AZOOSPERMIA

ESSAY

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By
Edmond Makram Salama

Supervised by

Dr. ABD EL FATAH AGOUR
Prof. of Urology

Faculty of Medicine
Ain Shams University

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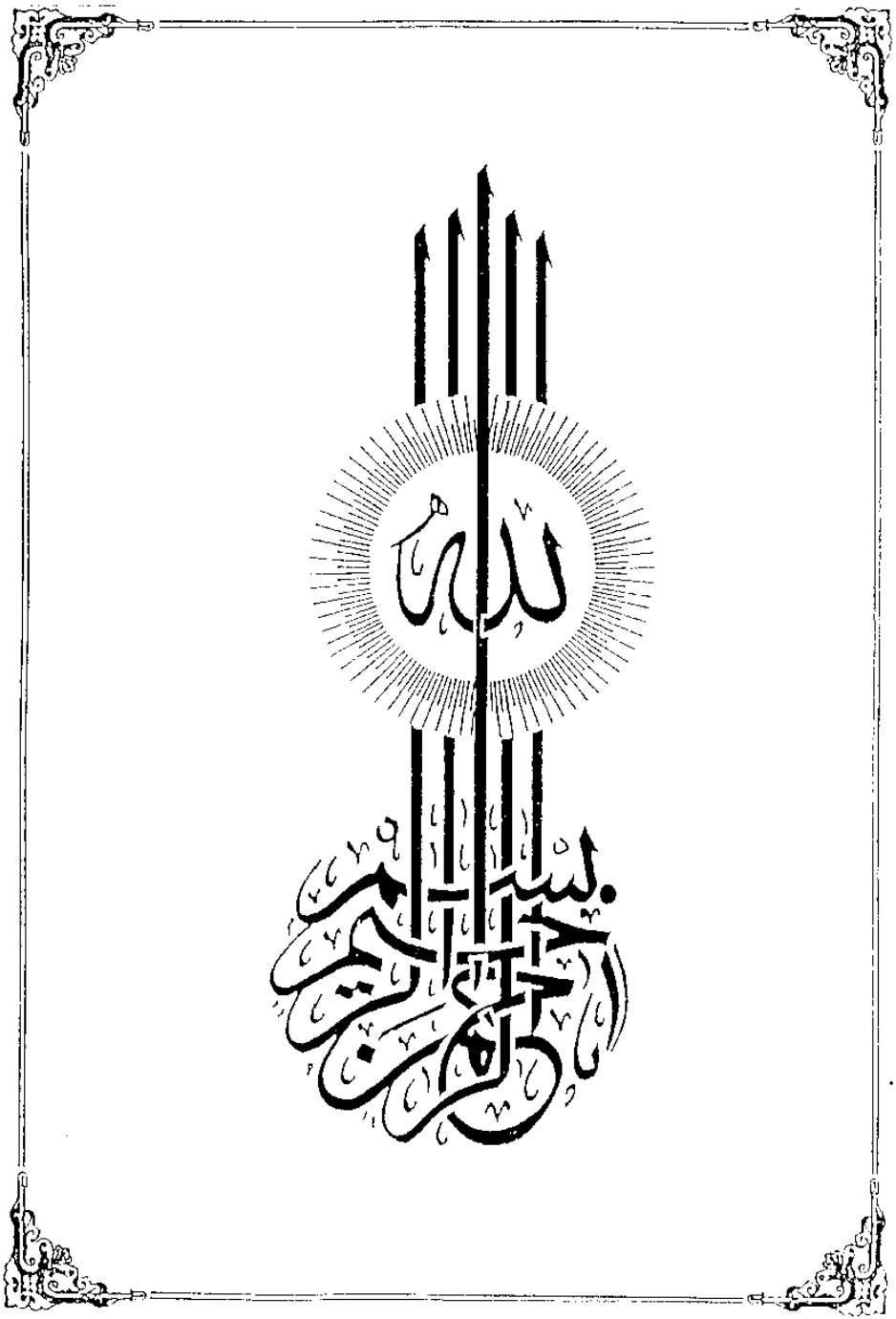

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INTRODUCTION

A man or woman who consults a physician because of involuntary childlessness should always be viewed as part of an infertile unit.

Even if a male factor for the infertility is diagnosed, it is important to clarify the potential fertility of woman as correctly as possible.

Also an expensive or time-consuming treatment or surgery should never be undertaken unless the propable fertility of the partner is known

= The male genital tract consists of unusually sensitive spermatogenic tissue, a complex excretory system and fluid-secreting glands which produce medium for tansport of the spermatozoa.

Malfunction of any of these tissues may reduce the fertility capacity of the ejaculate and it is important that a serious attempt be made to determine where the fault lies.

Routine treatment with well advertised drugs is a poor therapy. Obviously, no drug or no matter how effective will improve the fertility of a man with an obstruction lesion or of others with irreversible spermatogenic lesions.

= Semen analysis is the cornerstone of the evaluation of the infertile male

In the event that semen analysis reveal persistant azoospermia, the examination of the man should aim at differentiation among anatomical - endocrinological - genetic functional and idiopathic causes.

= Azoospermia is either functional due to spermatogenic failure or obstructive due to an obstruction in the male excretory duct.

Obstruction of the reproductive tract play an important role in the pathology of fertility

Two diagnositic methods are used:

- Surgical exploration of scrotal contents
- Exploration of the reproductive tract and accessory sex glands

Testicular biopsy is mandatory in azoospermic men to distinguish between ductal obstruction and spermatogenic failure.

= Induced azoospermia can be performed through vasectomy which became the simplest, most popular and most available form of voluntary permenant family planning.

= Patients with untreatable infertility should fully understand the nature of their disorders so that they may make decisions about adoption or artificial insemination

EMBRYOLOGY OF THE TESTIS AND EPIDIDYMIS & VAS DEFERENS & SEMINAL VESICLES

In each sex, the reproductive organs consist of gonads, an internal duct system and external genitalia. In the male, the gonads differentiate into the testis, the duct of the epididymis, ductus deferens and seminal vesicles. The development of gential organs proceeds from an indifferent stage (at 15-20 mm C-R crown-rump length) in which the sex of the gonad is not determined and in which the mesonephric (wolffian) and para mesonephric (mullerian) duct systems are both present.
The sexual development and differentiation pass with 3 stages of sucessive manner :-

1. Stage of establishment of Genetic Sex Genetic Sex
2. Stage of establishment of Gonadal Sex Gonadal Sex
3. Stage of establishment of Phenotypic Sex Phenotypic Sex

ESTABLISHMENT OF GENETIC SEX :

The Sex of the normal embryo is determined at the time of fertilization depending on whether or not the Y chromosome is present in the fertilizing sperm. Female embryo possesses two identical Sex Chromosomes XX and male embryo possesses two heterogenous sex chromosomes XY.
The Sex of the embryo can be readily established by the now widely used sex chromatin test which is based on the sex dimorphism shown by the resting nuceli of most somatic cells. This test, which was discovered by Barr depends on the fact that in most resting cells of the female a small chromatin.

mass which lie in close apposition to the nuclear membrane, can be found in the nucleus. The presence or absence of this Sex chromatin body enables most tissues to be divided into chromatin + ve or chromatin - ve.
It is now established that sex chromatin bodies represent inactivated X Chromosomes in excess of one per cell, so that XY, XO and XYY individuals have no sex chromatin bodies, XX, XXY and XXYY individuals possess one sex chromatin body, XXX, XXXY individuals possess two sex chromatin bodies.

ESTABLISHMENT OF GONADAL SEX

The medulla of primordial gonad becomes a testis if the chromosomal constituation of the germ cells includes a Y chromosome, where as a 46, XY individual is a normal male. Absence of Y chromosome yield 45, XO individual who develops as a female with streak gonads. Either the Y chromosome or the interaction of Y & X chromosomes is responsible for development of the gonad into a testis.

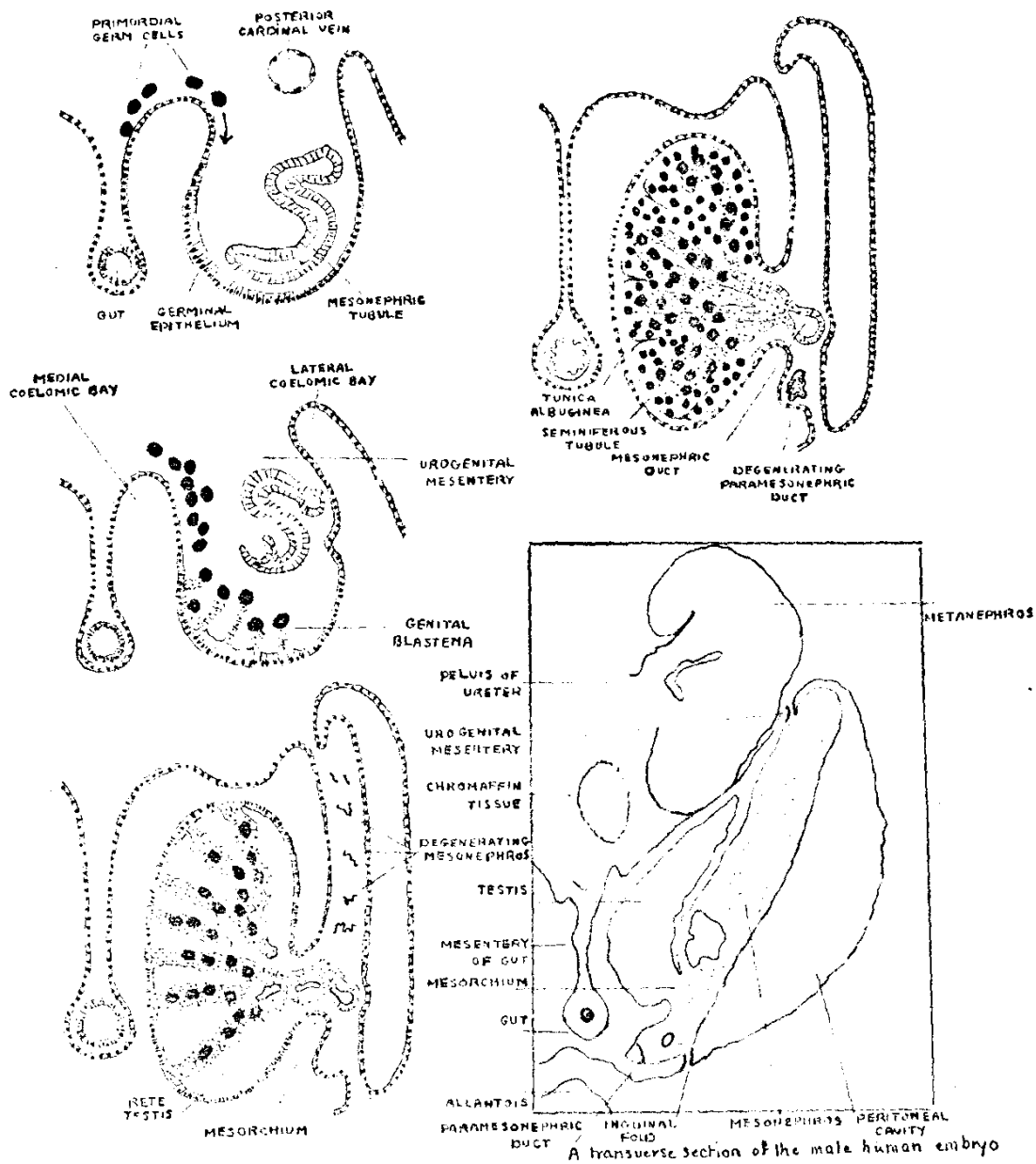
- Hamerton (1966) states that the structural gene information for differention of testis is found on X chromosome and regulatory gene information is carried on the Y chromosome.

- Federman (1973) concludes that structural gene information for testicular morphogenesis is carried on X chromosome, the Y chromosome carries a regulatory focus monitors its expression.

- Jacobs and Ross (1966) state that the regulator focus may be located on the short arm of Y chromosome.

... The histologically recognizable primordia of the sex glands (testes) appear in embroys of 4 - 5 mm C - R length as thickenings " genital ridges " of the coelomic epithelium on the medical aspect of the mesonephros. When the genital thickenings differentiate in the coelomic epithelium the basement membrane separating the latter from the underlying mesenchyme disappears and cords of cells proliferate from the epithelium into the mesenchyme. Soon, cells of special type become interspersed in the substance of gonadal primordium. These cells are spherical and are larger than surrounding mesenchymal cells, they possess large vesicular nuclei. These special cells are called " primordial germ cells ". The primordial germ cells take origin from endoderm of the yolk sac wall close to the allantoic diverticulum by about the 1mm stage of development then they are transferred from the yolk sac to the mesoderm of the hindgut and thence along the mesentery to the gonadal ridges.

The gonads therefore, are derived from 3 different components, the primordial germ cells, the coelomic epithelium and subjacent mesenchyme of limited part of mesonephric ridge. These cells of different origins form a condensation " the genital blastema " which extends over the middle two quarters of the medial aspect of the mesonephros. The mesonephros is now projecting into the coelomic cavity, possessing a thick mesentery which is separated from root of the gut mesentery by a medial coelomic bay and from the parietal coelomic epithelium by lateral coelomic bay. Since this mesentery suspends both the mesonephros and the attached genital blastema, it is called (urogenital mesentery).



Schemes to show the development of the testes

(Drawn from: Human Embroyology, 1972)

The mesentery, the mesonephros and the gonad together make up the (urogenital ridge). As the gonad increases in size and projects from the medial aspect of common urogenital ridge, deep grooves appear on its lateral and medial aspects separating it from the retrogressing mesonephros laterally and supra renal primordium dorsomedially. Deepening of these grooves results in formation of gonadal mesentery (mesorchium or mesovarium) and urogenital mesentery becomes attenuated.

. The development of the suprarenal gland and metanaphros and the growth of the gonad cause the urogenital mesentery to be displaced laterally also medial inclination of paramesonephric and mesonephric ducts results in the ridge approaching its fellow of the opposite side and eventually fusing with it forming the " urogenital septum " which lies between the bladder ventrally and the hindgut dorsally. As the tubal portion of urogenital ridge passes the brim of the embryonic pelvis it is joined to the anterior abdominal wall by mesodermal thickening, the inguinal fold in which the gubernaculum later develops.

*Differentiation of the gonads into the testes

Before the seventh week of embryonic life the gonads of both sexes are identical in appearance so that an examination of their structure does not permit a diagnosis of sex to be made.

. The testis can first identified in embryos of 17 (15 - 20) mm C.R. length when the male gonadal blastema becomes subdivided into sex cords by fibrous bundles.

- At about the 25 (18 - 32) mm stage the development of dense fibrous layer, the tunica albuginea, separates the sex cords from the germinal epithelium completely.
- Later development results in the inclusion of the male primordial germ cells into the sex cords and in extension of the latter into the region of mesorchium where they form a network the rete testis.
- At 30 mm stage the cords become canalized to form the seminiferous tubules the walls of which are formed by the sustentacular (sertoli) cells surrounding the intercalated primordial germ cells.
- At 32 - 35 mm stage the interstilial cells of the testis (leydig cells) appear and synthesis of testosterone begin (some of shorter sex cords may not become canalized and possibly persist as some of the interstilial cells but most of the interstilial cells are derived from the mesenchymal cells of the stroma).
- The rete testis becomes canalized relatively late (50 - 90 mm) and further extension into mesonephric tubules. The mesonephric epigenital tubules which join the rete testis lose their glomeruli, but persist to form the efferent ductules which bring the rete testis into communication with the mesonephric duct.

DISORDERS OF GONADAL DIFFERENTIATION due to :

1. Anomalous Sex Chromosomes
   Gonadal dysgenesis - True hermaphroditism - mixed gonadal dysgenesis - Klinefelter's Syndrome.
2. Uncertain cause (chromo somal Sex is normal)
   pure gonadal dysgenesis - Gonadal agenesis

Gonadal Dysgenesis " Turner's Syndrome "

It is disorder in phenotypic females in which $1^{\underline{ry}}$ amenorrhoea and sexual infantilism are associated with multiple cong. anomalies and bilateral streak gonads and it is must be distinguished from :

a. Mixed gonadal dysgenesis

   Unilateral testis and contralateral streak gonad are present in patient with mosaic 45 XO/46 XY Karyotype.

b. Pure gonadal dysgenesis

   Bilateral streak gonads are present in phenotypic female with $1^{\underline{ry}}$ amenorrhoea normal stature and 46 XY Karyotype.

c. Turner's phenotype

Phenotypic males and females have short stature and other somatic anomalies typical of Turner's Syndrome but have normal testis & ovaries.