |
| Findings on exploration |
| Location | No. (%) |
| Testis present | 28 (73.7) |
| abdominal | 27 |
| inguinal canal | 1 |
| Testis absent | 10 (26.3) |
| Vanishing abdominal testis | 1 |
| No testicular vessels or vas | 7 |
| Vanishing canalicular testis | 2 |
| Total | 38 (100) |
two. A comparison of testicular vessels in patients with unilateral non-palpable testis showed that the ipsilateral vessels were usually smaller than the vessels of the contralateral normal side particularly in the older age groups. However, very small or hypoplastic vessels were visualized both in patients with localized testes and in those with absent testes. The only finding of a patent processus vaginalis was in the patient with a testis in the inguinal canal. In ten cases of absent testes (Table 2), there were four contralateral testes in the scrotum, two in the inguinal canal, two in the abdomen and no testis in one case, anorchia being confirmed by laboratory tests.

Discussion

Laparoscopy for the non-palpable testis was first reported by Cortesi and co-workers in an 18-year old patient. Various authors have since used this technique in patients of all ages. The reported technical success rate of laparoscopy is 88 to 100%, that of the present study being 92.8%. Our experiences agree with those of numerous other investigators that laparoscopy is safe and makes a very important contribution to the localization of the impalpable testis.

Our observation that a technically successful laparoscopy leads to the localization of all impalpable testes is in accord with the reports of many others, the generally reported success rate being 84.5–100% (Table 3). However, we found a higher number of testes on the right side than on the left, a marked departure from most previous reports, a left/right ratio of 2.4:1 being reported by Castilho. Since our previous work on a much larger series of cryptorchid testes showed the incidence on both sides to be almost equal, we suggest that geographical variation may have a role to play in this.

Most of the authors who based the diagnosis of non-palpable testis solely on physical examination while the patient was awake, reported a relatively high incidence of canalicular testis; those investigators who added the requirement of palpation under general anaesthesia, as in the present study, reported a lower incidence (Table 3). It does appear, therefore, that palpation under general anaesthesia is valuable in locating the testes in the inguinal canal. Weiss and Seashore, following laparoscopy on 32 patients with 33 non-palpable testes, attributed their observed high incidence of 63.6% of testicular absence to the prospective nature of their study and the strict criteria used to classify a testis as impalpable. The present study and that of Castilho, also of a prospective nature, and with very strict criteria for an impalpable testis, including palpation for the testis under general anaesthesia, had a much lower such incidence of 23.5% and 40%, respectively (Table 3). It does appear, therefore, that some other factors may be contributory to the high incidence of absent testis obtained by Weiss and Seashore.

The presence of a contralateral scrotal testis in 40% of cases of testicular absence in this study is at variance with that of 100% reported by Weiss and Seashore.

Our observation that all intra-abdominal testes identified at laparoscopy and at exploration were located between the internal inguinal ring and the external iliac vessels is in accord with the reports of most investigators who found all the testes in the pelvic cavity.

Considerable controversy still exists, however, as to which laparoscopic findings are indicative of testicular absence thereby obviating the need for exploration and therapeutic operation. Our findings are in accord with the general view that blind-ending testicular vessels and vas deferens, termed vanishing testis by Abeyaratne and associates, is indicative of an absent testis and, therefore, requires no exploration. Our experiences are also similar to those of most authors that a blind-ending testicular vessel in the

<table>
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<th>Ref. nos various studies</th>
<th>Pro. study</th>
<th>PGA</th>
<th>NPT</th>
<th>Abd.</th>
<th>Canal</th>
<th>Absent</th>
<th>Lap success rate</th>
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<td>34</td>
<td>73.5</td>
<td>2.9</td>
<td>23.5</td>
<td>100</td>
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</tbody>
</table>

Pro. = Prospective.
PGA = Palpation under general anaesthesia.
NPT = Non-palpable testis.
Lap = Laparoscopic.
abdomen signifies an absent testis while testicular vessels entering the internal ring require inguinal exploration. Recently, some investigators have given great importance to very small testicular vessels which they refer to as hypoplastic vessels. They hold the view that laparoscopic visualization of hypoplastic testicular vessels, accompanied or not by a vas deferens, establishes the diagnosis of vanishing testis and avoids surgical exploration. We have, in the present series, observed some very small testicular vessels both in patients with localized testes and those with absent testes. In our view, using this criterion to preclude inguinal exploration in patients with a laparoscopic finding of gonadal vessels and vas entering the internal ring may be a source of error, particularly when passed on to the generality of urologists and paediatric surgeons. It is reassuring, however, that Guiney and associates who first proposed the criterion of hypoplastic vessels made the following qualifying remarks: The above comments represent the more difficult interpretative aspect of laparoscopy.

An isolated vas deferens ending blindly in the abdomen or entering the internal ring is not interpreted as indicative of testicular absence by most investigators. A few authors, however, hold a contrary view and consider surgical exploration unnecessary. These same authors also believe that the combined non-visualization of the testicular vessels, vas deferens and testis precludes a confirmatory exploration. Most of the authors, however, subscribe to the view that exploration should be undertaken whenever testicular vessels are not visualized since, in the literature, it does appear that, when present, a testis is found at the same location as the termination of the ipsilateral testicular vessels. Although exploration in the present study did not lead to the identification of a testis in any of such patients, the need to visualize gonadal vessels before voiding exploration appears justifiable. We consider very appropriate the advice of Weiss and Seashore that when in doubt, exploration is required and that a considerable experience with laparoscopy is necessary before attempting a change in accepted therapeutic protocols.

In conclusion, laparoscopy is a safe and valuable procedure in localizing the impalpable testis. Visualization of blind-ending testicular vessels either in isolation or in association with a blind-ending vas deferens, reflects the absence of a testis on the ipsilateral side and, therefore, renders exploration and therapeutic operation unnecessary. Laparoscopy is also a valuable aid to the surgeon in determining the best access for therapeutic operation.

References