Journal of Pediatrics and Neonatology

ISSN 2688-5573

Research Article

Efficacy of Laparoscopy in the Treatment of Non-Palpable Testes

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Abstract

Introduction: To assess the efficacy of laparoscopy in patients with non-palpable testes. To identify associated diagnoses in the studied patients, proposing a critical route of diagnosis and treatment for the patients included in the study.

Methods: Qualitative, retrospective, longitudinal study. Analyzing patients with ages 0 to 18 years old with IAT operated from 2012 to 2019. They were evaluated preoperatively with clinical history, laboratory and imaging studies. Inclusion criteria: patients undergoing laparoscopic exploratory surgery. Exclusion criteria: patients with cryptorchidism and palpable testes, and patients with disorder in sexual development.

Results: There were 989 patients diagnosed with cryptorchidism, of which 36 patients had IAT (47 IAT units), 13 right cases, 12 left cases, and 11 bilateral cases. IAT had an incidence of 3.6 % of the total number of patients with cryptorchidism, with a total of 25 unilateral and 11 bilateral testes. After the surgery, 11/13 right IAT, descended; 6/12 left IAT, descended; 12/22 testes with bilateral IAT, descended; 6/47 IAT had testicular agenesis; 10/47 IAT had testicular atrophy: 6 right and 4 left.

Conclusion: Laparoscopic orchidopexy has gained wide acceptance in the management of non-palpable testes and is increasingly reproducible and useful in timely diagnosis and treatment, allowing for less dissection of the vascular elements, shorter hospital stays, and better cosmetic results.

Keywords: Cryptorchidism; Non palpable testes; Intra-abdominal testes; Laparoscopy; Orchidopexy; Clinical pathways

Introduction

Cryptorchidism is a congenital pathology characterized by an incomplete descent of one or both testes into the scrotum. There are four identified factors that can limit the movement of the testes into the scrotal sac: mechanical, endocrine, paracrine, and growth factors; when one of these is affected, the developmental stages of the testis are limited [1-8]. The prevalence rate in live newborns worldwide is 4.5%, with the highest incidence in 30%-45% of preterm infants, in 75% of whom the testicle is likely to descend in newborns at full term. In 90% of preterm infants, it will descend during infancy with a decrease in the incidence of 0.8%-1.2% during their first year of life. Cryptorchidism is unilateral in 85% of the cases, with predominance on the right side [3-10]. For Berchi-García FJ, the anomaly affects the right testis in 50% of cases, the left testis in 30%, and bilaterally in 20% of the cases [7]. The risk factor is more common in patients with low birth weight, twins, children of mothers with gestational diabetes, alcohol or tobacco intake, exposure to estrogens and pesticides [11]. The correct clinical diagnosis is made by palpation of the empty and hypoplastic or probably wrinkled scrotum and sensation of inguinal fullness [3]. A non-palpable testis can be intra-abdominal, absent, ectopic, or not appreciated in the physical examination when we encounter non-cooperative patients, overweight patients and/or patients with previous surgeries that obscure the inguinal-scrotal anatomy [13]; they are usually asymptomatic or accompanied by minimal discomfort. For this reason, a correct anamnesis supported by a medical interview of the parents should be carried out. When the testes are not palpable, they can be explored sitting in a squatting position with the legs apart in order to increase intra-abdominal pressure, paying attention to the descent of the testis into the inguinal canal [14]. Findings suggesting endocrine, genetic or metabolic disorders such as dysmorphic features, midline defects, nystagmus, hypertelorism, cleft palate, short or tall stature, skeletal abnormalities, hypotonia shall be evaluated [15]. It is important to indicate that a patient with a male phallus and bilateral non-palpable testes has a high genotypic potential of the female gender with congenital adrenal hyperplasia until proven otherwise. In the differential diagnosis, we should include disorders of sexual development and request the following: sex chromatin for differential diagnosis of Klinefelter's syndrome; karyotype for malformities and genetically caused syndromes; HCG testicular stimulation test to confirm the presence of testicular tissue capable of stimulation; measurement of Müllerian inhibitory substance; inhibin B, FSH, LH and testosterone in patients who do not have congenital adrenal hyperplasia to evaluate the presence of anorchia [6]. The testes are diagenetic and therefore can condition a functional alteration of the testis. An individual with unilateral cryptorchidism may have a contralateral testis normally descended but genetically diagenetic; therefore, they can have an average number of abnormal and immature spermatozoa [2]. Gomez et al. [16] conducted a study in a population of 44 adults with cryptorchidism, of which 45.5% had normal sperm count, and 43.2%

Citation: Tapia Garibay JI, Miranda Ruiz GA, Román CL. Efficacy of Laparoscopy in the Treatment of Non-Palpable Testes. J Pediatr Neonatol. 2022;3(2):1023.

Publisher Name: Medtext Publications LLC

Manuscript compiled: Oct 17th, 2022

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had severe oligozoospermia of less than 10 million/ml, and 11.4% had moderate oligozoospermia of 10-20 million/ml. The risk of testicular cancer is 10 to 60 times higher in patients with cryptorchidism than in the general population [6,17]. Another complication is testicular torsion, which is ten times more common in undescended scrotal testes than in normal testes [18]. In boys with untreated undescended testes, an inguinal hernia can present at any time typical symptoms or complications, including incarceration [19].

The treatment can be carried out hormonally or surgically

Hormonal: It has been shown that hCG, GnRH, and LHRH are a therapeutic option in testicular descent, reporting only 20% less efficacy when the testis is higher. Androgens are not used because they can trigger precocious puberty; however, hCG can cause adverse reactions such as increased scrotal wrinkling and skin pigmentation, as well as increased pubic hair growth and penile growth at doses above 15000 IUI29. The success rate is 10% in intra-abdominal testes. When we find unilateral ascended testes, we must perform a surgical procedure after hormone treatment [20,21].

Surgical: Orchidopexy is recommended to be performed after six months of age and before two years of age [22]. In the case of intra-abdominal testes, the current trend is to use diagnostic laparoscopy with the recommendation to perform the orchidopexy in the same surgical procedure [23]. Laparoscopic surgery offers the surgeon the possibility of performing minimally invasive approaches, leaving aside open exploration and facilitates laparoscopic orchidopexy. For the non-palpable testis, it allows us to perform a correct diagnosis with high therapeutic potential; its main surgical objective is to determine whether the testis is present or not. In the case of viable testes, they are placed and fixed within the scrotum, and the remains of the non-viable testis are removed [24].

Methods

A qualitative, retrospective, longitudinal, risk-free, retrospective study was performed. We included 989 patients who attended for medical examination and assessment in the Pediatric Urology Service of the Children's Hospital of Morelia "Eva Sámano de López Mateos" (SSA), over a period of eight years (2012-2019). For the clinical analysis and classification, it was determined to use Beltran-Brown's classification for cryptorchid lesions. The definition of the units of observation was the files of patients with a diagnosis of non-palpable testes. To carry out the study, male patients aged 0 to 18 years old, who had to comply with the absence of at least one testicle in the scrotum, were examined.

Results

There were 989 patients who attended Pediatric Urology consultation at the Children's Hospital of Morelia diagnosed with cryptorchidism: 36 (3.64%) non-palpable and 953 (96.36%) palpable. The mean age at diagnosis was 13.89 months, with a standard deviation of 27.5 months. 47.2% were diagnosed at the age of 0 months; the mean age of treatment was 37.6 months, with a standard deviation of 37.1; 25% were treated at 24 months. Of the 36 patients included in the study, representing a total of 72 testicular units, 25 (34.7%) descended and 47 (65.3%) undescended were identified. At the time of examination, 36.1% of the non-palpable testes were right, 33.3% were left, and 30.6% were bilateral. 30.6% corresponded to descended right intra-abdominal testes, 8.3% descended left intra-abdominal testes; 16.7% were bilateral descended intra-abdominal testes; 5.6% right testicular agenesis, 11.1% left testicular agenesis, 11.1% left testicular atrophy, 2.8% bilateral testicular atrophy, 2.8% testicular atrophy due to iatrogenesis, 5.6% descended left intra-abdominal testes, as well as right testicular atrophy, 2.8% right testicular atrophy and left testicular hypotrophy, 2.8% descended left intra-abdominal testis and descended right inguinal testis in Table 1. Twenty-five unilateral and 11 bilateral intra-abdominal testes were successfully descended, having a total of 47 affected testicular units, 11 right testes descended, 6 left testes descended, 12 bilateral testes descended satisfactorily. Table 2 was observed: 12 Testicular atrophy, 6 Testicular agenesis, 29 Descended testicles in Table 3. Of the 22 bilateral units, 54.5% of the right testis was diagnosed as descended right intra-abdominal testis, 36.4% as of right testicular atrophy, 9.1% as of right canalicular testis. In the left testis, 81.8% of the left intra-abdominal testis was diagnosed as descended, 9.1% as atrophy of the left testis, 9.1% as hypotrophy of the left testis. 19.44% of patients had associated diagnoses: 1 patient with obesity, 1 ADHD, 2 hypospadias, 1 hypogonadism, 2 right-sided hydroceles, 1 scrotal lipoma, 1 micropenis, 1 lingual frenulum, 1 VSD. It was possible to descend into the scrotum on the 36.1% for right non-palpable testis, 33.3% for left non-palpable testis, and 30.6% for bilateral non-palpable testis.

Discussion

Studies have been conducted in Mexico [25,26] with smaller cohorts in terms of patients and testicular units explored in relation to the present study, which included 36 patients with a total of 47 testicular units explored; however, they did not collect data on the period of time from diagnosis to treatment. Berkowitz GS [27] reported a prevalence of 1-2% of patients with cryptorchidism, with 20% being non-palpable or intra-abdominal testes. Méndez MG [28] reports an incidence of 8.8%. Meza G et al. [25] reported in the Hospital de Occident in Guadalajara, Jalisco, where the age group with the highest incidence was preschoolers with 30%. Lopez P [29] reported 40.3% left non-palpable testis, 40.3% right non-palpable testis, and 19.4% bilateral non-palpable testis, demonstrating an equal distribution in both cohorts studied in terms of laterality distribution of non-palpable testis. Riquelme -Heras MA [26] the efficacy of exploratory laparoscopy is 100% effective in diagnosis and therapy, allowing the clinical testis to be recognized for subsequent descent, as well as the recognition of atrophy/hypotrophy, to continue with orchiectomy, and lastly to observe the absence of gonadal development.

Conclusions

Laparoscopic orchidopexy has gained acceptance in the management of the non-palpable testis and is increasingly reproducible and helpful in diagnosis and timely treatment. Laparoscopic orchidopexy is the best option for intra-abdominal non-palpable testis: it is a procedure that produces less trauma in the location of the testis and dissection of the vascular elements, with the advantages of less pain in the postoperative period, rapid recovery, shorter hospital stays, and better cosmetic and functional results. It was possible to descend into the scrotum on the 36.1% for right NPT, 33.3% for left NPT, 30.6% for bilateral NPT, which in sum presents an efficiency of 100%, in the final diagnosis, which represents knowing if the testicle exists, is atrophic or agenesis. Also taking into account the importance of knowing if there are remnants of the testicles due to the malignant repercussions that are associated with it. In order to give certainty to the parents of what happened to the gonads of their child.

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Table 1: Recording of non-palpable testes according to their anatomical situation.

LAPAROSCOPIC DIAGNOSIS	TESTICULAR UNITS	PERCENTAGE
DESCENDED RIGHT INTRA-ABDOMINAL TESTIS	11	30.6%
DESCENDED LEFT INTRA-ABDOMINAL TESTIS	3	8.3%
DESCENDED BILATERAL INTRA-ABDOMINAL TESTIS	6	16.7%
RIGHT TESTICULAR AGENESIS	2	5.6%
LEFT TESTICULAR AGENESIS	4	11.1%
LEFT TESTICULAR ATROPHY	4	11.1%
BILATERAL TESTICULAR ATROPHY	1	2.8%
IATROGENIC ATROPHY OF THE LEFT TESTIS	1	2.8%
DESCENDED LEFT INTRA-ABDOMINAL TESTIS AND ATROPHY OF THE RIGHT TESTIS	2	5.6%
ATROPHY OF THE RIGHT TESTIS AND HYPOTROPHY OF THE LEFT TESTIS	1	2.8%
DESCENDED LEFT INTRA-ABDOMINAL TESTIS AND DESCENDED RIGHT INGUIINAL TESTIS	1	2.8%
TOTAL	47	100%

Table 2: Recording of descended, agenesis, atrophic, hypotrophic, and inguinal testes.

Final diagnosis	Testicular units	Laterality	Testicular units	Percentage	Total percentage
Unilateral descended	17	Descended right testes	11	23.4%	36.2%
		Descended left testes	6	12.8%	
Bilateral descended	12	Bilateral descended testes	12	25.5%	25.5%
Testicular agenesis	6	Right-sided agenesis	2	4.3%	12.8%
		Left-sided agenesis	4	8.5%	

Table 3: Final diagnosis of the testicles.

Final diagnosis	Testicular units
Testicular atrophy	12
Testicular agenesis	6
Descended testicles	29
Total	47

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