

## Inguinal re-operation after an unsuccessful primary orchiopexy: Approach through internal oblique muscle incision

*Başarısız primer orşiopeksiden sonra inguinal reoperasyon: İnternal oblik kas inzsizyonu yoluyla yaklaşım*

Hasan Rıza Aydın<sup>1</sup>, Senol Adanur<sup>2</sup>, Yılmaz Aksoy<sup>2</sup>

<sup>1</sup> Department of Urology, University of Health Sciences, Trabzon Kanuni Training and Research Hospital, Trabzon, Turkey

<sup>2</sup> Department of Urology, School of Medicine, Ataturk University, Erzurum, Turkey

### Özet

**Amaç:** Geçmişte orşiopeksiye maruz kalmış ancak testis pozisyonu tatmin edici olmayan inmemiş testisli olgularda, uyguladığımız inguinal reoperasyon deneyimlerimizi ve uzun dönem sonuçlarını sunmayı amaçladık.

**Gereç ve Yöntem:** Ocak 2000- Mayıs 2014 tarihleri arasında 29 anormal testis pozisyonlu(1 bilateral) 28 hasta değerlendirildi. Bütün hastaların geçmişte inguinal cerrahi hikayesi mevcuttu. Uzun dönem takipte prepubertal hastalarda sadece klinik muayene yapılırken postpubertal hastalara, semen analizi ve testiküler volüm muayenesi de yapıldı.

**Bulgular:** Reoperasyon uygulanan 28 hastanın reoperasyon zamanında ortalama yaşları  $12 \pm 5.7$  yıl (2-27) idi. Toplam 18 hastada 19 testise başarılı reorşiopeksi uygulandı. Reorşiopeksi uygulanan 19 hastanın preoperatif testis lokalizasyonu sırasıyla internal inguinal ring, inguinal kanal, eksternal inguinal ring; 2,13,4 idi. 19 testisin 10'unda (%52.6) spermatik damarlar ve vas deferensin gergin olmayacak şekilde yeterli mobilizasyonunu sağlamak için internal oblik kas kesisi yapıldı. Reorşiopeksi esnasında vakaların 6'sında (%31.5) patent processus vaginalis, 3'ünde ise (%15.7) başarısız herni onarımı belirlendi. 10 testise ise atrofik testis veya spermatik kord kısalığından dolayı orşiektomi uygulandı. Reorşiopeksi yapılan 19 hastanın 11'i (%57.8) uzun dönem takip için başvurdu. Ortalama takip süresi  $37.4 \pm 27.9$  ay (4-95) idi. Tüm testisler atrofi olmaksızın skrotum içinde idi.

**Sonuç:** Başarısız primer orşiopeksiden sonra inguinal reoperasyonlarda, deneyimli pediatik cerrahlar tarafından uygun diseksiyonla internal abdominal kas kesisi yapılarak, daha iyi internal inguinal ring vizüalizasyonu sağlanıp, yeterli kord ve spermatik damar uzunluğu elde edilerek operasyonun başarı oranları anlamlı şekilde artırılabilir

**Anahtar Kelimeler:** Kriptorşidizm, İnguinal kanal, Reoperasyon

### Abstract

**Objective:** We aimed to present our experiences with inguinal re-operations and resulting long term outcomes in cryptorchidism cases who had previously underwent unsatisfactory orchiopexy procedures where proper testis position had not been achieved.

**Materials and Methods:** Between January 2000 and May 2014, twenty eight patients with abnormal testis position (bilateral in one) were evaluated. All patients had a history of previous inguinal operation.

**Results:** The mean age at re-operation time was  $12 \pm 5.7$  years(2-27). A successful orchiopexy was performed in 19 testes of 18 patients. Internal oblique muscle incision was performed in order to provide adequate mobilization so that the spermatic vessels and vas deferens would not be too tight in 10 of the 19 testes(52.6%). During re-orchiopexy, a patent processus vaginalis was detected in 6 cases(31.5%) and unsuccessful hernia repair was detected in 3 cases (15.7%). Orchiectomy was performed for 10 testes either due to testicular atrophy or the presence of a short spermatic cord.

**Conclusion:** In inguinal re-operation after an unsuccessful primary orchiopexy, the success rate of surgery may be improved in the hands of experienced pediatric surgeons where better visualisation of the internal inguinal ring is achieved with internal abdominal muscle incision which provides a proper dissection and a sufficient length of cord and spermatic vessel.

**Keywords:** Cryptorchidism, Inguinal canal, Reoperation

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### Yazışma / Correspondence

Dr. Şenol Adanur  
Department of Urology  
School of Medicine  
Ataturk University  
25240 Erzurum, Turkey  
Phone: +90 442 344 7627  
Fax: +90 442 316 6688  
E-mail: s.adanur61@hotmail.com

## Introduction

Cryptorchidism is one of the most common disorders in childhood that affects 3% of newborns, 0.8% of one-year-old infants and 21% of premature babies. Approximately 20% of cryptorchidism cases are non-palpable. The testis is absent in 20-50% of children with non-palpable testis [1].

Orchiopexy is the most common surgical procedure performed for the treatment of cryptorchidism. The size and position of the testis is satisfactory at a ratio of 74-92%, depending on the initial position [2]. The position of the testis may not be satisfactory after orchiopexy or inguinal surgery. Re-operation is required in only 1-10% of patients requiring orchiopexy for the positioning of the testes in the scrotum [3].

In this study, we aimed to present our experiences with inguinal re-operations and the long term outcomes in cryptorchidism cases who had previously underwent unsatisfactory orchiopexy procedures where proper testis position had not been achieved.

## Materials and Methods

Between January 2000 and May 2014, inguinal re-operation was performed for 29 testes with abnormal position in a total of 28 patients who had previously undergone inguinal orchiopexy. Physical examination and inguinal ultrasonography were performed for all the patients before re-operation. While testes were palpable in 20 (71.4%) patients, they were not palpable in 8 (28.6%) patients.

When required, we performed re-orchiopexy at by extending the previous incision site. The external oblique aponeurosis was passed carefully and the inguinal canal was reached. The spermatic cord and testis were located in the inguinal canal. A sharp dissection was used in order to free any distal scar tissue adhering to the testis. Scar tissue observed around the testis and spermatic cord was preserved in order to prevent vascular injury. The internal oblique muscle fibers were dissected in cases where the spermatic cord length was insufficient and cord mobilization was provided. The internal inguinal ring and retroperitoneum were visualized better with division of the internal oblique muscle (Figure 1). Presence of a patent processus vaginalis in the internal ring was determined (Figure 2). If present, the hernia sac was care-

**Table 1.** Patient, operative and follow-up characteristics

	No	%	Mean
Number of failed primary orchiopexy	29		
Mean age of the patients(yıl)			12
Number of orchiectomy	10		
The number of successful re-orchiopexy	19		
Location of testis			
Internal ring	2	11	
Inguinal canal	13	68	
External ring	4	21	
Postoperative follow-up			
The number of patients	11	58	
Mean follow-up time(month)			37.4
The number of patients postpubertal	7	64	
Testicular size			
Normotrophic testis	4	57	
Hypotrophic testis	3	43	
Sperm analysis			
Normospermi	4		
Oligospermia	1		
Azoospermia	2		

fully separated from the spermatic cord and vas deferens and ligated in order to provide spermatic vessel mobilization. After an adequate cord length had been provided, a dartos sheath was formed through a transvers incision in the scrotum and a subdartos poche was formed by external spermatic fascia separation. The testis was then placed in this subdartos poche with no spermatic cord tension.

Postoperative follow up included a physical examination at 3 months and an ultrasonography at the end of a year. Nineteen of the re-orchiopexy performed patients were contacted by phone and called in for clinical examination and long term follow up. On follow up, while only clinical examination was performed for the prepubertal patients, semen analysis and testicular volume examination were also performed in the postpubertal patients. Prader orchidometry was used for the detection of testicular volume. The position and viability of the testis was also evaluated.

## Results

Of the 28 re-operation patients, the mean age was 12±5.7 years (2-27). Of the 28 patients who underwent



Figure 1. View of the internal oblique muscle incision



Figure 2. View of patent processus vaginalis in the internal ring after internal muscle incision

re-operation, 7 had their first operations at our hospital and 21 had been operated on at other institutions. During this study, the incidence of unsuccessful orchiopexy at our clinic was 3.04%. The average time between the first operation and re-operation was  $65.8 \pm 44.9$  months (12-156). After re-operation of the 29 testes of the 28 patients, successful re-orchiopexy was performed in 19 testes. The

preoperative testis localization of the 19 patients who underwent re-orchiopexy was the internal inguinal ring in 2, the inguinal canal in 13 and the external inguinal ring in 4. The remaining 10 patients had orchiectomies due to a blunt spermatic vessel and vas deferens or testicular atrophy. The patient, operation and follow up characteristics are listed in **Table 1**. Internal oblique muscle incision was performed in order to provide adequate mobilization, without spermatic vessel and vas deferens tension, in 10 of the 19 testes with successful orchiopexy.

Adequate mobilization of the spermatic vessels and cord was provided in 6 of the 19 patients (31.5%) with a patent processus vaginalis after hernia repair and in 3 patients (15.7%) with unsuccessful primary hernia repair.

Eleven of the 19 patients (58%) who underwent re-orchiopexy were followed long term. The mean duration of follow up was  $37.4 \pm 27.9$  months (4-95). Four patients were still in the prepuberty period. There was normotrophic testes in 4 of the 7 patients, hypotrophic testes in 3, normospermia in 4, oligospermia in 1 and azospermia in 2 patients.

#### Discussion

Primary orchiopexy is a common operation which provides positive results in most patients. A small portion of these patients have postoperative improper testis positioning and require a second operation. There are also cases of iatrogenic cryptorchidism which would require orchidopexy to position the testis in the scrotum following inguinal surgery for hernia or hydrocele repair [4].

Re-operative orchiopexy is a difficult technique for pediatric surgeons which sometimes cannot provide satisfactory testicular position. It is difficult to know the reason of this complication which requires re-operation. In re-operative orchiopexy, difficulties may be encountered in obtaining adequate testicular vessel length [5]. Besides significant complications including atrophy, difficulties in mobilization have made way for many approaches [5,6]. Re-operation of the inguinal canal is quite complex and challenging. Significant problems such as changed anatomy and intensive scarring may be encountered [7,8]. A successful inguinal hernia repair and orchiopexy in children is a meticulous technique which requires great attention and a detailed knowledge of anatomy [7].

In different series, the reported incidence of recurrent cryptorchidism ranges from 7.5% to 13% [9-11]. Patients may be predisposed to potential spermatic cord injury during re-intervention after orchiopexy and inguinal surgery [12]. For a proper orchiopexy, the testes, spermatic vessels, vas deferens and the patency of the processus vaginalis should be evaluated [13,14]. Detailed information was not present about previous operations since most of the patients were referred to our clinic from other institutions. In our clinic, the incidence of recurrent cryptorchidism was found to be 3.04%.

Different techniques are recommended for re-orchiopexy. High ligation of patent processus vaginalis, wide retroperitoneal mobilization of the spermatic cord and the formation of a sufficient dartos sheath are the most common procedures [15]. Recently, the approaches of transperitoneal and en-bloc cord mobilization through the cremasteric fascia have been proposed [3,16,17]. Previously described procedures for recurrent orchiopexy include approaching the testis following mobilization of cord structures. Cartwright and Snyder reported an approximate 95% success rate by popularizing the en-bloc spermatic cord mobilization technique [7]. This approach has become a standard. In addition to this technique, in order to better visualize the internal inguinal ring and retroperitoneum in cases where the spermatic cord length was insufficient, we achieved positioning of the testes into the scrotum by dissecting the internal oblique muscle fibers, mobilizing the cord and repairing any present inguinal hernia in 10 of the 19 successful re-orchiopexy cases..

Failure in the complete excision of patent processus vaginalis and high ligation may contribute to failures of primary orchiopexy. Extensive tension and inadequate scrotal fixation have been shown to be the main causes of an unsuccessful primary orchiopexy [18]. Anne et al. [4] reported a 89% success rate in re-operation by the scrotal approach following previous inguinal surgery in 27 cryptorchidism cases and reported hernia repair after the detection of patent processus vaginalis in 3 patients (12.5%). In their study reporting the results of re-orchiopexy performed on 32 testes, Ziylan et al. [19] detected patent processus vaginalis in 11 cases (34.4%) and unsuccessful hernia repair in 9 cases (28.1%). We provided adequate mobilization of the cord and spermatic vessels af-

ter hernia repair due to patent processus vaginalis in 6 of the 19 testes (31.5%) and unsuccessful hernia repair in 3 patients (15.7%) during successful re-orchiopexy surgery.

Re-orchiopexy has been shown to be risky and difficult due to changed anatomy and intensive scarring after inguinal re-operation [3,10,15]. For an easier dissection and softer tissues, authors recommend the ideal time for re-orchiopexy surgery to be a minimum of 6-12 months after the first operation [20,21]. We performed our procedures by paying maximum attention to these durations.

With clinical and experimental data, it is known that fertility problems may develop after both unilateral and bilateral cryptorchidism [22,23]. In their study of unilateral re-orchiopexy cases and the evaluation of long term functional outcomes, Pesce et al. [11] reported hypotrophic testis in 13 of 20 patients and severely abnormal spermograms in 18.7%. Seven of the 11 patients, who were followed up in the long term (57.8%), were postpubertal and 4 were prepubertal. Testes of prepubertal patients were within the scrotum and viable. Testes were normotrophic in 4 of the 7 postpubertal patients and hypotrophic in 3. Sperm analysis showed azospermia in 2 patients, oligoasthenospermia in 1 patient and normospermia in 4 patients.

The limitations of our study were its being retrospective and the small number of patients followed in the long term.

### Conclusion

A patent processus vaginalis and inadequate inguinal hernia repair are the main factors for unsuccessful primary orchiopexy. These causes may easily be revealed through an internal abdominal muscle incision during re-orchiopexy and the success rate of re-orchiopexy operations may be improved by treating them effectively and safely.

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