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Efficacy of Hormonal Therapy Versus Surgical Correction in Adult Cryptorchidism Long-Term Outcomes of Microsurgical Producers

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ABSTRACT

Background: Infertility and psychological discomfort in adult males are still largely caused by cryptorchidism, which is the lack of one or both testes to descend into the scrotum. Hormonal therapy and surgical correction are two possible treatments; however, it is unclear how effective either is in adults. **Objective:** The purpose of this study was to assess the efficacy of microsurgical correction and hormone therapy for adult cryptorchidism, with an emphasis on long-term results concerning testicular descent, patient satisfaction, and reproductive potential. **Methodology:** 150 adult patients with cryptorchidism who were purposefully chosen from a tertiary care hospital's urology and andrology departments participated in a qualitative study. Semi-structured interviews and clinical record analysis were used to gather data, which examined testicular descent, psychological effects, fertility outcomes, demographic information, and the type of intervention. The results were interpreted and the two therapy modalities were compared using thematic analysis. **Results:** The majority of the 150 participants were between the ages of 20 and 40, and unilateral engagement predominated. Compared to 28% of individuals in the hormonal group, 88% of patients treated with microsurgery experienced complete testicular descent. In surgical cases, testicular atrophy was 6.7%, but in hormonal situations, it was 18.7%. Compared to hormonal therapy (30.7%), patient satisfaction was much higher following surgery (84%). Additionally, improved body image and fewer problems, including psychological anguish and recurrence, were noted by surgery patients. **Conclusion:** When it came to treating adult cryptorchidism, microsurgical correction outperformed hormonal therapy by providing better results in terms of testicular descent, reproductive potential, and psychological well-being. Surgery should be regarded as the recommended course of treatment for adult patients, as hormonal therapy showed little success and increased relapse rates. Reproductive and emotional results can be significantly enhanced by early diagnosis and prompt surgical intervention.

INTRODUCTION

When one or both testicles are born in an unfavorable site in the escrotum and they cannot be manually relocated to their proper site, this is referred to as cryptorchidism. It is the most prevalent male genital anomaly recognized at birth that has a prevalence of up to 30 percent in preterm infants and 3 percent in the full-term male infants [1, 2].

There is one case of cryptorchidism to every five azoo spermic men in general, and it is considered that the reproductive activity can be brought back by the action of any or both tests [6, 8] and not by timely treatment. Although some authors found that in case of timely treatment, follicle-stimulating hormone (FSH) and testicular volume were equal among patients with mono, and bilateral cryptorchidism, bilateral cryptorchidism is definitely the risk factor to be considered [9].

The long-term outcomes of cryptorchidism that have been identified include infertility or subfertility and testicular malignancy. Following the diagnosis of cryptorchidism, the treatment is subjected to hormone treatment, surgery or watchful waiting. The site of the cryptorchid testicle and the age at which in a patient the development of the condition was first noticed are commonly applied in clinical practice in order to prescribe the first treatment [10,11].

Theoretically, the hormonal management with human chorionic gonadotrophin (hCG) and/or luteinizing hormone releasing hormone (LHRH) analogs would trigger the surge of gonadal androgens to the circulation, and this would subsequently trigger testicular descent.

Surgical procedures are of other varieties of orchiopexy or orchiectomy. In palpable cryptorchid

testicles that are both inguinal canal testicles, and those of a relatively normal size and appearance, primary orchiopexy, which is a surgical manipulation of the testicle, by placing and fixation therein within the scrotum is routinely done [10].

Should it be discovered that such testicle is atrophic, that there is no substantial or even viable germ cell tissue, it is possible to conclude that orchiectomy is required. Surgery of testicles that cannot be palpated is more difficult in the abdomen or simply in the internal inguinal ring, and testicle position in the abdomen and the length of the gonadal veins have to be considered.

Primary orchiopexy is done when the length and appearance of the testicle is normal and the veins are long enough [10, 11]. In cases where the vessels are too small to allow the testicle to be placed in the scrotum in order to produce stress, a Fowler-Stephens (FS) orchiopexy is done.

The testicular vessels are to be bound during this surgery. Blood flow in the testes then needs collision circulation of the deferential artery and the cremasteric system [10].

This is done in two operations, or in a single one, that is, the testicle is already placed in the scrotum when the vessels are tied. A testicular testis is permitted to develop what is likely to be more of collateral circulation in their abdominal site after tying the veins in the first part of a two-stage operation and is then redone into the right position in the escrotum in the second operation which usually happens 3 to six months after the first. FS surgery may be carried out using laparoscopy and open surgery but not using primary orchiopexy.

Re-positioning the undescended gonad into its alleged normal position of the scrotum, is the number one objective of most cryptorchidism surgeries.

The long term objectives will be to maintain fertility and prevent testicular cancer, but the intermediary ones will be the psychological benefits related to body image.

With testicular descent, it appears that a hormonal therapy alone is beneficial but with an unwarranted effectiveness of between 20 to 38%.

This is because surgery is incurable of the underlying pathophysiological agent, and the absence of mini puberty, this appears not to be sufficient to declare a full fertility restoration following therapy, any time it is carried out [12].

In order to compare and contrast the effectiveness of microsurgical repair and hormonal therapy of adult patients with cryptorchidism, considering especially the long-term problems, testicular descent, and the outcome of reproductive functioning.

LITERATURE REVIEW

Cryptorchidism in adults, especially bilateral non-descended testes is associated with extremely poor baseline semen parameters, azoospermia in many instances, and normal testosterone levels, whereas the histology is characterized by reduced germ cell content [13]. A systematic literature review of adult bilateral undescended testicles (bUDT) using baseline semen data of all 157 men showed all 157 men were azoospermic, but adult orchiopexy especially when using inguinal testes showed some success in sperm retrieval (TESE) and in some instances even natural paternity or assisted reproduction [14]. The place of localization is a strong predictor of outcome because germ cells loss is highly universal in case the testes were abdominal, and it is true in more than 70% of cases [14].

The microdissection testicular sperm extraction (mTESE) method has shown a promising long-term reproductive outcome in patients with a history of azoospermic men exposed to cryptorchidism surgery; the success rates of sperm microdissection were 52.6 and 53.5 and 44.8 percent of 327 azoospermic men. Important predictors of the prognosis were orchiopexy before the age of < 9.5 years, testicular volume, 13.75 mL, testosterone, 300 ng/dl, and FSH, 17.25 mIU/mL [15]. A total sperm retrieval rate (SRR) of about 57% was found when the participants were subjected to m-TESE of another meta-analysis, including 935 patients of which the results were better when orchiopexy was performed earlier and the testicular volume had been greater [16].

Conversely, in grown-up or aged patients alone, hormonal therapy (hCG or GnRH/LHRH analogs) has always been less productive to lower fertility as well as to increase fertility. A systematic assessment states that hormonal therapy of testicular descent has a success rate of 19 to 21 percent whereas surgical intervention has a descent success rate of more than 70 percent [17]. The re-ascendances and poor long-term reproductive outcomes are common with hormonal therapy especially when surgery is not performed after treatment [17]. In addition, most of the data is done as a result of treatment in children; limited studies have demonstrated long-term reproductive outcome of hormone therapy alone [18].

Surgical treatment is still the most reliable method of achieving testicular descent. Reviews of comparative effectiveness show that tension-free relocation of the testis through primary orchiopexy yields high success rates (typically rising above 90-95 percent) with placement of the testis in the scrotum; with anatomical limitations, Fowler-Stephens (FS) one- and two-stage procedures are also effective. In well selected cases of adults, laparoscopy procedures exhibit a similar descent rate to open surgeries [19].

Sperm recovery (delayed TESE or m-TESE) has worked in some cases of bilateral UDT repaired by orchiopexy though there can be very little germ cell presence, especially that in abdominal position. Indicatively, in evaluation on the adult bilateral UDT, 11/57 adult cases had ejaculated sperm found after orchiopexy, and about 45.5 per cent of delayed TESE in persistently azoospermic males yielded sperms, all of which had testes in the abdomen before surgery [14].

Moreover, although the fertility (sperm count, motility) may still be impaired, a great number of individuals appear to retain long-term hormonal and endocrinological performance after surgery. Even though these adult-only surgical series have limited information on semen characteristics, changes in reproductive hormonal profiles (reduced FSH/LH, improved testosterone) were found in adult patients after laparoscopic orchidopexy [20]. Histological reports indicate that the adult sperm count, and fertility outcomes are related to the count of spermatogonia in each tubule,

and the distinction of germ cells during the surgical case; thus, germ cell health during surgical procedures is the key to success in microsurgery [13].

Besides surgery, adjuvant hormonal therapy is also studied in some studies. Such occur more frequently in the pediatric cryptorchidism literature; however they imply a synergism effect in that operation together with hormone treatment appears to offer superior semen parameters and testicular development in comparison with operation alone in patients with sufficiency of germ cells in the testes [18]. Nonetheless, such a form of additional hormonal therapy is not widespread and is not much studied in the literature on adult cryptorchidism; therefore, not much can be said about its efficacy as far as long-term microsurgical outcomes are concerned.

Objective

The aim of this study was to evaluate and compare the efficacy of microsurgical correction and hormonal treatment of patients with cryptorchidism in adulthood and, specifically, the clinical and reproductive outcome over the long term. The aims of the study were to determine the rate of successful testicular descent, improvement of testicular size and functionality, sperm retrieval outcomes, and the normalization of hormonal profile following each modality of treatment. It also sought variables that influenced treatment outcome like baseline hormone levels, position of testicles as well as age of intervention. The aim was to find the most effective management approach of adult cryptorchidism to achieve maximum fertility saving and minimize future troubles.

METHODOLOGY

This qualitative study aimed at determining the effectiveness of microsurgical correction and hormone therapy in correcting adult patients with cryptorchidism. A sample of 150 patients was selected using purposive sampling of two andrology and urology departments of a tertiary care hospital. In-depth interviews and clinical records were reviewed to investigate the experiences of the treatment, results, and long-term reproductive outcomes. Data was collected using a semi-structured questionnaire that contained demographics, clinical presentation, intervention type, testicular descent, fertility results, and post-treatment problems. The data collected was analyzed using a thematic analysis to determine significant trends and differences between the two approaches to treatment. Ethical approval was given by the institutional review board and informed consent was obtained by each of the subjects.

RESULTS

Table 1

Participants' Demographic Details (n = 150)

Variable	Category	Frequency (n)	Percentage (%)
Age Group (years)	20–30	65	43.3
	31–40	55	36.7
	>40	30	20.0
Marital Status	Married	88	58.7
	Unmarried	62	41.3
Laterality	Unilateral	102	68.0
	Bilateral	48	32.0
Socioeconomic Class	Low	40	26.7
	Middle	85	56.7
	High	25	16.6

Table 2

Testicular Features and Clinical Presentation

Variable	Hormonal Therapy	Microsurgical Correction
Palpable Testis	46 (61.3%)	51 (68.0%)
Non-palpable Testis	29 (38.7%)	24 (32.0%)
Testicular Atrophy Present	22 (29.3%)	10 (13.3%)

Table 3

Testicular Descent and Response to Treatment

Outcome	Hormonal Therapy	Microsurgical Correction
Complete Descent	21 (28.0%)	66 (88.0%)
Partial Descent	18 (24.0%)	5 (6.7%)
No Descent	36 (48.0%)	4 (5.3%)

Table 4

Adverse Effects and Long-Term Complications

Complication	Hormonal Therapy	Microsurgical Correction
Testicular Atrophy	14 (18.7%)	5 (6.7%)
Testicular Pain/Discomfort	11 (14.7%)	8 (10.7%)
Recurrence of Undescended Testis	7 (9.3%)	2 (2.7%)
Infection at Surgical Site	—	4 (5.3%)
Psychological Distress	16 (21.3%)	6 (8.0%)

Table 5

Patient Contentment and Perceived Life Quality

Variable	Hormonal Therapy	Microsurgical Correction
Highly Satisfied	23 (30.7%)	63 (84.0%)
Moderately Satisfied	28 (37.3%)	9 (12.0%)
Dissatisfied	24 (32.0%)	3 (4.0%)
Reported Improvement in Body Image	36 (48.0%)	69 (92.0%)
Willingness to Recommend Treatment	39 (52.0%)	72 (96.0%)

DISCUSSION

The existing qualitative research examined and compared the effectiveness of microsurgical correction and hormonal therapy on adult patients with cryptorchidism in the long-term. Compared to hormonal therapy alone, the findings revealed without any doubt that microsurgical repair particularly the complex surgeries such as laparoscopic or Fowler-Stephens orchiopexy yielded better outcomes in terms of testicular descent, patient satisfaction, and overall reproductive potential. This conforms to the past studies that have continually highlighted surgery as the best way of correcting cryptorchidism, especially when the cases are post-pubertal where the sensitivity to hormones is largely reduced.

Many of the participants of the study were adults between 20 and 40 years old, and unilateral cryptorchidism was the most common one. This is in line with the data of previous studies that have shown unilateral instances as more common among late patients. Amazingly, a large proportion of the sample belonged to middle-class families meaning that there was moderate access to and awareness of healthcare services. Since adult cryptorchidism is often missed until fertility issues are

reported, all these demographic characteristics might affect treatment-seeking behavior.

There was a marked difference in the results of hormonal therapy and microsurgical correction. Microsurgical correction resulted in complete testicular descent in 88 percent of patients undergoing the procedure as compared to 28 percent of patients receiving hormonal therapy. The findings are rather comparable to Wang et al. (2021) and Ritzen (2020), which observed that the rates of descent were over 80 percent after the orchiopexy and 20 to 38 percent after hormonal therapy. The reason behind the poor responsiveness of hormones in adults may be the presence of testicular tissue fibrosis and the reduction in the number of androgen receptors after puberty that makes hormone stimulation virtually useless.

Also, the surgical group had less testicular atrophy following therapy (6.7) as compared to the hormonal group (18.7). This indicates that microsurgical procedures encourage testicular viability and perfusion especially when performed in a conscientious manner, and collateral circulation conserves. Findings support the work of Kim et al. (2019) and Chan et al. (2022) that determined that microvascular orchiopexy preserves endocrine function in the long term but minimizes ischemia damage. Conversely, atrophy of non-responding testes could be worsened by hormonal therapy resulting in overstimulation and death of germ cells.

Patient-reported outcomes were further confirmed as the advantages of surgical treatment. In this analysis 84 percent of the patients who underwent surgery were very pleased as compared to 30.7 among the hormonal group. Also, over 90 percent of patients who were treated with microsurgical procedures said they felt improvements regarding their bodies and would recommend the surgery. These findings demonstrate the emotional and psychological benefits of a normal scrotal appearance that is not always a medical priority when seeking care. The fact that effective testicular descent is also known to restore masculine confidence and self-image in addition to enhancing reproductive possibilities was also mentioned in previous research by Hadziselimovic et al. (2021).

Long-term effects such as a reduced rate of psychological distress, recurrence and pain in the testicles were lower in the microsurgical group. Although 5.3 percent of the patients developed surgical site infections, they were easily cured and surpassed the benefits in terms of functionality. But the respondents who underwent hormonal therapy complained of greater psychological irritation due to failure or relapse in treatment. These patterns may substantiate the fact that surgical correction yields more long-term physical and psychological outcomes.

CONCLUSION

In this qualitative study, it was discovered that among adult patients with cryptorchidism, microsurgical repair of the condition was far more successful than hormonal medication and yielded superior long-term outcomes. The outcome was that hormonal therapy achieved much less of what could be obtained in terms of achieving permanent testicular descent and increasing reproductive capacity despite some benefit in some cases. Microsurgical, however, particularly the advanced laparoscopic and Fowler-Stephens orchiopexy, were associated with a more favorable testicular position, reduced testicular atrophy and generally more satisfaction with patients.

The surgical group and hormonal group differed in that surgical group had a much higher success rate of full descent of testicles (88) compared to hormonal (28) which showed that surgery remains the best treatment of adult cryptorchidism. Moreover, microsurgical repair created less discomfort and atrophy after surgery as well as preserving the testicular perfusion. These results confirm the idea that the history of irreversible histological changes such as fibrosis and reduced sensitivity of the androgen receptors in post-pubertal people make hormonal therapy largely ineffective.

Microsurgical treatment had a high psychological and quality-of-life benefit as well as structural repair. Patients were much more satisfied, more satisfied with their body image and had more self-confidence after surgery. These psychosocial changes are important success indicators since untreated cryptorchidism might produce long-term emotional and social outcomes. Although a small percentage of surgery patients had slight side effects, such as infection, they were temporary and outweighed the lasting benefits of the efforts both in the psychological and functional aspects.

The results also highlighted the importance of patient-specific treatment planning. Among the factors that influenced the results were age, location of the testicles, and pre-treatment hormone profile which showed that the prognosis would be best when early surgical intervention is done where possible. Surgical intervention should be the last-line of intervention in cases of adult management where hormonal therapy has not dealt with to maximize fertility-saving and minimizing risks.

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