# PERCUTANEOUS VENOGRAPHY AND OCCLUSION IN MANAGEMENT OF SPERMATIC VARICOCELE

THESIS
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بسم الله الرحمن الرحيم

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# Chapter 1

# Introduction and Aim of the Work

**Introduction and Aim of the Work**

Male infertility seems to be on the increase, because certainly many couples marry later, many postbone having a family untill they are in their thirties. By the time they decide to have a child, the firtility of one or both partners may have been declined. Years ago, the husband did not want to be evaluated for infertility, instead placing the burden on his wife. But this situation has changed nowadays because the patients are now better informed about the problem of the male infertility (Logan J, 1986).

The association of male subfertility and clinical Varicocele of the testes has been well demonstrated. Varicocele is now accepted as an important cause of infertility accounting for up to 39% of the cases of male infertility (Shuman L, 1986).

A decreased sperm count together with an abnormal sperm motility and morphology have been shown to occur with all degrees of Varicocele whether clinically apparent or not. The size of the Varicocele seems not to influence the degree of infertility (Dubin and Amilar, 1970).

The surgical treatment of the Varicocele, irrespective to its size has been by ligation of the incompetent veins of the testes (Dubin and Amilar, 1970).

More recently, attention has been directed to the subclinical Varicocele, which can be exclusively demonstrated by a spermatic venography.

The percutaneous vascular approaches evolved originally for purely diagnostic imaging purposes have been adopted to a variety of therapeutic maneuvers. These maneuvers had profound impact on many branches of medicine and surgery, and moved the radiologist to the front line of patient management (

The greatest expansion seen in the interventional radiology in the past decade has been in the feild of vascular techniques. One of the recent feilds on this ground is the management of spermatic Varicoceles by percutaneous venography and occlusion of the incompetent veins with the use of sclerosing materials (Morag B, 1984).

Nowadays the interventional radiology has allowed for occlusion of the spermatic vein when indicated thus giving place to unnecessary surgical interference (Morag B, 1984).

The aim of this work is to evaluate the use of venography and occlusion in the management of spermatic Varicoceles.

In order to fulfill this aim, a short account on the anatomical and pathological aspects of Varicocele will be given as well as its clinical picture and the different diagnostic modalities used in its investigation.

# Chapter 2

## a- Embryology

## Embryology of the Male Reproductive Tract

The normal male sexual differentiation is devided into early and late phases. During the early phase, which occur in the first trimester, there is development of the definitive testis, the internal duct structures, and the external genitalia. In the late phase, during the second and third trimester, there is growth of the external genitalia and descent of the testis.

Differentiation of the testis : (Fig11)

The first event, which occurs between the third and fifth week of gestation, is the formation of an indifferent gonad. This gonadal primordium is composed of three cell types :

1- Cells arising from the coelomic epithelium that form longitudinal folds on either side of the mesentry (genital ridges);

2- Primordial germ cells that arise outside the urogenital ridge in the dorsal endoderm of the yolk sac and migrate via the mesentry of the gut into the primitive gonad; and

3- Mesenchymal cells that penetrate into the genital ridge from the adjacent mesonephros.

Further development of this indifferent gonad into either an ovary or testis is directed by chromosomal factors. In the male, begining at six weeks of gistation, the primordial germ cells become incorporated into testicular cords. Later, at nine weeks, Leydig cells are formed from the mesenchymal cells of the interstitium, and the surface germinal apithelium condenses to form the tunica albuginia.

It was thought that the Y chromosome is primarily responsible for directing the testicular differention. This conclusion was based on early cytogenic studies of patients with abnormalities of gonadal differentiation. Because 45/x0 patients lacked a testis, and 47/xxy, 46/xxxy and 49/xxxxy patients developed testicular tissue, the Y chromosome appeared to bear the male determining factors.

However, as more patients have been studied, there is suggestion that determinants on both the Y and X chromosomes are necessary for normal testicular development.

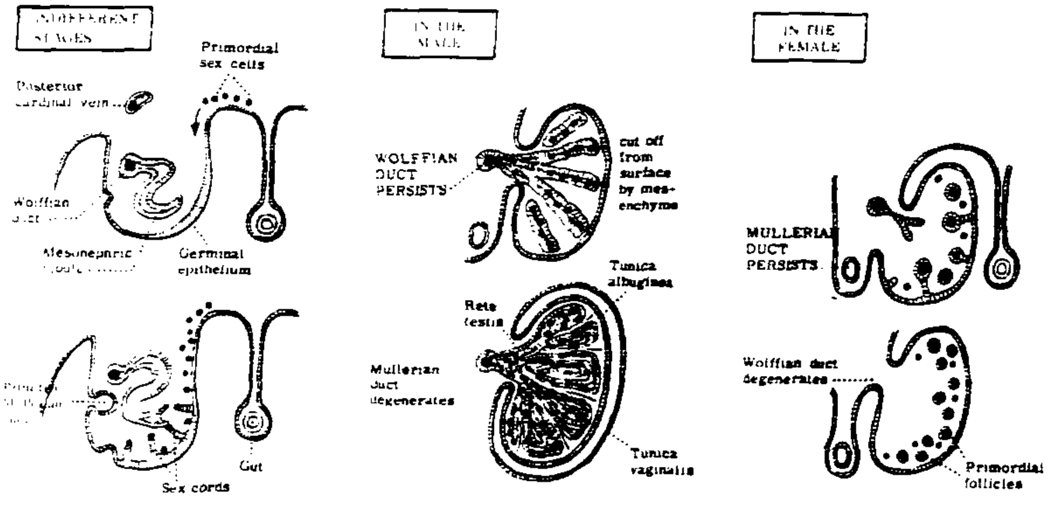


Fig.(11) Development of the gonads (After Smith CPw.1984)

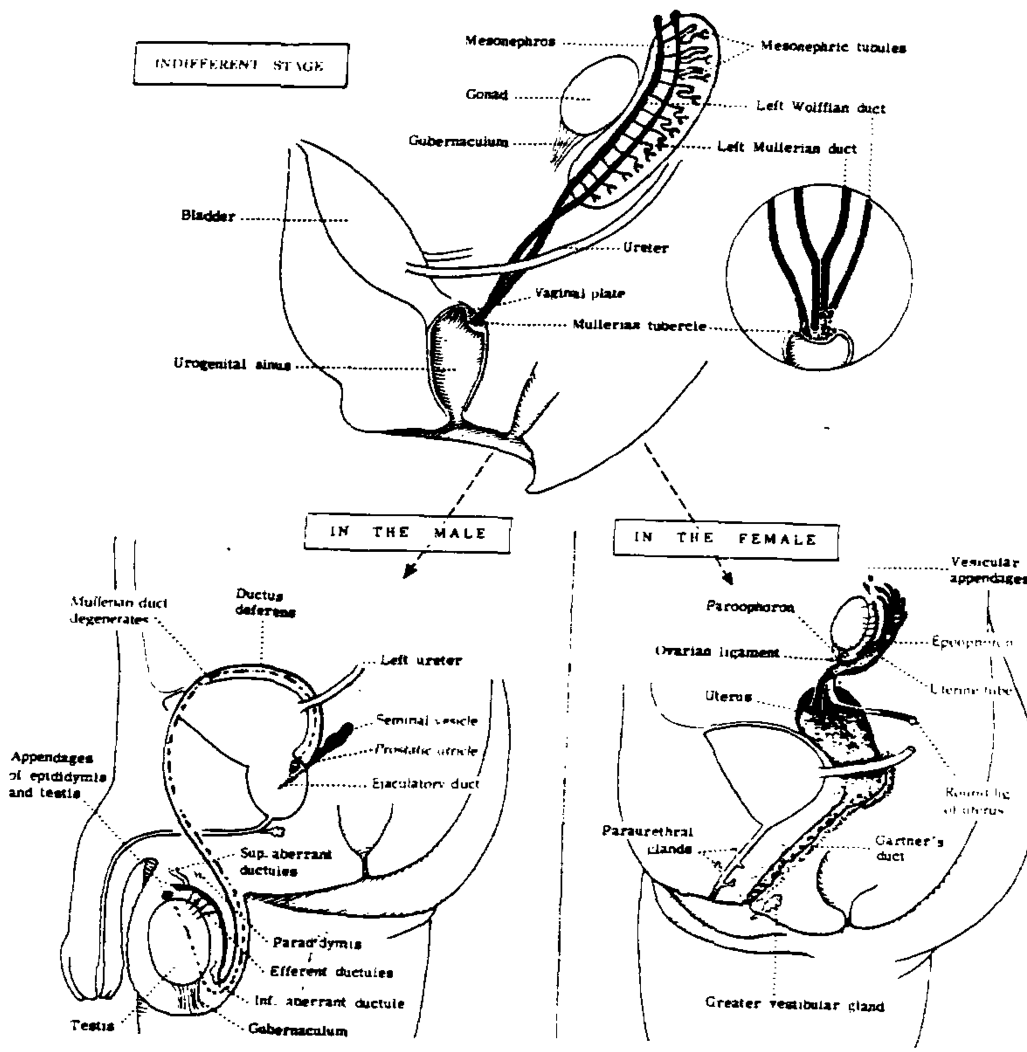


Fig.(12) Development of the gonads (After Smith CPW, 1984).

Differentiation of the internal ducts : (Fig. 12)

Once the fetal testis is formed, it directs the differentiation of the internal ducts and the external genitalia. Prior to the onset of sexual differentiation, two sets of well formed primordial ducts are present in both male and female fetoses : The mesonephric or Wolffian ducts; and the paramesonephric or Mullerian ducts.

The first event in the development of the male internal duct system is the Mullerian regression, which begins shortly after the onset of differentiation of the spermatic tubules of the testis. The cranial portion of each duct persists to form the appendix testis, and the remainder disappears. Shortly thereafter, the proximal Wolffian duct becomes elongated and convoluted forming the epididymis, and the remainder of the duct gives rise to the vas deferens. At the extreme proximal end of the Wolffian duct, the blind cranial end persists to form the appendix of the epididymis, and the adjacent portion connects with the semineferous tubules to form the rete testis. At the caudal end of the Wolffian duct, near its junction with the urogenital sinus, the vas becomes dilated, forming an ampulla from which a diverticulum arises to form the seminal vesicle. The portion of the duct between the seminal vesicle and the urethra becomes the ejaculatory duct.

Because the seminal vesicle is formed late, (at approximately 13 weeks of gestation), it is possible to have a fully developped testis and epididymis with an underdevelopped vas deferens, seminal vesicles and ejaculatory ducts. If the entire vas deferens is underdevelopped, a normal seminal vesicle or ejaculatory duct is impossible. If the Wolffian duct ceases development at an early stage, the ureter and kidney will be absent on that side.

Role of the fetal testis :

The development of the internal ducts is directed by the fetal testis which secretes two hormones : Androgen an the Mullerian inhibiting substance. The later causes regression of the Mullerian ducts, while the former, the testosterone, is resposible for verilization of the Wolffian duct to form the epididymis, the vas deferens and the seminal vesicles, and for verilization of the urogenital sinus and the external genitalia. Siiteri and Wilson, (1974), concluded that the testosterone appears to be an intracellular mediator necessary for the differentiation of the Walffian duct into the epididymis, the vas deferens, and the seminal vesicle, whereas dihydrotestosterone is the intracellular

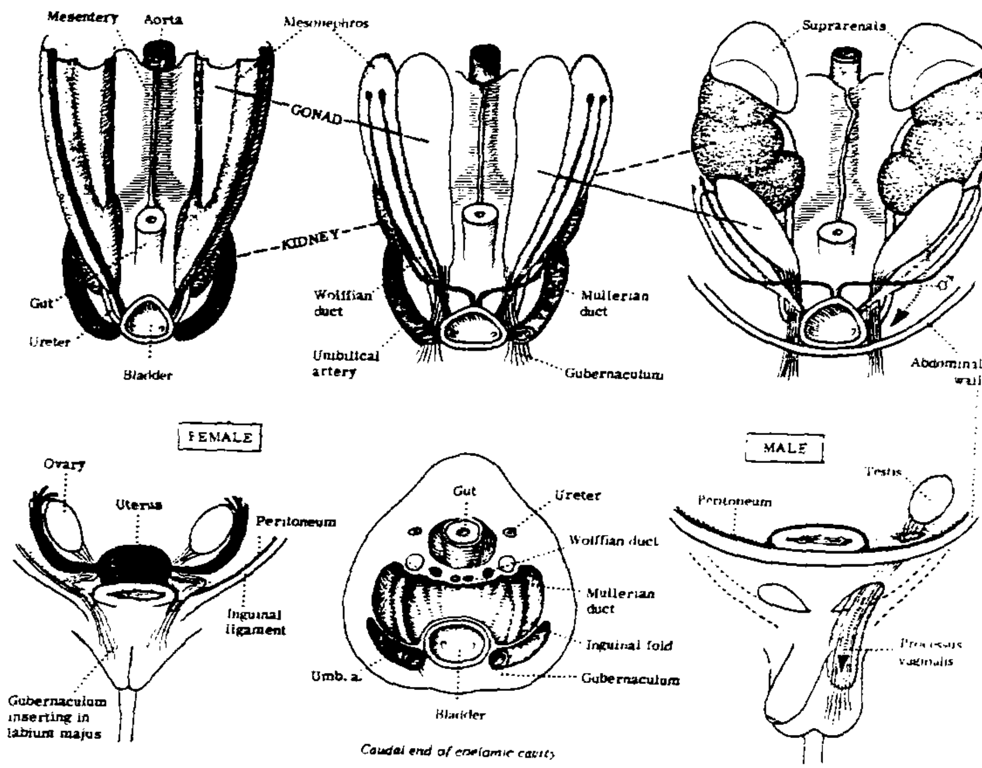


Fig.(13) Ascent of the kidneys and descent of the gonads (After Smith CPW, 1984).

hormone resposible for the virilization of the urogenital sinus and the external genitalia. Supporting these conclusions is the fact that patients who lack the ability to form dihydrotestosterone as in complete pseudohermaphroditism, type II, have a distinctive phenotype : the Wolffian duct structures are present, but the tissues derived from the urogenital sinus and from the analoge of the external genitalia are female in charecter.

Differentiation of the external genitalia : (Fig. 12)

Finally, development of the male external genitalia commences shortly after virilization of the Wolfian duct. The urogenital sinus gives rise to the prostate. The genital tubercle forms the glans penis, the genital folds form the urethra and the shaft of the penis, and the genital swellings merge and unite inferiorly to form the scrotum.

The late phase : (Fig. 13)

When the early phase of sexual differentiation is completed, the testes are located at the level of the internal inguinal rings. The process of testicular descent remains dormant from the third to the seventh month of intrauterine life, but during the last trimester the testes move from the internal inguinal ring through the inguinal canal into the scrotum. There is evidence that both gonadotopin and andogen are essential for growth of the penis and descent of the testis.

**Embryology of the Spermatic Veins :**

The embryogenesis of the spermatic veins should be cosulted in the total evolution of the inferior caval system in the embryo. The initial venous system is composed of a pair of symmetric dorsal veins. It is made of a right and a left anterior cardinal system and again a right and a left posterior cardinal system. On the right as well as on the left these anterior and posterior cardinal systems joint together to form the canals of Curvier which drain in a median venous sinus. The blood of paramedian renals is drained by the ventral subcardinal venous plexus which anastomoses with the median venous system. Like the others, they make together the caudal parts of the posterior cardinal system (embryo of eleven millimeter).

In the next step (embryo of fifteen millimeter), the supracardinal system develops by the anastomosis between the posterior cardinal and the subcardinal systems. This supracardinal system is a pair of symmetrical dorsal veins located lateral to the aorta (Fig.14)

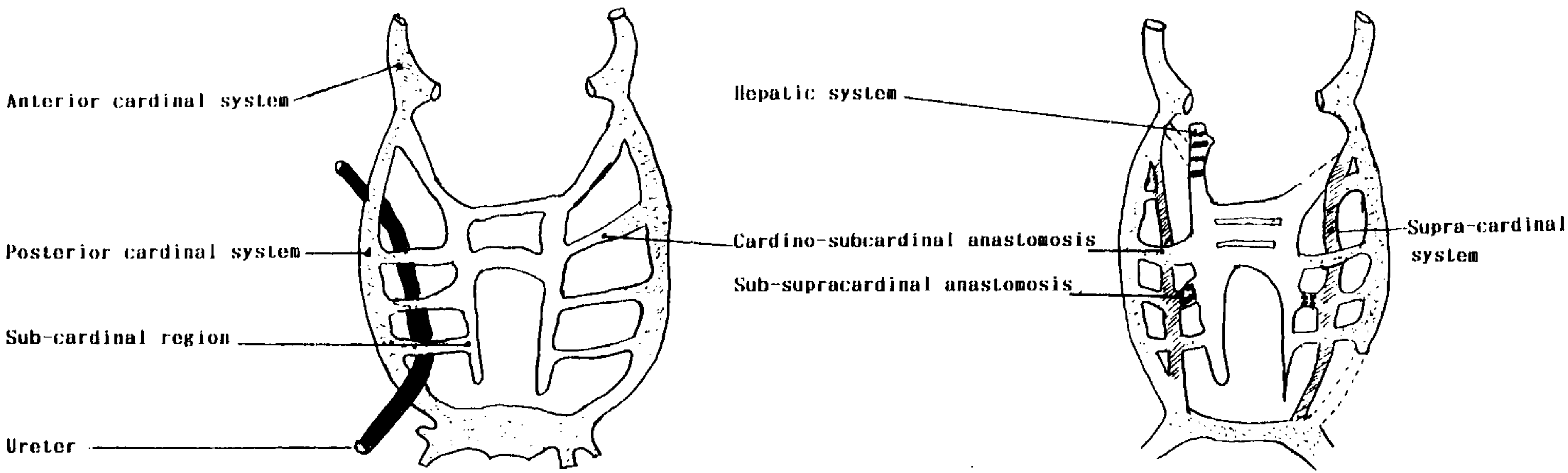


Fig.(14:a,b) Development of the spermatic veins, early phase (After Bigot JM, 1978).