ORIGINAL ARTICLE

Is Laparoscopy for Non-palpable Testes a Well-known Entity?

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ABSTRACT

Objective: *Laparoscopy has been accepted as the best diagnostic tool and suggested as the treatment of choice for non-palpable testes cases. However, its use in unilateral non-palpable testis cases has been previously debated.*

Methods: *The clinical records of the non-palpable testis cases that were managed with laparoscopy between January 2011 and December 2013 were retrospectively reviewed.*

Results: *Laparoscopy was performed in 29 non-palpable testis cases. The cases were divided into three groups according to the laparoscopic findings. Orchiopexy was performed in cases with viable testes, and the internal inguinal ring was left open in these cases.*

Conclusion: *Laparoscopy provided definitive diagnosis and was helpful in the treatment of unilateral, non-palpable testis cases. Leaving the internal inguinal ring open did not result in subsequent indirect inguinal hernia in our cases.*

Keywords: Inguinal ring, laparoscopy, orchiopexy, testis.

INTRODUCTION

The reported overall incidence of undescended testes is 1% in newborn babies, and 20% of these testes are non-palpable (1). Intrauterine torsion, intra-abdominal location, obesity and testicular agenesis are the main causes of non-palpable testes. Orchiopexy has been long accepted and is widely practiced for the prevention of reported infertility and possible malignancies in non-palpable testis cases when a viable testis is found during exploration (1, 2).

Laparoscopy has been accepted as the definitive diagnostic tool and has been suggested to be the treatment of choice for non-palpable testes cases or cases in which previous inguinal explorations for non-palpable testes have failed (3–5). However, its usage in unilateral cases (6), the mobilization of the testis down to the scrotum via the inguinal channel or the performance of the Prentis manoeuvre (7, 8), leaving the internal inguinal ring open during orchiopexy (9), and completing the operation solely with laparoscopy or with the help of inguinal incision remain subjects of debate (8). Herein, we report and discuss our initial results from uni- and bilateral non-palpable testes cases that were managed with laparoscopy.

MATERIAL AND METHODS

A retrospective analysis was conducted for all laparoscopic explorations that were performed for cases with non-palpable testes between January 2011 and December 2013 at our institution. The collected and evaluated data included patient age, physical examination results, laparoscopy results, pathological findings in excised materials, and post-operative follow-up results. Informed consent was obtained for all cases in terms of the operation type, possible complications, and possible risk of testicular atrophy and/or re-operation.

RESULTS

A total of 29 cases with non-palpable testes were admitted to the Department of Pediatric Surgery, Zeynep Kamil Maternity and Children's Training and Research Hospital, İstanbul, Turkey, over a 3-year period. The mean age of the cases was 34.2 ± 37.44 months (7–145 months). The non-palpable testes were on the right in 14

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(48.3%), the left in 11 (37.9%) and bilateral in 4 (13.8%) cases.

Physical examination revealed scrotal hypoplasia in 20 (69%) of the 29 cases. Eight (40%) of the 20 cases had 10 viable testicular units on laparoscopic exploration. In four (44.4%) of the nine remaining cases without scrotal atrophy or hypoplasia, we found five viable testicular units upon laparoscopic exploration. The conditions associated with the cases were as follows: Prader–Willi syndrome (1), autism (1), partial adrenal insufficiency with microphallus (1), and two cases with concomitant left undescended testis that underwent operations during laparoscopic exploration.

The cases were divided into three groups according to the laparoscopic findings:

(1) Group A: Both the vas deferens and testicular vessels were found to be blind-ending in four unilateral cases and no further laparoscopic or inguinal explorations were performed in this group (Fig. 1).

(2) Group B: The testicular vessels and/or vas deferens were found to enter the inguinal channel through closed internal inguinal rings in 13 unilateral cases. Laparoscopy was stopped, and limited inguinal explorations were performed. No viable testicular tissue was found in these cases, and all remnants were excised and sent for pathology. Pathological examinations of the specimens revealed fibrovascular tissue in one case; vas deferens structures with fatty tissue, connective tissue, vascular structures, or focal calcifications in four cases; microcalcifications and haemosiderotic macrophages in five cases; and Sertoli cell only syndrome in one case. The pathology reports of two cases could not be found and evaluated.

(3) Group C: 15 viable testicular units were found in 12 cases. Seven viable testes in four bilateral and six viable testes in six unilateral non-palpable testes cases located within 2.5 cm diameter from the internal inguinal ring (Fig. 2), one testis near the urinary bladder, and one testis close to the lower pole of the right kidney were found during laparoscopy. For the latter case, a two-stage Stephen–Fowler operation was planned, and the first stage was performed. In two cases, orchiopexy was completed through the scrotum by inserting a 4th scrotal trocar. In 10 patients and 13 testes, the mobilization of the testes down to the scrotum was completed via the inguinal channel through an inguinal incision after laparoscopically freeing the testes from the peritoneum.

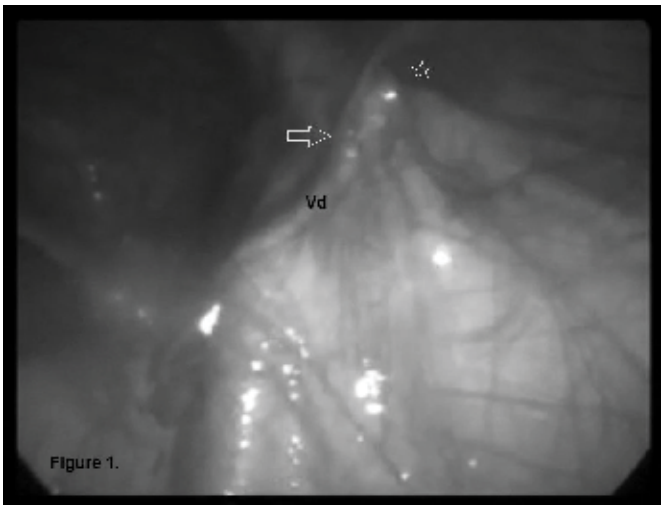

Fig. 1: Blind-ended vas deferens. Note that there are no viable testicular vessels, and the internal inguinal ring (IIR) is closed. (Vd: vas deferens. The white arrow indicates the blind end of the Vd, and the white star indicates the location of the closed IIR).

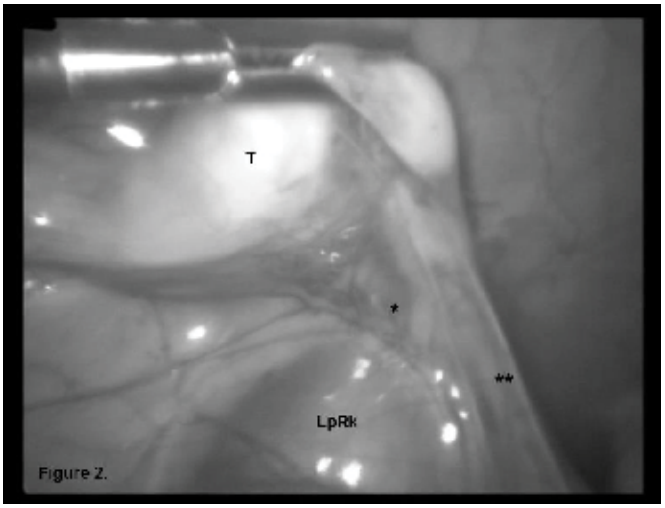

Fig. 2: Right intra-abdominal testis located near the lower pole of the right kidney. Note the testicular vessels coming from the cranial direction (T: testis, LpRk: lower pole of the right kidney, *: testicular veins, **: testicular artery).

The mean ages of the groups were as follows: group A, 33.5 ± 41.7 months; group B, 24.66 ± 33.18 months; and group C, 43.15 ± 40.6 months. In group A, one (25%) case was above 24 months of age. In group B, with the exception of a 129-month-old case, 11 (91.66%) of the 12 cases were equal or younger than 24 months of age (range 9–24 months). In group C, 4 (30.8%) of the 13 cases were below the age of 24 months (7–16 months), and 9 cases (69.2%) were older than 24 months (range 26–145 months). Table summarizes the surgical results for the cases below and above 24 months of age.

No laparoscopy-related complications were observed in the reported cases. The mean post-operative time of

feeding was 5.06 ± 5.44 hours (2–24 hours). Nineteen cases (65.5%) were fed at the post-operative 3rd hour and discharged home on the day of the operation. The mean post-operative follow-up period was 23.37 ± 10.31 months. During the follow-up, one testis was found to be located in the high scrotum and atrophied, six testicles were located in the high scrotum without atrophy (including one bilateral case with autism and one bilateral case with Prader–Willi syndrome) and seven testicles were in the scrotal position. The two-staged Stephen–Fowler case was found to be atrophied during the second operation. In one case that underwent surgery for a right non-palpable testis, left testicular torsion occurred 7 months after the first operation. This testis was salvaged by emergency scrotal exploration followed by detorsion and fixation.

Table: Final results after laparoscopic and inguinal explorations for the non-palpable testis cases according to age group

	Age of the case	
	Below 24 months n = 18 (%)	**Above 24 months n = 11 (%)**
Testis present	11 (61.1)	1 (9)
Nubbin testis	4 (22.2)	9 (81.8)
Testicular agenesis	3 (16.7)	1 (9)

DISCUSSION

Previously, ultrasonography (US) was the most commonly utilized diagnostic tool for non-palpable testes cases among the many other available tools, including computerized tomography, magnetic resonance imaging and scintigraphy (10). However, it is now well known that US has low value for the diagnosis and/or location of non-palpable testes (11). Furthermore, it has been stated that US is unnecessary, misleading and can even cause legal problems (12). In our first 12 cases, we performed US investigations, and no testicular tissue was identified. However, laparoscopic exploration revealed three testicular units in three (25%) cases. Thus, in such cases, we no longer perform US examinations as we previously have.

Our policy for non-palpable testicle cases is to perform a second and rigorous physical examination under general anaesthesia before we proceed with laparoscopy (13). In these cases, when the testis can be palpated under general anaesthesia, we do not perform laparoscopy and proceed with inguinal exploration to complete open orchiopexy.

The superiority of laparoscopy in non-palpable testis cases is well known as this tool provides the direct and definitive diagnoses compared to other diagnostic tools, and the superior magnified visualization facilitates the peritoneal dissection of the testis. Furthermore, the limited dissection and short operation time compared with the extensive dissection of inguinal exploration have been well described (14, 15). However, a previous report suggested that inguinal exploration is sufficient and laparoscopic investigation is unnecessary for unilateral peeping testis (6). However, there is no diagnostic tool other than laparoscopy to identify and precisely locate a non-palpable testis before proceeding with inguinal exploration (11, 16). In our study group, 25 cases had unilateral non-palpable testes. Eight (32%) of the 25 cases had testicular tissue, and in six of these cases, the tissue was located within 2.5 cm of the internal inguinal ring, including one case near the bladder and one case near the lower pole of the right kidney. Thus, if we had not performed laparoscopy for the initial explorations of these unilateral non-palpable testis cases, we might have missed the latter two cases (8% of the 25 unilateral cases), which would have necessitated a second operation with laparoscopy. Additionally, laparoscopy prevented us from performing unnecessary extensive inguinal dissections in four cases in group A (16% of the 25 unilateral cases).

Regarding the age data, Table demonstrates that nubbin testes were more frequently found in patients older than 24 months (81.8%), and the likelihood of identifying testicular tissue during exploration was greater in the patients below the age of 24 months (61.1%). These findings enable the provision of more accurate information to the family regarding the results of the surgery.

The malignancy potential of excised nubbin testicle tissue is defined based on the presence of germ cells in the seminiferous tubules, and positive results warrant further pathological examination with specific staining (17). The reported rates of viable germ cells in excised nubbin testicle tissues range from 7% to 18% (2, 18). Some authors have suggested that inguinal exploration for nubbin testes is unnecessary and claim that any malignant transformation can be recognized later by the patient (16). However, in our opinion, it is not possible for the patient to recognize any malignant transformation in cases in which the testis is localized to a remote area such as near the lower pole of the kidney as observed in one of our cases. It is also seems difficult to identify and excise nubbin testes in such remote locations without laparoscopic explorations. In group B, no viable testicular tissues were observed during the limited inguinal explorations, and all remnants were

excised and sent for pathology. According to our histopathological results, nubbin testes were found in 10 of 13 specimens. Although no premalignant or malignant cells were detected in the excised materials in our study, based on the published literature (18, 19), we believe it is advisable to excise nubbin testes to prevent possible complications.

When we first began to perform laparoscopic explorations for non-palpable testes cases, we used a 4th scrotal trocar to complete the orchiopexy in two cases with viable testes, as previously reported (8). However, subsequent to those two cases, we abandoned scrotoperitoneal trocar insertion and added an approximately 1-cm to 1.5-cm inguinal incision to mobilize the freed testis down to the scrotum via the inguinal channel because we felt this technique to be safer, and less traumatic to the testicle and its attachments. In our opinion, this approach allows the surgeon to handle the testis more delicately than can be achieved by grasping it with laparoscopic instruments. Additionally, due to the possibilities of acute angulation and the interruption of the collaterals between the gubernaculum and the artery to the vas deferens during the Prentis manoeuvre are well known. Thus, bringing down the testis via the inguinal channel has also been justified (7).

Leaving the internal ring open during laparoscopic orchiopexy has been reported, and no subsequent indirect inguinal hernias have been observed (9, 20). Moreover, leaving the hernia sac open without subsequent recurrence has previously been reported in childhood hernia cases (21). In our study, we left the internal inguinal ring open in all laparoscopy-assisted orchiopexy cases. The follow-up period for these cases was 23.37 ± 10.31 (10–44) months; none of our cases reported any bulging in the inguinal region, and no indirect inguinal hernias were found during control examinations in this period.

CONCLUSION

We reported our results to emphasize performing laparoscopy in unilateral non-palpable testis cases. Our results support the use of laparoscopy in unilateral non-palpable testes cases as laparoscopy provides accurate and definitive diagnoses and is helpful in the treatment of such cases. In addition, leaving the internal inguinal ring open does not seem to result in subsequent indirect inguinal hernia.

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