



# Clinical Characteristics and Treatment of Cryptorchidism in Adults: A Single Center Experience

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**Purpose:** We evaluated the clinical and therapeutic characteristics of adult cryptorchidism, which have been difficult to establish, given the small number of patients presenting to outpatient clinics.

**Materials and Methods:** A retrospective study of 20 adult patients with cryptorchid testis was performed. We analyzed their palpation of testis, location, surgical method, marital status, number of children, histologic findings, and semen analysis.

**Results:** In 17 cases with unilateral cryptorchidism, the mean age at surgery was  $31.1 \pm 12.5$  years. Fourteen patients had a palpable, small cryptorchid testis. The location of the testis, as verified, was inguinal in 14, prepubic in 2, and intra-abdominal in 1, respectively. We performed orchiopexy in 14 out of 15 patients who sought to have this procedure. Four among 6 married patients had children. Testis biopsy was performed in 12 patients, and all showed abnormal histologic findings. Three among 4 patients, performed semen analysis, showed abnormal findings. In three cases of bilateral cryptorchidism, the mean age at surgery was  $35.7 \pm 12.5$  years. All of these patients had palpated cryptorchid testes in the inguinal area and sought to have a bilateral orchiopexy. Two patients have been married but had no children. All showed abnormal findings in both testis biopsy and semen analysis. No testicular neoplasm was detected during the duration of follow-up.

**Conclusions:** Most adult patients with cryptorchidism preferred orchiopexy to orchiectomy. However, most of patients showed abnormal histology of the testis and semen analysis. Therefore, orchiopexy with regular scrotal examination may be considered a suitable treatment options for adult cryptorchidism.

**Key Words:** Adult; Cryptorchidism; Orchiectomy; Orchiopexy

## INTRODUCTION

Cryptorchidism is a pathological condition defined as the failure of the testis to descend into the scrotum. It is one of the most common congenital anomalies, occurring in 1% to 4% of full-term male neonates [1]. The prevalence

of cryptorchidism in adults is about 1% at 1 year of age [2]. The treatment of cryptorchidism in infants and children is well known. A surgical approach such as orchiopexy is recommended for testes that remain undescended after 6 months of age [3]. In addition, fertility disorders may occur, and are commonly ascribed to the harmful effects of

Received: Jun 14, 2014; Revised: Jul 12, 2014; Accepted: Jul 24, 2014

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the undescended testis on the contralateral one, or to related immunologic reactions [4]. Even though urologists usually recommend that cryptorchid patients have corrective surgery, some patients miss the most appropriate time to undergo surgery. One study in South Korea showed that two common reasons for delayed orchiopexy are unintentional late detection and intentional negligence despite prior recommendation by a primary physician [5]. Contrary to cryptorchidism in children, orchiectomy has been mainly recommended for cryptorchidism in adults, because of the increased probability of neoplasms. In clinics, adult cryptorchid patients present less frequently than pediatric patients. Therefore, the clinical characteristics of and therapeutic options for cryptorchidism in adults are not well established. In this study, we evaluated the clinical and therapeutic characteristics in 20 adults with cryptorchidism who had undergone orchiectomy or orchiopexy within the previous 10 years.

## MATERIALS AND METHODS

A retrospective study of 20 adult patients presenting with cryptorchidism (17 unilateral and 3 bilateral) between 2000 and 2010 was performed. We reviewed the preoperative palpation of the testis (palpable or not palpable), the patients' therapeutic preference (orchiopexy or orchiectomy), the marital status (married or unmarried), the number of children, the surgical method (orchiopexy or orchiectomy), the intraoperative location of the testis (prepubic, inguinal, or abdominal), the histologic findings of the testis, and semen analysis findings. Semen specimens were collected by masturbation and the semen analyzed for sperm concentration and percent motility using computer-assisted semen analysis (SAIS Plus; Medical Supply, Seoul, Korea). The normal values used here were based on the World Health Organization 2010 reference limits [6]. Azoospermia was defined as an absence of sperm in the semen, and asthenozoospermia was defined as a ratio of motile sperm to all sperm of under 40%.

## RESULTS

Of all 20 patients, 17 had unilateral and 3 had bilateral cryptorchidism. In 17 cases with unilateral cryptorchid-

ism, the mean operation age was  $31.1 \pm 12.5$  years (19~60 years). The cryptorchid testis of 14 patients (82.4%) was palpable before the surgery, but the testis size was smaller than the contralateral testis. The location of cryptorchid testis identified during the operation was inguinal in 14 (82.4%), prepubic in 2 (11.7%), and intra-abdominal in 1 (5.9%), respectively. We performed orchiopexy in 14 patients (82.4%). Among them, there was no case for which additional orchiectomy was needed after the initial orchiopexy. Before the surgery, 15 patients (88.2%) wanted to undergo orchiopexy instead of orchiectomy. Four of the 6 patients who were married, had children. All of the 12 patients, in light of the testis biopsy results, had abnormal histologic findings except premalignant or malignant lesions. Four patients underwent preoperative semen analysis, among them, 3 patients' results were abnormal.

In three cases with bilateral cryptorchidism, the mean age at the time of the operation was  $35.7 \pm 12.5$  years (23~48 years). All of the patients had palpated cryptorchid testes in the inguinal area. Before the operation, all of the patients wanted to undergo bilateral orchiopexy and chose to undergo orchiopexy. Two patients have been married and none of them have had children. All of the patients underwent a testis biopsy and semen analysis, and the tests showed abnormal findings. However, premalignant or malignant lesions were not detected in the biopsy findings (Table 1, 2).

The mean follow-up duration after the operation was  $61.4 \pm 41.4$  months (7~132 months) (Table 1). There was no case of additional orchiectomy after the initial orchiopexy. No testicular neoplasm was detected for the duration of follow-up.

## DISCUSSION

In terms of clinical characteristics, this study demonstrated that most adult patients had unilateral cryptorchidism, which was palpable before the surgical procedure, but all the cryptorchid testes were smaller than the contralateral testes. The location of the cryptorchid testis in the operation was mostly in the inguinal area. The clinical characteristics in adult cryptorchidism seem to be similar to those of child cryptorchidism.

**Table 1.** Clinical characteristics of twenty adult cryptorchid patients

Patient No.	Age (yr)	Laterality	Preoperative palpation of testis	Surgical method (patient preference)	Marital status	No. of children	Operation	Location of testis	Biopsy	Semen analysis	Follow-up duration (mo)
1	19	Unilateral	Palpable	Orchiopexy	Unmarried	0	Orchiopexy	Prepubic	-	-	132
2	23	Unilateral	Not palpable	Orchiectomy	Unmarried	0	Orchiopexy	Inguinal	Atrophy	Normal	124
3	48	Bilateral	Palpable	Orchiopexy	Married	0	Orchiopexy	Inguinal	Sertoli cell-only syndrome	Azoospermia	123
4	32	Unilateral	Palpable	Orchiopexy	Married	0	Orchiopexy	Inguinal	Hypospermatogenesis	Asthenozoospermia	121
5	27	Unilateral	Palpable	Orchiopexy	Unmarried	0	Orchiopexy	Inguinal	Atrophy, immature testis	Asthenozoospermia	96
6	23	Bilateral	Palpable	Orchiopexy	Unmarried	0	Orchiopexy	Inguinal	Hypospermatogenesis	Azoospermia	93
7	29	Unilateral	Palpable	Orchiopexy	Unmarried	0	Orchiopexy	Prepubic	Atrophy, hyalinized seminiferous tubules	Asthenozoospermia	88
8	36	Bilateral	Not palpable	Orchiopexy	Married	0	Orchiopexy	Inguinal	Atrophy, hyalinized seminiferous tubules	Azoospermia	67
9	46	Unilateral	Palpable	Orchiopexy	Married	1	Orchiopexy	Inguinal	-	-	59
10	18	Unilateral	Palpable	Orchiopexy	Unmarried	0	Orchiopexy	Inguinal	Hypospermatogenesis	-	46
11	21	Unilateral	Palpable	Orchiopexy	Unmarried	0	Orchiopexy	Inguinal	-	-	45
12	26	Unilateral	Palpable	Orchiopexy	Unmarried	0	Orchiopexy	Inguinal	Sertoli cell-only syndrome	-	43
13	38	Unilateral	Palpable	Orchiopexy	Married	1	Orchiopexy	Inguinal	Atrophy, hyalinized seminiferous tubules	-	43
14	19	Unilateral	Palpable	Orchiopexy	Unmarried	0	Orchiopexy	Inguinal	Immature testis	-	41
15	27	Unilateral	Palpable	Orchiopexy	Unmarried	0	Orchiopexy	Inguinal	Sertoli cell-only syndrome	-	30
16	25	Unilateral	Palpable	Orchiopexy	Unmarried	0	Orchiopexy	Inguinal	-	-	24
17	56	Unilateral	Not palpable	Orchiectomy	Married	1	Orchiectomy	Inguinal	Spermatic cord with absence of testicular tissue	-	18
18	27	Unilateral	Palpable	Orchiopexy	Unmarried	0	Orchiopexy	Inguinal	Atrophy, hypospermatogenesis	-	16
19	60	Unilateral	Not palpable	Orchiectomy	Married	1	Orchiectomy	Abdominal	Hyalinized seminiferous tubules	-	11
20	36	Unilateral	Palpable	Orchiopexy	Married	0	Orchiopexy	Inguinal	Atrophy	-	7

-: Biopsy or semen analysis was not performed.

**Table 2.** Comparison of clinical characteristics between patients with unilateral and bilateral cryptorchidism

	Unilateral	Bilateral
Total patients	17 (85.0)	3 (15.0)
Preoperative palpation		
Palpable with smaller size	14 (82.4)	3 (100.0)
Not palpable	3 (17.6)	-
Location of testis at operation		
Inguinal	14 (82.4)	3 (100.0)
Prepubic	2 (11.7)	-
Intraabdominal	1 (5.9)	-
Marriage status		
Married	6 (35.3)	2 (66.7)
Unmarried	11 (64.7)	1 (33.3)
Children		
Yes	4	-
No	2	2
Patient priority of management option		
Orchiopexy	15 (88.2)	3 (100.0)
Orchiectomy	2 (11.8)	-
Management		
Orchiopexy	14 (82.4)	3 (100.0)
Orchiectomy	3 (17.6)	-
Pathologic findings	n=12	n=3
Testicular atrophy	6	1
Hyalinized seminiferous tubules	3	1
Hypospermatogenesis	3	1
Sertoli cell-only syndrome	2	1
Immature testis	2	-
Semen analysis findings		
Azoospermia	-	3
Asthenozoospermia	3	-
Normal	1	-
Total	4	3

Values are presented as number (%) or number only.

It has been difficult to establish a treatment for adult cryptorchidism, given the small number of patients. Therefore, some controversy exists regarding the effect of cryptorchid testis on neoplasia and fertility in adult patients. In our study, we evaluated the clinical perspective, specifically, each patient's therapeutic preference (orchiopexy or orchiectomy), the histologic findings from the testis, and the semen analysis findings related with the risk of cancer and fertility.

In previous reports [4,7-10], it has been noted that a late operation for undescended testis is associated with an increased risk of testicular malignancy and infertility. The relative risk of testicular cancer in a cryptorchid testis is

2.75~8 times (maximally 40 times) greater than in the general population [11,12]. In a large cohort study of 16,983 men who were surgically treated for cryptorchidism, the risk of testicular cancer among men who were treated at 13 years of age or older was approximately twice that among men who underwent orchiopexy before the age of 13 [7]. In our study, most adult patients wanted to preserve their cryptorchid testis despite the future risk of malignancy. We did not find any case with testis malignancy during the follow-up duration of  $61.4 \pm 41.4$  months (7~132 months) after orchiopexy.

In terms of fertility, it is well established that the untreated cryptorchid testis is associated with infertility. There is evidence that the development of postnatal germ cells deteriorates in the undescended testis after the first year, and perhaps for this reason, the risk of infertility increases with age [8-10]. Many authors have reported that testes remaining undescended until postpubertal age will not function and that fertility rates are not improved after postpubertal repair [13-15]. Therefore, it has been recommended that these testes be resected because they cannot produce spermatozoa and have a significant risk of malignant change [16]. In other studies, orchiectomy is recommended more highly, especially in unilateral cases, for several reasons, including abnormal findings in the semen analysis and testicular neoplasm in follow-up studies [4,17].

On the other hand, some articles on the topic of postpubertal cryptorchidism have demonstrated that postpubertal orchiopexy could provide fertility by initiating spermatogenesis [18-20]. Shin et al [19] reported the induction of spermatogenesis and pregnancy after adult orchiopexy. Lin et al [20] reported successful testicular sperm extraction and paternity in an azoospermic man after bilateral postpubertal orchiopexy.

In terms of paternity, in cases with unilateral cryptorchidism, this study demonstrated that all of the 12 patients who underwent a testis biopsy had abnormal histologic findings. Three of the 4 patients who underwent the preoperative semen analysis showed abnormal findings. However, 4 of the 6 married patients had children. On the other hand, all of the patients with bilateral cryptorchidism showed abnormal findings in the testis histology and the semen analysis, and had no children.

As in previous reports, in this study, all of the patients

presented abnormal findings in the testicular biopsy and the semen analysis. However, in terms of the patient's therapeutic preference (orchiopexy or orchiectomy), most of the patients wanted to preserve their testis instead of undergoing an orchiectomy. In our study, only two patients who presented unilateral, non-palpable testis, both of whom were married and had fathered a child, underwent orchiectomy. As stated above, orchiopexy did not provide advantages to the adult cryptorchid patients. However, most adult patients in Korea seemed to prefer orchiopexy to avoid the negative perception of emasculation. This may reflect the psychic trauma they anticipated experiencing after an orchiectomy and may be related to Korean aesthetic preferences as well. In addition, our patients did not have any malignancy or complication after orchiopexy. Therefore, we concluded that the orchiopexy in adult cryptorchidism may be a legitimate option for management respecting the patient's preference.

Finally, it should be noted that this study has some limitations given the small number of patients, a relatively short follow-up duration for malignancy risk of the testis, and no follow-up data on semen analysis after the orchiopexy. However, based on previous reports and our study, given abnormalities in the histologic findings and the semen analysis, adult patients who have undergone orchiopexy should be regularly examined in the outpatient clinic.

## CONCLUSIONS

In this study, the clinical characteristics of adult cryptorchidism seem to be similar to those of child cryptorchidism. However, all of the patients presented abnormal findings in the testicular biopsy or the semen analysis. Most adult patients with cryptorchidism preferred orchiopexy over orchiectomy. With regular examinations after orchiopexy, it can be a legitimate treatment option for adult cryptorchidism in consideration of the patient's preference.

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