



Single Scrotal Incision Orchiopexy in Children with Palpable Undescended Testis

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

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To:

My parents

*for their endless love, support,
and continuous care*

*My Family
&
My Friends*



List of Contents

Title	Page No.
List of Tables	6
List of Figures	7
List of Abbreviations.....	9
Introduction and Rationale	- 1 -
Aim of the Work	4
Review of Literature	
▪ Embryology	5
▪ Anatomy of Testis, Epididymis Spermatic Cord and Scrotum	12
▪ Functions of the Testis	29
▪ Evaluation of a Patient with Maldescended Testis.....	41
Patients and Methods	47
Results	54
Discussion.....	65
Summary and Conclusion.....	70
References	71
Arabic Summary	

List of Tables

Table No.	Title	Page No.
Table (1):	Testicular size according to age during childhood	12
Table (2):	Shows demographic data of the patients:.....	54
Table (3):	Shows distribution of patients according to affected side:	55
Table (4):	Shows undescended testicular sites in the patients:	55
Table (5):	Shows postoperative complications in the patients:	56
Table (6):	Shows mean of the total surgical time:	56
Table (7):	Shows volume of testes operated in mm3 among patients	57
Table (8):	Shows volume of contralateral testes (not operated) in mm3 among patients:	57

List of Figures

Fig. No.	Title	Page No.
Fig. (1):	Migrational pathway of the primordial germ cells along the wall of the hindgut and the dorsal mesentery into the genital ridge.....	5
Fig. (2):	Transverse section through the lumbar region of a 6-week embryo showing the indifferent gonad with the primitive sex cords.	6
Fig. (3):	Schema of the development of the gonads and associated ducts as seen in transverse section	7
Fig. (4):	Descent of the testis	10
Fig. (5):	Schema showing gubernacular development in two phases of testicular descent in the human fetus.....	11
Fig. (6):	The right testis exposed by incising and laying open the cremasteric fascia and parietal layer of the tunica vaginalis on the lateral aspect of the testis	13
Fig. (7):	Vertical section through the testis and epididymis, showing, diagrammatically, the arrangement of the ducts of the testis and the mode of formation of the deferent duct	15
Fig. (8):	Various anomalous relations of epididymis to testes	16
Fig. (9):	Transverse section through a part of a human testis, stained with iron haematoxylin and Van Gieson's stain, magnification 1: 350	19

List of Figures *cont...*

Fig. No.	Title	Page No.
Fig. (10):	Arterial supply to the testis, epididymis, and vas deferens, with anastomosis around caudaepididymis	25
Fig. (11):	The range of positions that can be adopted by undescended testes	34
Fig. (12):	The diameter of the seminiferous tubules is smaller than normal in this testis from a 2 - year old infant	39
Fig. (13):	High scrotal incision in bianchi technique.	58
Fig. (14):	Testis emerging from surgical incision in bianchi technique.....	58
Fig. (15):	Identification of hernial sac, vas and vessels in spermatic cord.....	59
Fig. (16):	Intraoperative appearance of herniotomy during scrotal orchidopexy.	59
Fig. (17):	Length of spermatic cord after dissection and herniotomy.....	60
Fig. (18):	High scrotal incision after closure.	60
Fig. (19):	Operatited left palpable UDT	61
Fig. (20):	Bilateral palpable UDT operated in the left side	61
Fig. (21):	Operated right palpable UDT.	62
Fig. (22):	Operated right palpable UDT.	64

List of Abbreviations

Abb.	Full term
<i>CGRP</i>	<i>Calcitonin gene-related peptide</i>
<i>CT</i>	<i>Computerized tomography</i>
<i>DHT</i>	<i>Dihydro - testosterone</i>
<i>FSH</i>	<i>Follicle stimulating hormone</i>
<i>GH</i>	<i>Growth hormone</i>
<i>Gn - Rh</i>	<i>Gonadotropic releasing hormone</i>
<i>Insl13</i>	<i>Insulin-like factor</i>
<i>LH</i>	<i>Luteinizing hormone</i>
<i>LH</i>	<i>Luteinizing hormone</i>
<i>MRI</i>	<i>Magnetic resonance imaging</i>
<i>UDT</i>	<i>Undescended testis</i>

INTRODUCTION AND RATIONALE

Undescended testis or cryptorchidism is one of the most common congenital abnormalities of the genitourinary system in young boys, approximately 1-2% of boys at the age of 1 year have undescended testis, the disorder being unilateral in about 90% of cases and bilateral in about 10%.^(1, 2)

Approximately 80% of undescended testes are palpable and 20% are non-palpable, the non-palpable testis can be located in the abdomen in some boys, but it might have been pushed into the upper inguinal canal: this disorder is termed 'peeping testis', in about half of the cases of non-palpable testis, a testis is located in the abdominal cavity; the remainder are atrophic, either secondary to an antenatal torsion in utero or agenesis, only 20-40% of non-palpable testes are absent upon surgical exploration.⁽³⁾

Palpable testes may be undescended, ectopic, or retractile, ectopic testes exit the external inguinal ring and are then misdirected along the normal course of the testis, retractile testes may be palpated anywhere along the natural course of the testis, although most are inguinal, although not truly undescended, these testes may be supra-scrotal secondary to an active cremasteric reflex, this reflex is usually weak in infants and most active in boys aged 5 years, these testes can be manipulated into the scrotum, where they remain without

tension, this condition is considered a variant of normal; however, the risk of ascent may approach 50%.⁽⁴⁾

Cryptorchidism has a potential adverse effect on fertility; most investigators suggest that damaging influences causing testicular morphological changes and a decreased spermatogonial count begin at the first year of life. Cryptorchidism is also a major risk for testicular cancer.^(5, 6)

Successful surgical placement of the testis in the scrotum is based on the principles originally described by Bevan in 1899; these include adequate mobilization of the testis and spermatic vessels, ligation of the associated hernia sac, and adequate fixation of the testis in a dependent portion of the scrotum, many different techniques have been described.⁽⁷⁾

The majority of cryptorchidic testes are in the superficial inguinal pouch of Denis Browne, making inguinal exploration the traditional surgical correction procedure.⁽⁸⁾ The traditional technique is accepted as providing good access for a variety of undescended testicular positions, the inguinal procedure requires two incisions: one in the groin to release the testicle, and another scrotal incision to make a pocket to accommodate the testicle.⁽⁹⁾

The traditional approach for managing undescended testes was initially described by **Schuller**⁽¹⁰⁾ and **Bevan**.⁽¹¹⁾ This approach is considered safer by avoiding damage to the

testicular vessels and vas, most observers still maintain that adequate mobilization of the cord is not possible without an inguinal and retroperitoneal dissection of the cord with high ligation of the patent processus vaginalis, even for “low” (testes palpable distal to inguinal canal) undescended testis. ⁽¹²⁾

In **1989 Bianchi and Squire** introduced a technique utilizing a single scrotal incision. ⁽¹³⁾

Bianchi and Squire have shown that the palpable undescended testes has a normal vascular pedicle and is held by shorter than normal and often high insertion of the processus vaginalis; they proposed that the hernia sac can be addressed in most such cases through the high scrotal incision without the need for an additional groin incision, a single scrotal incision is sufficient to bring low undescended testes to the base of the scrotum, due to the short inguinal canal, mobility of the skin incision, especially in younger children and many palpable undescended testes can be localized distal to the external inguinal ring in the superficial inguinal pouch, this approach has also been used to treat abnormalities of the patent processus vaginalis, such as hernia and hydrocele in selected children. ⁽¹²⁾⁽¹³⁾

It is suggested that this technique adds the advantages of a single incision, shorter operation time, ease of dissection, accelerated healing, less pain, good maintenance of testicular position and an excellent cosmetic result. ⁽¹⁴⁾

AIM OF THE WORK

We conducted this prospective study to assess the efficacy and safety of single-incision, transscrotal orchidopexy in children with palpable UDT.

The following parameters were evaluated

1. Operative technique.
2. Operating time.
3. Intra-operative and postoperative complications including wound infection, testicular atrophy, testicular reascent, and hernia.
4. Cosmetic satisfaction.

Chapter 1

EMBRYOLOGY

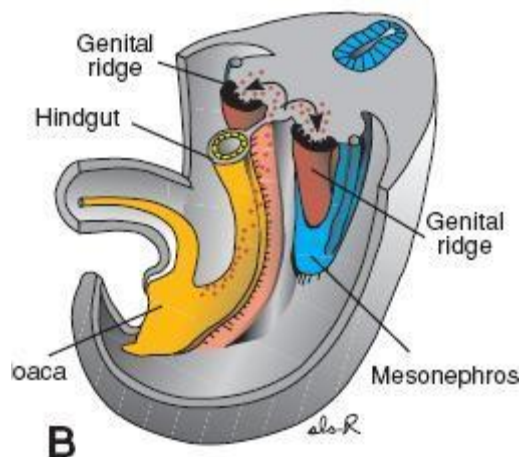
Development and descent of the testes:

The reproductive and urinary systems are developed from the mesoderm of the intermediate cell mass and they are associated to each other in the earlier stages of their development. ⁽¹⁵⁾

1) Development of the testes:

The gonads are the bilateral primary sex organs, during the 4th week of intrauterine life they start to appear in the form of a pair of longitudinal ridges called the gonadal or genital ridges which lie on either side of the midline on the medial side of the mesonephros (**Fig 1**), by the 6th week of gestation, primordial germ cells migrate along the dorsal mesentery of hindgut to reach the genital ridges; then by the 7th week, the indifferent gonads differentiate into fetal testes. ⁽¹⁶⁾

Fig. (1): Migrational pathway of the primordial germ cells along the wall of the hindgut and the dorsal mesentery into the genital ridge. ⁽¹⁷⁾



The proliferating epithelium forms a number of gonadal cords separated by mesenchyme of the mesonephros, which constituted the medulla, the primary sex cords extend into the medulla if the gonad and lose their connection with the surface epithelium to form thick tunica albuginea, while the primary sex cord form the seminiferous tubules, the cellular cords lengthen and encroach on the medulla where they unite with the network derived from the mesenchyme forming testicular rete. **(Fig. 2)**⁽¹⁸⁾

The mesodermal cells in the sex cords develop into the sertoli cells which secrete anti - mullerian hormone that cause the regression of the mullerian duct⁽¹⁹⁾, while the mesoderm between the seminiferous cords give rise to interstitial cells, leydig cells, which at 10 to 11 weeks of gestation start to produce testosterone that stimulate the development of wolffian duct to for the epididymis, vas deferens and seminal vesicles.⁽²⁰⁾ Differentiation of external genitalia takes place between 10 and 15 weeks of gestation and is dependent on the presence of 5 - alpha reductase, which converts testosterone to dihydro - testosterone (DHT).⁽²¹⁾

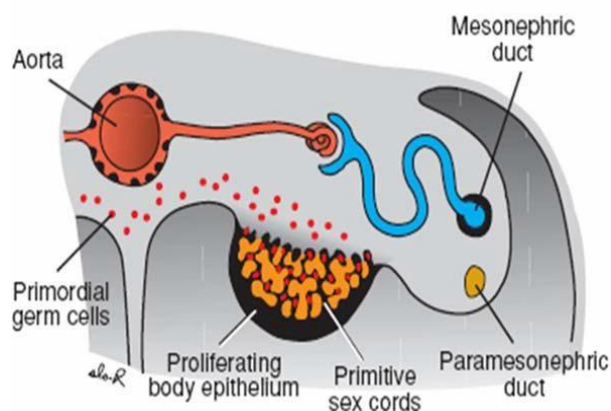


Fig. (2): Transverse section through the lumbar region of a 6-week embryo showing the indifferent gonad with the primitive sex cords.