UNDESCENDED TESTIS TREATMENT: PERSONAL RESULTS VERSUS LITERATURE DATA

RE Iacob[1], ES Boia[1], O Adam[2], C Popoiu[1], A Pavel[2], A Radulescu[1], Daniela Iacob[1]
[1]University of Medicine and Pharmacy „Victor Babes" Timisoara
[2]Clinical Emergency Hospital for Children "Louis Turcanu" Timisoara

Abstract

The undescended testis is a term we use to describe all instances in which the testis cannot be manually manipulated into the scrotum. Electron microscopy has confirmed reduced number of spermatogonias and tubular diameter in undescended testis after the first two years of life. To improve spermatogenesis treatment should be done before the age of two. Other reasons to realize orchidopexy are: a higher incidence of malignancy, trauma and torsion, and future cosmetic and psychological problems in the child. The management is surgical and/or hormonal (Human Chorionic Gonadotropin - HCG). Surgery is limited by the length of the testicular artery. Palpable testes have a better prognosis than non-palpable. This paper work presents the personal results of undescended testis treatment compared to the most important studies in a chronological order.

Key words: undescended testis, hormonal treatment, surgical treatment.

Introduction

Undescended testis is a common congenital abnormality occurring in 2-5% of full-term boys at birth (the incidence is double at preterm infant). By 3 months of age, the incidence rate spontaneously reduces to 1-2%.

The etiology of the disorder is not very well known, but the integrity of hypothalamo-pituitary-gonadal axis is needed for normal descent of the testes. Abnormal sexual differentiation is associated with maldescent and the majority of boys with undescended testis show no endocrine abnormalities after birth.

Several studies have been performed to evaluate the ultra-structure of the undescended testis after birth. Increased degeneration of germ cells can be observed in undescended testes after the first year (electron microscopy). From the age of 2 years, changes which occur in the undescended testis can be found on light microscopy with a qualitative difference in the changes the higher the testis lies, and therefore early treatment is recommended. So most pediatric urologists recommend orchiopexy by 1 to 1.5 years of age or earlier, because fertility potential may be improved by early treatment. Other reasons to treat are to avoid testis cancer and psychological reasons. The most effective treatment is surgery, but hormone treatment with either hCG or GnRH analogues can be considered, particularly in cases where testes can be palpated in high scrotal position. The efficacy of hormone treatment depends on the initial location of the testis; nonpalpable testes rarely descend with hormone treatment. However, both surgery and hormone treatment can have untoward effects. Treatment with hCG has been associated with an inflammation-like reaction in the testes and an increased rate of apoptosis of germ cells leading to a reduced adult size of the testes. Vascular complications can occur during surgery, particularly in staged orchidopexies.

Purpose

The aim of study is to establish correlations between the results of hormonal and surgical treatment on 206 cases of undescended testis hospitalized from January 2002 to December 2004 at Clinical Emergency Hospital for Children "Louis Turcanu" Timisoara, Department of Pediatric Surgery, and the most recent literature data.

Material and method

The necessary data to elaborate personal study was obtained by analyzing the observation files, laboratory results and surgical protocols. The literature data was obtained from on line prestigious journals of pediatric surgery.

Results

From 01.01.2002 to 31.12.2004 a number of 206 patients with undescended testis were treated at Clinical Emergency Hospital for Children "Louis Turcanu" Timisoara, Department of Pediatric Surgery, and an approximative constant distribution of cases / year was found (fig. 1).

Place distribution of cases indicated that the urban area had slightly more cases, probably because of better development of medical services and more facile access to them (fig. 2).

According to localization right side undescended testis was found in half of cases, almost 1/3 cases on left side and in 1/5 cases both testicles were in a high position (fig. 3).

year 2002 – 64 cases

year 2003 – 73 cases

year 2004 – 69 cases

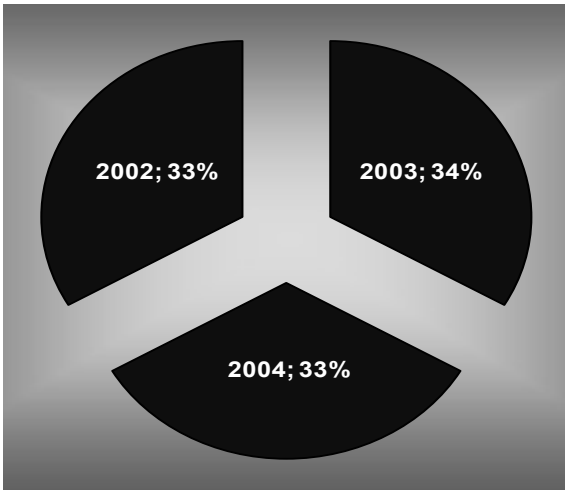

Fig. 1. Annually repartition of undescended testis cases.

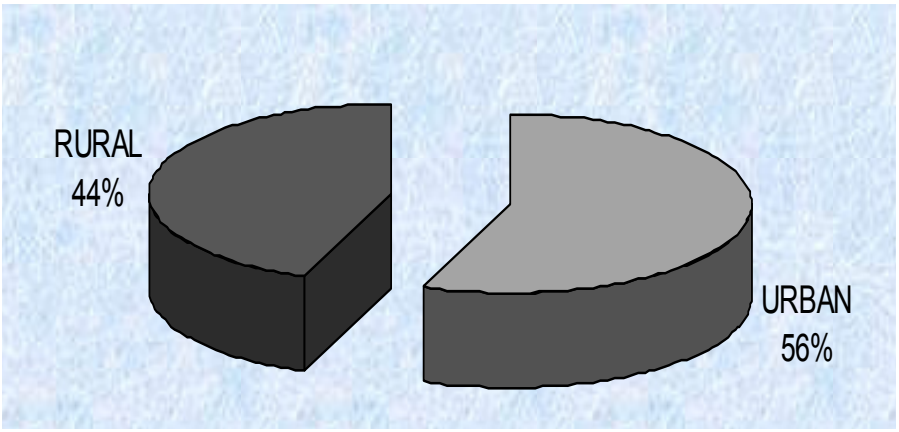

Fig. 2. Place distribution of cases.

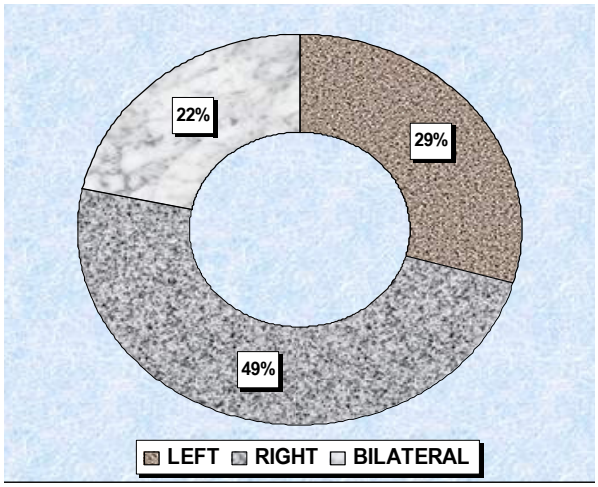

Fig. 3. Distribution of cases according to localization.

If we refer at age of diagnosis, we found the following results:

- 0 – 12 months – 7 cases
- 1 – 4 years – 69 cases
- 5 – 10 years – 96 cases
- 11 – 16 years – 44 cases

We can observe that only 3% of cases were resolved under age when histological modifications occur, 32% of cases between 1 and 4 years, 45% case at group 5-10 years and 20% after 11 years old (fig. 4).

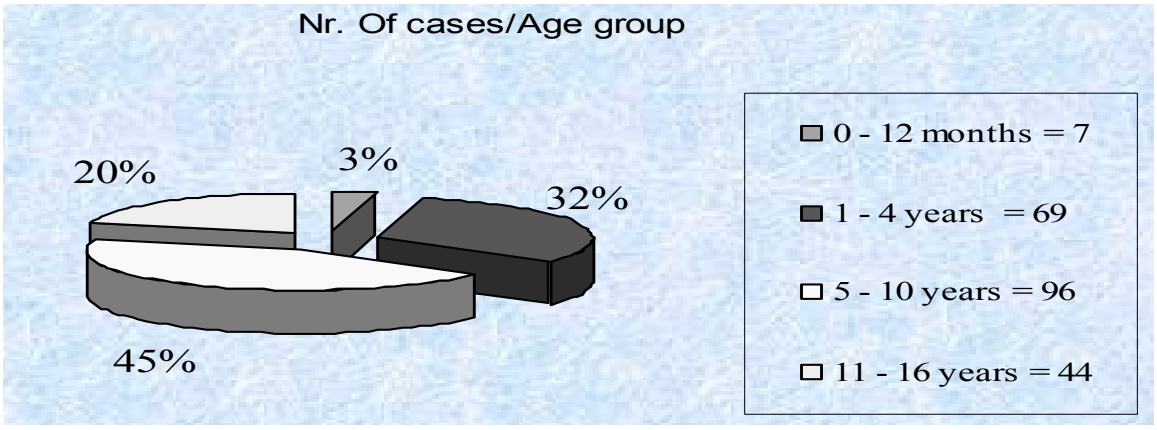

Fig. 4. Repartition of cases according to age group.

If we consider the therapy, next table presents the treatment methods:

TREATMENT	2002	2003	2004	TOTAL
HORMONAL	6	11	9	26
SURGICAL	51*	49*	52*	152*
HORMONAL + SURGICAL	7	13	8	28

*2, 5 respective 4 cases (total 11) needed two stage orchidopexy

It is important to mention that the hormonal therapy was made by OMS indications which mean: 250 UI HCG at age < 1 year, 500 UI HCG at age 1-5 years and 1.000 UI HCG at patients older then 5 years, 10 doses (2 doses per week for 5 weeks).

We can observe that the number of successful results (12,5%) is equal with cases which surgical interventions after hormonal treatment.

If we refer to literature data, many authors have been preoccupied of the modifications of the hormonal table and fertility at patients treated formerly of undescended testis. Although there are many contradictory opinions, I'll present the most important studies developed in the last 5 years, in a chronological order.

Crespo Chozas and collaborators, in 1999, studied 20 postpubertal males with a mean age of 17.35 years (range: 15-21 years) and treated for undescended testis during childhood were evaluated for pubertal development and gonadal function. A hormonal study which included basal determinations of testosterone, luteinizing hormone (LH) and follicle-stimulating hormone (FSH), and semen analysis was performed on each patient. Complete virilism was observed in all patients. The start and development of puberty were normal in all cases (except one patient that started puberty at 10 years of age). Basal studies in all patients showed normal levels of LH and testosterone. FSH levels were increased in 3 patients and normal in the other 17 patients. Fourteen patients achieved normal spermatogenesis with more than 20 million spermatozoids/ml. In the other 7 patients (35%), 5 with unilateral undescended testis and 2 with bilateral undescended testis, the sperm count remained below 20 million with a range of 0.8 to 18.4 x 10^6 spermatozoids/ml. The three males with elevated levels of FSH also presented oligospermia. The results showed that pubertal development is normal after undescended testis. Impaired spermatogenesis was a major factor in undescended testes. Basal FSH levels can be useful in predicting germinal damage secondary to undescended testis.

In the same year, Lee PA and collaborators studied 84 men with a history of unilateral undescended testis. They found that age at orchidopexy significantly correlated inversely with inhibin B and positively correlated with FSH. Comparison of mean hormone levels and sperm density by analysis of variance for linear trend revealed a significant relationship between age at surgery with inhibin B and testosterone, while sperm density, FSH and luteinizing hormone were not significantly related. Men

who previously had unilateral undescended testis and who underwent orchidopexy by age 2 years have higher inhibin B and lower FSH profiles than those who underwent surgery later in life. This finding suggests an overall beneficial effect of early orchidopexy in boys born with unilateral undescended testis.

The same authors compared sperm counts and gonadotropin levels before and after gonadotropin-releasing hormone stimulation between formerly unilaterally cryptorchid men and controls that had completed a detailed questionnaire on fertility and other pertinent paternity information. These parameters were also compared between the subsets of formerly cryptorchid men who reported paternity and unsuccessful attempts at paternity. Sperm density and total count, and basal and gonadotropin-releasing hormone stimulated follicle-stimulating hormone (FSH) levels were different in the undescended testis and control groups. Higher FSH levels and lower sperm counts correlated inversely in the undescended testis group, while luteinizing hormone, testosterone and other results of semen analysis did not differ. Furthermore, FSH levels were higher and sperm counts were lower in the subset who reported unsuccessful attempts at paternity compared with those reporting paternity. Other measured parameters did not differ between these groups. They concluded that FSH levels are significantly higher and sperm counts are significantly lower in formerly cryptorchid men than in controls. In the undescended testis group the same differences are found in fertile and infertile men. Thus, elevated FSH and low sperm counts may be considered risks for infertility in formerly cryptorchid men.

In 2000, the same authors, determined differences in paternity and levels of the hormones inhibin B, follicle-stimulating hormone, luteinizing hormone, testosterone and free testosterone based on the preoperative location of the undescended testis in men with previous unilateral undescended testis. In 103 cases they performed semen analysis and measured the levels of the hormones inhibin B, luteinizing hormone, follicle-stimulating hormone, testosterone and free testosterone. Paternity, sperm count and hormonal parameters were compared with cryptorchid testicular location. Logistic regression was done to analyze pre-treatment testicular location as a risk factor for infertility. Paternity, duration of attempted conception in men who achieved paternity, sperm count and hormone levels did not differ based on abdominal, internal ring, inguinal canal, external ring, upper scrotum or ectopic testicular location. The overall paternity rate was 90% with the lowest rate of 83.3% in the abdominal group. More than 12 months were required to achieve conception in 28.9% of the study group overall and in 39.4% of the abdominal group. Varicocele and a partner with fertility problems were risk factors for infertility, while abdominal testicular location caused borderline significant risk. They concluded that preoperative testicular location in men with previous unilateral undescended testis is not a major determinant of fertility according to paternity, sperm count or hormone levels.

In 2001, in Italy, Vinardi S and collaborators evaluated testicular volume, serum luteinizing hormone (LH), follicle-stimulating hormone (FSH), and testosterone as well as semen specimens, in 57 men (mean age, 19 years; range, 18 to 27 years) treated in childhood for unilateral (n = 47) and bilateral (n = 10) undescended testis. In 3 unilateral cases monorchidism was found. Thirty-seven patients underwent orchidopexy after hormonal treatment (luteinizing hormone releasing factor, 1.2 mg/d for 28 days followed by human chorionic gonadotropin, 500 IU intramuscularly 3 times a week for 3 weeks). The remainder underwent surgery. Mean age at surgical treatment was 5.4 years (range, 2 to 12 years). These patients were examinated again after a mean period of 13.3 years (range, 10 to 19 years). Reduced testicular volume (<12 mL) was found in 6 of 64 testes (9.3%). LH, FSH, and testosterone levels were found within the normal range in all patients. With linear regression, inverse relations were found between FSH and, respectively, testicular volume, sperm concentration, sperm motility, and normally shaped sperms. There were direct relations between testicular volume and sperm concentration, sperm motility, and normally shaped sperms. They did not find any statistical correlation between age at surgery and semen quality. Significantly better results in terms of sperm counts were found in patients directly operated on in comparison to those treated with hormones before orchidopexy.

Cortes D and collaborators studied 135 patients with undescended testis (70 bilateral and 65 unilateral) in 2003, who had a simultaneous biopsy taken at orchidopexy in childhood, and in adulthood had analyses of semen and FSH. In adulthood 42 formerly bilateral cryptorchid boys had repeat testicular biopsies taken. Infertility was suspected in men with < 5 million sperm/mL in the best sample of semen and concomitant poor sperm motility, and who were classified by follicle-stimulating hormone (FSH) values. At orchidopexy the number of spermatogonia/tubule and the germ cell differentiation were measured. In adulthood the percentage of tubules with complete spermatogenesis, spermatogenic arrest and Sertoli-cell only status was assessed. Infertility was suspected in 38 of 70 (54%) of formerly bilateral and six of 65 (9%) formerly unilateral cryptorchid patients. High FSH values were expected in these suspected infertile patients, but 15 of 38 (59%) formerly bilateral and five of six formerly unilateral cryptorchid patients had normal FSH values. These patients were identified in childhood at orchidopexy; those with bilateral undescended testis generally presented with germ cells, but the mean number of spermatogonia per tubule was < 30% of the lowest normal value, and the germ cells were seldom normally differentiated, whereas those with unilateral undescended testis generally lacked germ cells in the biopsies. No patients had a decreased FSH value.

Conclusions

By analyzing these studies the conclusion is that the level of testosterone and LH, in the majority of the cases of undescended testicle, is in normal limits, while FSH levels modifies in connection to fertility. So, while oligospermia is high, FSH values are high too. The infertility rate is 50% in some studies, when the disease is bilateral and 10% when it is unilateral. There are no major

influences regarding the initial position of the undescended testicle, but the best results were obtained in the case of orchidopexy until the age of 2 years.

Although our knowledge on undescended testis has increased considerably during the last decades, many questions about undescended testis treatment and its results remain to be answered:

1. Do hormones have any role in the treatment? In our opinion they do, 12,5% of cases in our study being healed with hormonal treatment only.

2. What is the role of surgical treatment? Surgical treatment is the most effective and reliable method to bring testes into the scrotum.

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Correspondence to:

Radu Emil Iacob
D. Kiriac Street, No. 8, Ap. 9,
Timisoara 300487,
Romania
E-mail: radueiacob@yahoo.com