ROLE OF LAPAROSCOPY IN UNDESCENDED TESTIS IN CHILDREN

An essay

submitted for partial fulfillment of master degree

in general surgery

By

Ismail Mohamed Abdel Aatty Mohamed

M.B.B.CH, Mansoura University

Supervised by

Prof. DR. HISHAM Abdel Raouf El Akkad

Professor of General Surgery

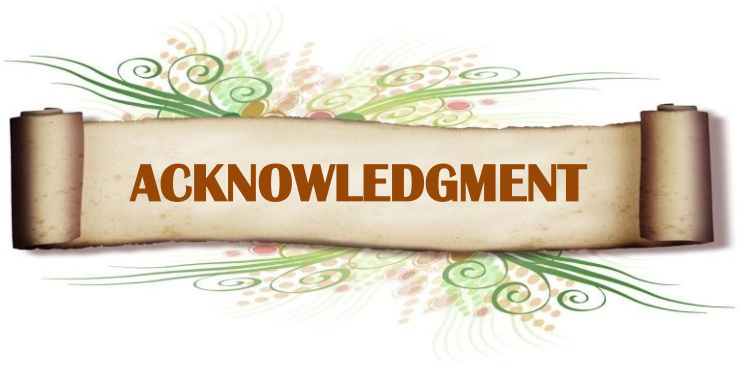
Faculty of Medicine - Ain Shams University

DR. Mohamed Ibrahim Hassan Bourai

Lecturer of General Surgery

Faculty of Medicine - Ain Shams University

2016



TO **ALLAH**,*everythingin life is resumed. In this work, he helped me too much. He offered me what I did not know and what I have to know. Hence, if only one to be thanked, Allah is the first and the last. Then those offered by Allah to advise and guide me, have to be thanked.*

I would like to express my profound gratitude to **Prof.DR. Hisham Abdel Raouf El Akkad** *Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his kindsupervision, experienced guidance, masterly teaching and his great support that madethe completion of this work possible.*

*I am also grateful to***DR. Mohamed Ibrahim Hassan Bourai***Lecturer of General Surgery, Faculty of Medicine, Ain Shams University, for his continuous encouragement,generous guidance and critical review. Also for his precious time and great support.*

List of Contents

List of Abbreviations

Ad	Adult dark spermatogonia
AMH	Anti- Müllerian Hormone
CGRP	Calcitonin gene–related peptide
CT	Computed tomography
CAH	congenital adrenal hyperplasia
DWI	Diffusion-weighted imaging
DSD	Disorders of sexual development
FSH	Follicle-stimulating hormone
HCG	Human chorionic gonadotropin
HOXA10	Homeobox A10
HOXA11	Homeobox A11
IAT	Intraabdominal testis
Insl-3	Insulin like growth factor 3
ITGCN	Intratubular germ cell neoplasia
LGR8	Leucine-rich repeat containing G protein like peptide receptor 8
LH	Luteinizing hormone
MIS	Müllerian Inhibiting Substance
MRI	Magnetic resonance imaging
RXFP2	Relaxin/insulin-like family peptide receptor 2
SIP	Superficial inguinal pouch
SRY	Sex-determining region of the Y chromosome
SLTO	Staged laparoscopic traction-orchiopexy
TGCT	Testicular germ cell tumor
TV	Testicular vessels
UDT	Undescended testis
USG	Ultrasonography

List of Figures

ABSTRACT

Cryptorchidism or undescended testis is one of the most common anomalies in pediatric surgery. The main reasons for the treatment of cryptorchidism include reducing the risks of an impairment of fertility potential, testicular malignancy, torsion, associated inguinal hernia and other psychological problems at puberty.

The use of laparoscopic surgery has grown dramatically in recent years in most all types of surgery. Improved diagnostic accuracy, postoperative convalescence, cost effectiveness and superior outcomes have resulted in routine use of diagnostic laparoscopy and laparoscopic orchiopexy for management of the nonpalpable testis.

Key words

Undescended testis

Impalpable testis

Laparoscopy

Orchideopexy

Inguinal canal

INTRODUCTION

Introduction

The undescended testis represents one of the most common pediatric disorders of the male endocrine glands and the most common genital disorder identified at birth **(Kolon, 2014).** Although the mechanism that regulates prenatal testicular descent is still partly obscure, there is persuasive evidence that endocrine, genetic, and environmental factors are involved **(Brouwers, 2012).**

The main reasons for the treatment of cryptorchidism include reducing the risks of an impairment of fertility potential, testicular malignancy, torsion, associated inguinal hernia and other psychological problems at puberty (**Hutson, 2012**).

Over the years, many imaging modalities have been used to detect undescended testis. These include ultrasonography, computed tomography, magnetic resonance imaging and invasive procedures like arteriography and venography, but they do not provide additional information to the physical examination or have an acceptable accuracy to detect the position of the testis or its absence **(Hartigan, 2014).**

Pediatric laparoscopy dates back to 1976 when it was used, for the first time, for non-palpable testis. Since then laparoscopy has become one of the standards for both diagnosis as well as for the treatment of non-palpable testis. Diagnostic laparoscopy is commonly used for the assessment of a non-palpable testis, with

the accuracy of testicular localization, greater than 95% **(Aggarwal, 2014).**

There are now several thousand reported cases documenting that laparoscopy is not only an accurate diagnostic tool for locating the testis but an appropriate tool to facilitate the management of the impalpable UDT, the principles of laparoscopic surgery for the UDT are similar to those of the open approach. These principles include mobilization of the spermatic vessels and the vas, hernia repair and redirecting the testis to the scrotum. The advantages of a laparoscopic approach include an accurate anatomical assessment of testicular position and viability, optimal exposure and magnification, as well as the minimal invasiveness of the procedure **(Hidas, 2012).**

.

AIM OF THE WORK

AIM OF THE WORK

The aim of this essay is to review the role of laparoscopy in undescended testis as a diagnostic and therapeutic modality in children.

CHAPTER 1

Anatomy and embryological development of the testis

Testicular development and descent depend on multiple factors, including endocrine, paracrine, growth and mechanical factors. Sexual determination begins at fertilization when a Y chromosome or an additional X chromosome is joined to the X chromosome in the egg. This phase represents the genetic determination of gender. Although the genetic gender of the embryo is fixed at fertilization, the phenotypic gender of the embryo is not manifested until the seventh week of gestation **(Carlson, 2014)**.

Differentiation of the testis:

A single sex-determining factor controls a cascade of events that lead to male development. This sex-determining transcription factor is encoded by the SRY (Sex-determining region of the Y chromosome) gene.When this transcription factor is expressed in the somatic support cells of the indifferent gonad, male development is triggered (This step is known as primary sex determination) **(Schoenwolf, 2015)**.

Primordial germ cells are the earliest precursors of gametes that arise outside the gonads and migrate into the gonads during early embryonic development. Human primordial germ cells become recognizable at 24 days after fertilization in the endodermal layer of the yolk sac and they are characterized by their large size and high content of alkaline phosphatase enzyme. They begin a phase of active

migration which takes them first from the base of the allantois to the future hindgut and, in a second stage, from the hindgut up to the dorsal mesentery into the genital ridges by 32 to 35 days (future gonads) **(Nistal, 2014)**.

When the primordial germ cells approach the genital ridges late in the fifth week of development, they will be attracted by chemotactic factors which are secreted by the future gonads and penetrate the genital ridges. When the primordial germ cells have penetrated the genital ridges, their migratory process ceases, and they lose their motility and begin to aggregate **(Freeman, 2003)**.

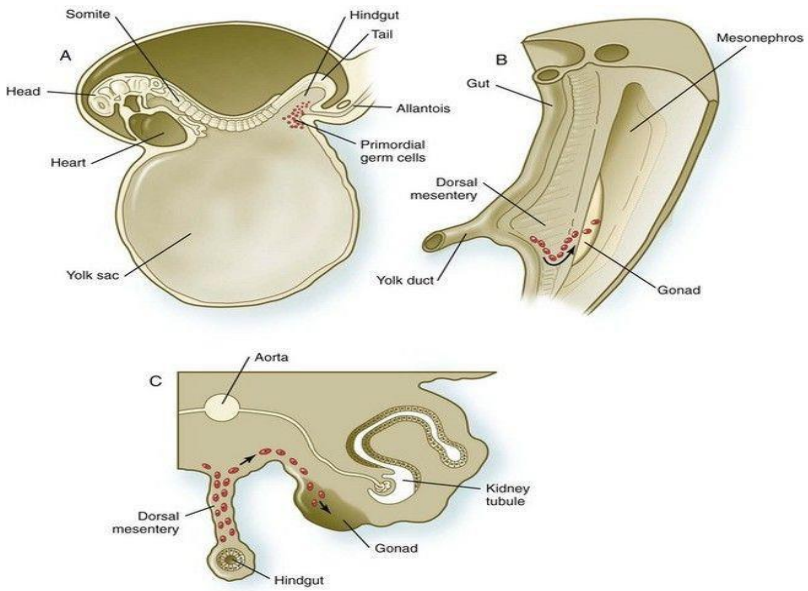


Fig. (1-1) Origin and migration of primordial germ cells in the human embryo. **A,** Location of primordial germ cells in the human embryo (midsagittal view). **B,** Pathway of migration *(arrow)* through the dorsal mesentery. **C,** Cross section showing the pathway of migration *(arrows)* through the dorsal mesentery and into the gonad **(Carlson, 2014)**.