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Our Surgical Technique and Results About Undescended Testis at Ordu University

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Abstract

Objective: Undescended testis is one of the most common congenital anomalies among the children. It is very important to treat this disease at the appropriate time in experienced centers. The aim of this study is to share the experience and results of our clinic on undescended testicular surgery and discuss with literature.

Methods: The results of 38 patients who were operated with the diagnosis of primary undescended testis in our clinic and whose data were available were used. Patients' ages, sides, follow-up times, and results were recorded. Remaining of the testis in the scrotum after the procedure, increase of size in the follow-ups were used as success criteria.

Results: The mean age (median ± IQR) of our patients was 60.97±12.29 (7-230) months. While 20 (52.6%) of the patients applied with the diagnosis of undescended testis, 18 (47.4%) patients were diagnosed during the examination performed for other reasons. Hernia sacs were detected in 32 (84.2%) of the patients during surgery. Recurrence was observed in two cases, positive results were obtained in 36 (94.7%) cases. In the surgeries performed in our clinic, the success rate for undescended testis was 94.7%.

Conclusion: As a result of this study, the success rates in undescended testicular surgery were found to be satisfactory. An important finding in this study was that most of these patients were diagnosed late. For this reason, we think that it is important to raise awareness and education of the society about personal testicular examination.

Key words: Undescended Testis, Surgical treatment, Success

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INTRODUCTION

Undescended testis is one of the most common congenital anomalies in children. It affects approximately 2-9% of term neonatals. When children reach the age of 1, the rate gradually decreases and is observed around 0.8-1%. As with preterms, the risk increases as the week of birth is early and the weight decreases (1). In a significant part of the cases, approximately 30-43% of the cases, the testis descends into the scrotum over time for unknown reasons. This descent event often occurs within 3-6 months after birth. Close follow-up of these children is important, as relapses occur in approximately 22% of cases (2).

Early recognition and treatment of this pathology is essential. Delays in this matter can lead to very important problems such as infertility, tumor development, testicular torsion, exposure to trauma as a result of compression of the testis in the inguinal canal (3). In addition, parents are seriously worried about the future of their children. For these reasons, the aim of treatment is to lower the testis into the scrotum with medical or surgical treatment. However, surgical treatment is still the gold standard method in the treatment of these patients, as there are problems with medical treatment and the possibility of recurrence is high. It is critical for the effectiveness of the treatment that this procedure is carried out in specialized clinics and by meticulously following certain rules. Otherwise, patients and their relatives may encounter problems such as unsuccessful treatment, loss of testis, and repeat surgery. The aim of this study is to describe the surgical technique we used in our clinic during undescended testicular surgery and to share our surgical results.

METHODS

Study Design

Patient data were obtained retrospectively from patient records. The results of 38 patients who were operated in the Urology Clinic of Ordu University Training and Research Hospital between April 2016 and April 2021 and whose data were accessed were used. Suspected cases such as previous scrotal surgery, relapse cases, previous medical treatment, and retractile testis were excluded. Demographic characteristics, history, physical examination findings, side of pathology and surgical results of the patients were recorded.

Clinical Evaluation

All patients were evaluated by anamnesis and physical examination. Physical examination was performed in frog position in a calm and warm room to prevent cremaster reflex in young children. When the testis could not be palpated during the examination, radiological studies such as ultrasonography were performed. In retractile or suspicious testicles, the families were taught the examination method, and they were asked to examine the testicles at regular intervals and record which region they were in. From these records, it was tried to determine the rate at which the testis was detected in the scrotum. In all cases, the diagnosis of undescended testis was not included in the treatment program without clarification. In all patients, surgery was delayed until 1 year of age due to the possibility of spontaneous testicular descent. Surgical procedure after 1 year, tried to be done as soon as possible. Success after surgery was accepted as the testis remaining in the scrotum and reaching a size close to the contralateral testis or at least above its initial size.

Surgical Technique

Relatives of patients who were scheduled for surgery were informed in detail about treatment options and outcomes. Written informed consent was obtained from all patients. The surgical procedure was performed with general anesthesia. Physical examination was performed again with anesthesia. In this way, important information was provided especially in non-palpable testicles. In order to reduce the need for anesthetic and postoperative analgesics, local anesthesia or caudal block was applied in appropriate cases.

The surgical procedure was initiated with a 3-5 cm inguinal incision parallel to the skin lines (From the edge of the rectus muscle, between the spina iliaca anterior superior, the inguinal canal is easily reached). If the testis is not palpable, the incision was modified slightly above. Then the champer and scarpa fascia were separated with scissors and the external obliq muscle was exposed. It is especially important that this be as lateral to the inguinal ligament as possible. Then, it was lifted with a curved clamp and the superficial fascia was opened. At this time, the testis, which is on the surface in the inguinal canal, should be kept in mind. In the meantime, pressing the abdomen may facilitate easy viewing of the testis at the level of the internal ring. The external obliq fascia is then sharply opened and terminated in the external ring. In the meantime, damage to the ilioinguinal nerve and its branches in the lower part should be avoided. The internal oblique fascia is then opened, and the testis is exposed within the tunica vaginalis.

The testicular tissue is gently lifted and separated from the surrounding cremasteric fibers and smooth muscle structures by blunt and sharp dissection. At this time, it is important to completely cut the cremaster muscle fibers. We spend a lot of time in our applications to cut this structure exactly. We think that the complete separation of this structure from the cord elements is one of the key points in surgical success. The testis is released from the gubernaculum, then with gentle traction the proximal connections of the spermatic cord are separated. The peritoneal connections on the cord were released and pushed into the internal inguinal ring. Then the tunica vaginalis opens anteriorly. If seen, the appendix testis and appendix epididymis are cauterized so that these structures do not later mimic testicular torsion. The cord is separated from the surrounding tissues until sufficient cord length is assured. Tunica vaginalis (peritoneal layer) is held close to the internal ring. The hernia sac is carefully separated from the vessel and cord structures with scissors or a hemostatic clamp. Meanwhile, the most difficult issue, especially for those who do not have sufficient experience in this surgery, is the separation of the sac. The tunica vaginalis may appear to surround the cord. The easiest way to separate the sac from the cord and vessels just below the internal ring is to dissect it alternately from the lateral and medial margins. The very delicate free edges of the sac are cut and held until the mosquito is separated with clamps. Then, the posterior and lateral connections of the internal spermatic fascia, which hold the sheath, are separated. The pouch must be completely separated. The edges are held with a mosquito clip and the peritoneal opening is closed as if closing the mouth of the bag. Sometimes this pouch is so thin that it can be easily torn. In this case, the peritoneal opening can be closed continuously with absorbable sutures.

At the same time, a very important point in surgical success is the clear separation of the cord from the peritoneal connections during high ligation

both above and above the internal ring. The cord is measured over the symphysis pubis, if it is not sufficient to reach the scrotum, the cremasteric and tunica vaginalis fibers should be carefully distinguished on the cord by working close to the internal ring. However, care should be taken in terms of cord and epididymal damage at this time. The use of cauterizing devices should be restricted as much as possible. Dissection in the retroperitoneum, separation of the lateral spermatic fascia allows medial movement of the cord.

A transverse incision is then made on the scrotal skin, creating a space between the skin and the dartos layer. A gap is created in the dartos layer through which the testis will pass. With a clamp extended from the outside of the scrotum, the testis is placed in this pouch without torsion through the inguinal canal. Dartos is narrowed with sutures on both sides to prevent the testicle from refluxing.

Postoperatively, the layers were closed anatomically. The scrotum was closed with minimal compression. The patients were discharged on postoperative day 1 when there was no problem, and they were called for control 10 days later. Then, 3 months later, the patients were included in the follow-up program.

Statistical analysis

Normal distribution of continuous data was checked with the Shapiro-Wilk test, while homogeneity of group variance was checked with Levene test. Comparison of variables abiding by assumptions was performed in two groups with the student t test and data are expressed as mean ± standard deviation. Variables not abiding by assumptions were compared in two groups with the Mann-Whitney U test and data are expressed as median [interquartile range (IQR)]. Categoric variables are expressed as frequency and analyzed with Pearson chi-square analysis. All calculations were performed with SPSS v.25 (IBM corp, Chicago, IL, USA) statistical program. Statistical significance used $p<0.05$.

RESULTS

Data of 38 patients were used in the study. The mean age (median ± IQR) was calculated as 60.97±12.29 (7-230) months. While 20 (52.6%) of the patients applied with the diagnosis of undescended testis, 18 (47.4%) patients were diagnosed during the examination performed for other reasons. When classified as undescended testis, it was observed as right in 19 (50%) patients, left in 3 (7.9%) and bilateral in 16 (42.1%) patients. While the testicles were palpable in 30 (78.9%) of the patients who were found to be undescended, they were not palpable in 8 (21.1%) patients. In 6 of the non-palpable cases, the testis was palpated after anesthesia.

Table 1. Demographic Characteristics of the Patients

Age (month)	60.97±12.29 (7-230)[a]
Outpatient clinic application due to undescended testis n (%)	20 (%52,6)
Diagnosed during examination n (%)	18 (%47,4)
Primary case n (%)	38 (100)
Number of patients with palpable testis n (%)	30 (78.9)

a = median ± IQR

When the preoperative cases were classified according to whether they were circumcised or not, 22 (57.9%) patients were uncircumcised, and 16 (42.1%) patients had been circumcised before. Retractile testis was detected in 11 (28.9%) of the patients. While hernia sac was detected in 32 (84.2%)

patients during surgery, it was not detected in 6 (15.8%) patients. The surgical procedure was terminated with dartos pouch in 35 (92.1%) cases, high scrotal insertion in 2 (5.3%) cases, and fowler stephans procedure in 1 (2.6%) case. Orchiectomy was not performed in any patient. The cases were followed up for a mean of 13.19±9.11 (2-36) months. During this period, 2 recurrences were observed, and the desired result was achieved in 36 (94.7%) cases. In surgeries performed in our clinic, the success rate for undescended testis was 94.7%.

Table- 2: Surgical Results

Cases that have been circumcised Before n (%)	16 (42.1)
Retractile testis n (%)	11 (28.9)
Presence of hernia n (%)	32 (84.2)
Surgically placed in the dartos Pouch	35 (92.1)
Fowler Stephans	1 (2.6)
Follow-up (month)	13.19±9.11 (2-36)
Success n (%)	36 (94.7)

DISCUSSION

Undescended testis is a common pathology in the community and associated with important problems when its treatment is delayed. Surgery is the gold standard method of treatment. The aim of this study was to present the surgical technique and results that we applied in our clinic during undescended testicular surgery. The most important finding in this study is that undescended testicular surgery has near perfect results in experienced clinics. In addition, it was found that most of the patients were diagnosed in the late period, beyond the ideal age.

In the prenatal period, the testis begins to develop in the intra-abdominal region. In other words, as we can understand from here, the testis is an intra-abdominal organ at first. However, in order to maintain normal functions such as spermatogenesis, it must migrate into the scrotum, which has a lower temperature than body temperature. Until the 7th month of antenatal development, the testis, which is in the intra-abdominal distance, then enters the inguinal canal. It often descends into the scrotum in prenatal term. Any problem during the descent of the testis results in the test is not descending into the scrotum. The exact reason for this is not known exactly, there are hypotheses put forward on this subject (4,5). When the testicles cannot descend into the scrotum, where they should normally settle, they cannot show their normal development and functions. Changes in germ cells adversely affect fertility and spermiogram pathologies are often detected in these patients (6,7). Cases that occur at older ages, especially after marriage, can be quite impressive in terms of their effects. For this reason, testicles that have not completed the descent process should be lowered into place at the most appropriate time.

Treatment options include medical and surgical treatment. The rationale for medical treatment is the thought that this descent is due to hormone deficiency. For this purpose, HCG and LHRH were used. There are doubts about its reliability, insufficient treatment results, and long-term effectiveness. For this reason, it could not find enough supporters for its use. Studies have reported low success rates up to 20% (8). Another problem is the lack of a common follow-up period for the studies on this subject. In addition, the long follow-up results of these patients are unknown. In our literature review, we could not find any information on the results of lifelong follow-up. In short, information on long follow-up results of these patients is lacking (9).

In the longest follow-up study on this subject, patients were followed for 4 years after medical treatment. As a result of the study, treatment failure was observed in 35% of the cases (10).

Considering the literature, medical treatment is not offered as the first treatment option in cases of undescended testis, except in special cases (11). This is our daily practice as well. We offer surgical treatment as the first choice and reserve medical treatment for a very limited patient group. We definitely do not use medical treatment, especially in cases where we consider open processus vaginalis or in newborns. Due to some of the side effects that can be important, the family should be informed about the side effects and results of the treatment when starting hormonal therapy. Another problem with this treatment is that the disease can recur. Therefore, even if the patient benefits from medical treatment, it should be monitored for recurrence. It is important that parents are informed about this issue and that they are trained to follow the child's test. Medical treatment may not be appropriate if problems are suspected in follow-up or immediate results are expected.

Surgical lowering of the testis into the scrotum is a very effective and successful technique. In cases diagnosed early, it is important to apply surgical treatment, especially in the 6-18 months period, to preserve the fertility potential (12). Because from this moment on, the number of germ cells begins to deteriorate. However, as seen in our study, most of the patients are diagnosed at a later age. The mean age of the patients at the time of surgery was 61 months. We do not know the exact reason for this delay. The reason for this may be that the hospital we are in addresses a large area and a significant part of these regions are located in rural areas. In a study conducted by Yildiz et al., the ages of 240 patients who applied for undescended testicular surgery in different regions of our country were examined (13). In this study, the mean age at surgery was 56.4 months. These results were very close to our results. Unfortunately, many patients are diagnosed late for various reasons. This age seems to be quite far from the ideal age (<2 years) recommended for surgery. This age limit is a very important threshold. Studies in children with undescended testicles have shown that if left untreated, germ cells, which are normal in the newborn period, decrease rapidly after 2 years of age. In addition, interstitial fibrosis and deterioration of tubular structures were also revealed (14). In the study of Wenzler et al., they found that the spontaneous descent of testicles was very low after 6 months in children with undescended testicles. Therefore, operation is recommended after 6 months, especially around 1 year of age. It was stated that surgery performed at this age is more suitable for both fertility and psychosocial aspects (14,15). These results have been confirmed by other studies in the literature. In this study, it was reported that surgery performed within 6-12 months is the most appropriate time for fertility and malignancy (16) Another important result in our study was that 47.4% of these patients were detected during the examination performed for another reason. For this reason, raising awareness and training of health workers and parents on this issue seems to be very important. The most important process is the diagnosis stage. Most of these patients are successfully treated after diagnosis.

In our patient group, the success rate for undescended testis was 94.7%. These results are similar to the rates reported in the literature (89-

100%) (17). None of the patients experienced testicular loss or any significant surgery-related complication. Problems such as pain in the postoperative period were resolved with simple measures. No patient encountered a problem such as reoperation or death in the early postoperative period. Surgical outcomes seem to be quite high compared to medical treatment. In a study on this subject, it was found that 52% of the patients who received medical treatment had testes in the scrotum after 9 years. Half of the patients were unsuccessful in treatment (18). It was not fully specified in this study how many patients had truly retractile or true undescended testicles. In addition, the results after 9 years are not known. In our study, cases with retratile testis were not included in the study and all of them consisted of true undescended testicles. It is very important to follow the basic rules during surgery. We think that the most important point in success is to lower the testis with sufficient length into the scrotum. This is possible in most cases. In cases where sufficient length cannot be achieved, it should be kept in mind that sufficient release may not have been made on the cord. Especially cremaster, spermatic fascia, peritoneal adhesions are the most limiting factors. In addition, hernia sac, which is very common (90%) in these patients, is an important limiting factor (19). If the sac is released from the cord elements, especially at the level of the internal ring, it can be seen more clearly. The very thinness of the sac can lead to dissection difficulties. Often the pouch is easily separated by gentle and unhurried dissection. It should be observed that the cord and the vascular structure diverge at the level of the internal ring. Care should be taken to preserve the vascular structures during dissection and insertion of the testis into the scrotum.

CONCLUSION

When the undescended testis is left untreated, it can lead to important problems, especially cancer development and infertility. It is important to diagnose these patients in the early period and to treat them as early as possible (6-18 months) in terms of preserving fertility and preventing malignant events. In particular, awareness and education of parents and healthcare professionals on this issue is very important in terms of diagnosis. In fact, the necessary information and training should be provided for everyone to examine their own testicles. It has been shown in many studies that significant changes in the testis begin after the age of 2 years. As seen in the results of our study, surgical treatment is quite effective and complication rates are negligible. We think that sufficient experience and experience is important in this regard.

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Author Contributions:

Concept: E.B, A.Y, Design: E.B., A.Ç., A.Y; Literature search: E.B., A.Ç, Data Collection and Processing: E.B., A.Ç.; Analysis or Interpretation: Y.K.A., Writing: A.Y., I.Y.

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