Management of Nonpalpable Undescended Testis with Special Reference to Microvascular Orchiopexy

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Background/ Purpose: Management of nonpalpable undescended testis is a surgical challenge involving evaluation and surgical management. The objective of this study is to present seven years experience in diagnosis and treatment of nonpalpable undescended testes.

Materials & Methods: The study included 28 patients with unilateral nonpalpable undescended testes in the Department of Surgery- Assiut University Hospitals between April 2000 and January 2007. Patients’ age ranged from 2.5 to 13 years (mean 5.2). Fifteen patients (53.5%) presented with nonpalpable testes on the right side and 13 (46.5%) on the left. Patients who had their testes palpated after anaesthetic induction were excluded from the study. All cases were subjected to preoperative laparoscopy. Surgical management was based on the laparoscopic findings of testicular position and viability.

Microvascular orchiopexy was done for 11 patients with viable intra-abdominal testes.

Results: Laparoscopy defined the intra-abdominal anatomy in all cases with no procedure related complications. 11 patients (39.2%) had viable intra-abdominal testis treated by microvascular orchiopexy. No testicular atrophy occurred in our series. 5 patients (17.8%) had blind ending spermatic vessels and vas deferens, needed no inguinotomy. In 12 patients (42.8%) the vas and vessels exited the internal inguinal ring. Viable inguinal testes were found in 3 patients and treated by standard orchiopexy. Orchiectomy was done in 9 patients in whom the vas and vessels ended in a testicular remnants or atrophic testis.

Conclusion: Laparoscopy is a safe and effective method for diagnosis of nonpalpable undescended testis. Microvascular orchiopexy is a feasible technique even in small children with good results and has a definitive place in the therapy of undescended testis.

Index Word: Testis; cryptorchidism; autotransplantation; laparoscopy; microsurgery.

INTRODUCTION

Undescended testis is present at birth in 3% to 5% of full-term male newborn. The incidence is higher in preterm and low birth weight infants. The two most important possible sequelae are infertility and testicular tumor. Most of the undescended testes descend in the first 12 months after birth. The incidence is approximately 1% in boys, 20% of which are nonpalpable. The nonpalpable testis represents a subset of undescended testes and restricted to those testes that are impalpable despite careful physical examination. In boys with a nonpalpable testis, approximately 50% are abdominal, 45% are atrophic secondary to in utero spermatic cord torsion, and 5% are in the inguinal canal. Testes that are atrophic are known as vanishing testes. The goal of management of a nonpalpable testis is to identify whether a viable testis is present and, if so, either perform an orchiopexy or, in selected cases, an orchiectomy.

Management of palpable undescended testis is quite straightforward and diagnostic studies are usually not
necessary. However, management of nonpalpable testes is more complex. The aim of our study is to present our seven years experience in the management of nonpalpable undescended testes with special reference to microvascular orchiopexy.

PATIENTS AND METHODS

Between April 2000 and January 2007, 28 patients with unilateral nonpalpable undescended testes were admitted to Department of Surgery- Assiut University Hospitals. The testis was considered to be nonpalpable if it is not palpable by careful physical examination in the outpatient clinic as well as with the patient under general anesthesia. After baseline investigations and preoperative fitness, all children underwent diagnostic laparoscopy for localization of the testis before surgical exploration. No preoperative radiological investigations were routinely performed to localize the testis. Laparoscopy was done under general endotracheal intubation through a small infraumbilical incision. All patients were submitted to testicular palpation under anesthesia before the introduction of Veress needle. Patients who had their testes palpated at this moment were excluded from the study and were submitted to inguinotomy. After insertion of the telescope, potential injuries to hollow viscera and other organs were assessed; next, the following was evaluated: region of internal inguinal ring, spermatic vessels and vas deferens, testicular size and position, in addition to comparison with the contralateral side.

The possible findings during laparoscopy included vas deferens and spermatic vessels coursing through the internal ring, viable intra-abdominal testis (fig. 1), and vessels and vas ending blindly prior to the internal ring. No further exploration was necessary when both the vas and the vessels end blindly intra-abdominally. When the spermatic cord structures exited a patent internal ring, an inguinal exploration was done under general endotracheal intubation through a small infraumbilical incision. All patients were submitted to testicular palpation under anesthesia before the introduction of Veress needle. Patients who had their testes palpated at this moment were excluded from the study and were submitted to inguinotomy. After insertion of the telescope, potential injuries to hollow viscera and other organs were assessed; next, the following was evaluated: region of internal inguinal ring, spermatic vessels and vas deferens, testicular size and position, in addition to comparison with the contralateral side.

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Microvascular orchiopexy was done in another setting for viable intra-abdominal undescended testes with short vessels. We explored the groin with extended incision to enter the peritoneum and search for the testicle. After delivery of the testis (fig. 2), all peritoneal attachments are carefully divided and the peritoneum was closed. All further dissection was done retroperitoneally under Loupe magnification to avoid injury of the vas or the vessels. The vessels were followed high towards the origin of testicular artery and beyond the confluence of the pampiniform plexus. The testicular vessels were divided high retroperitoneally. A donor vascular pedicle of sufficient length is prepared by dissection under magnification of inferior epigastric vessels to high level beneath the rectus abdominis. A course to the scrotum is developed and a scrotal wall incision is made through which a sub-dartos pouch is developed. Testicle is inspected to ensure that a dependent scrotal position can be achieved without tension on the vas. The testicle is brought out through the scrotal incision and secured with interrupted absorbable sutures in the dartos pouch. Anastomosis was done between the spermatic vessels and the inferior epigastric vessels by using interrupted 10-zero monofilament Nylon suture under microscope at 16 to 25X magnification. Postoperative follow up included clinical evaluation as well as testicular radioactive isotopes scan.

RESULTS

Of 28 patients in this study, 15 testes were on the right (53.5%), and 13 on the left (46.5%). The age ranged from 2.5 to 13 years (mean 5.2). Laparoscopy had defined the intra-abdominal anatomy in all patients with no procedure related complications. 11 patients (39.3%) had viable intra-abdominal testis identified by laparoscopy. 5 patients (17.8%) had blind ending spermatic vessels and vas deferens. In 12 patients (42.8%) the vas and vessels exited the internal inguinal ring.

We performed 11 microvascular autotransplants in 11 boys with laparoscopically visualized intra-abdominal testes. In all microvascular cases, the testes were grossly normal in appearance and the spermatic vessels were found to be short. Mean hospital stay has been 4 days per patient. Mean operative time was 4 hours. Testicular radioactive isotopes using Te99 assessed viability of the testes 3 months postoperative (fig 3). All testes were viable after testicular radioactive isotopes. Follow-up ranged from 6 to 24 months is available. 10 testes achieved a palpable intra-scrotal testicle that was stable in size, shape, and consistency compared to that noted at surgery. One
patient needed a secondary orchiolysis and scrotal fixation because the testis re-ascended to the inguinal region during the period of follow up.

In 5 cases the vas and vessels ended blindly prior to exiting the internal ring. No further exploration was necessary in these cases. Of 12 patients with the vas and vessels exiting the internal inguinal ring, viable inguinal testis was found in 3 patients and treated by standard orchiopexy. Orchiectomy was done in 9 patients in whom the vas and vessels ended in a testicular remnants or atrophic testis.

Fig 1. Laparoscopic view of an intra-abdominal testis.

Fig 2. Operative view of an intra-abdominal testis after its delivery in the inguinal incision.

Fig 3. Post-operative radioactive isotopes scan of autotransplanted testis.

Fig 4. Suggested algorithm for management of unilateral nonpalpable undescended testis.
DISCUSSION

The goal of management in a boy with an undescended testis is to place the testis in the scrotum to maximize its potential for spermatogenesis, to allow screening for malignant degeneration in adolescence and adulthood, and to close the patent processus vaginalis, which usually is present in these boys. Numerous radiologic studies have been used to try to "localize" the nonpalpable testis preoperatively, including retrograde venography, computerized tomography (CT), magnetic resonance imaging (MRI), and sonography. Sonography rarely will identify a gonad if it is viable and intra-abdominal or if it is atrophic. CT and MRI are more reliable than sonography in localizing the nonpalpable testis. However, even if the study localizes the testis, an orchiopexy is necessary. If the study fails to demonstrate a viable testis, surgical exploration is still necessary, because neither CT nor MRI has been shown to be reliable in diagnosing a vanishing testis. Consequently, no special investigative workup with ultrasound, CT, or MRI scan was done in this study.

Laparoscopy is now considered an integral tool in the evaluation and localization of the nonpalpable testis. Single stage or staged laparoscopic assisted orchiopexy can be done. Laparoscopy is considered technically successful if the testis is visualized, the vas deferens and spermatic vessels are observed coursing through the internal ring or the vas deferens and vessels are seen to end blindly. In our study, laparoscopy defined intra-abdominal anatomy in all patients with no procedure related complications. 11 patients had viable intra-abdominal testis, 5 patients had blind ending spermatic vessels and vas deferens, and 12 patients had the vas and vessels exit the internal inguinal ring.

The specific advantage of initial laparoscopy in the evaluation of children with unilateral nonpalpable undescended testis is to avoid unneeded inguinal exploration when the vas and vessels end blindly before exiting the deep ring. Certainly, inguinal exploration can be done by any competent surgeon. However, the procedure has potential complications as injury of the ileoinguinal nerve, hematoma formation, and wound infection. The patient also is left with a surgical scar that may not necessary.

Patients with intra-abdominal testes represent a small but challenging group who require innovative therapy. Initially, testicular microvascular orchiopexy was done only for older children. However, since instrumentation has improved, now the procedure can be performed in younger patients. Bianchi suggested that the procedure should be performed early (age 2 years), thereby reducing the risk of testicular damage. However, an experienced microsurgeon is essential to achieve optimal results. At first, testicular autotransplantation described without venous anastomosis and then the procedure modified to include venous anastomosis. This modification was undertaken because of venous engorgement and subsequent testicular atrophy after autotransplantation without venous anastomosis.

We prefer to use the inferior epigastric vessels since they are of good caliber and easily accessible. No testicular atrophy occurred in our series. The circumflex iliac artery can also be used, if necessary. Upton et al used the superficial epigastric artery, however, 4 of 10 testes atrophied in their series.

In a comparison of autotransplantation with laparoscopic orchiopexy Bogaert et al cited potential drawbacks, including length of operation, use of prolonged bed rest and a staged approach. Our average operating time is 4 hours and most patients are discharged home within an average of 4 days. All patients in our series required a diagnostic laparoscopy followed by a definitive procedure at another setting, as in most laparoscopic series. Bogaert et al reported that a repeat procedure was needed in 8 of 11 testes. Testicular autotransplantation can be done after initial laparoscopic dissection of the vas deferens and vessels.

CONCLUSION

Laparoscopy is a safe and effective method for diagnosis of nonpalpable undescended testis. Microvascular orchiopexy is a feasible technique even in small children with good results and constitute important addition to the surgical armamentarium of nonpalpable undescended testis. However, a larger study with long term follow-up is needed. Additionally, microvascular orchiopexy needs a high degree of microvascular skill and specialized instrumentation to achieve successful anastomosis.

REFERENCES