Factors Affecting the Results of Varicocele Treatment in Patients with Infertility

A thesis submitted for partial fulfillment of the M.D. in ***General Surgery***

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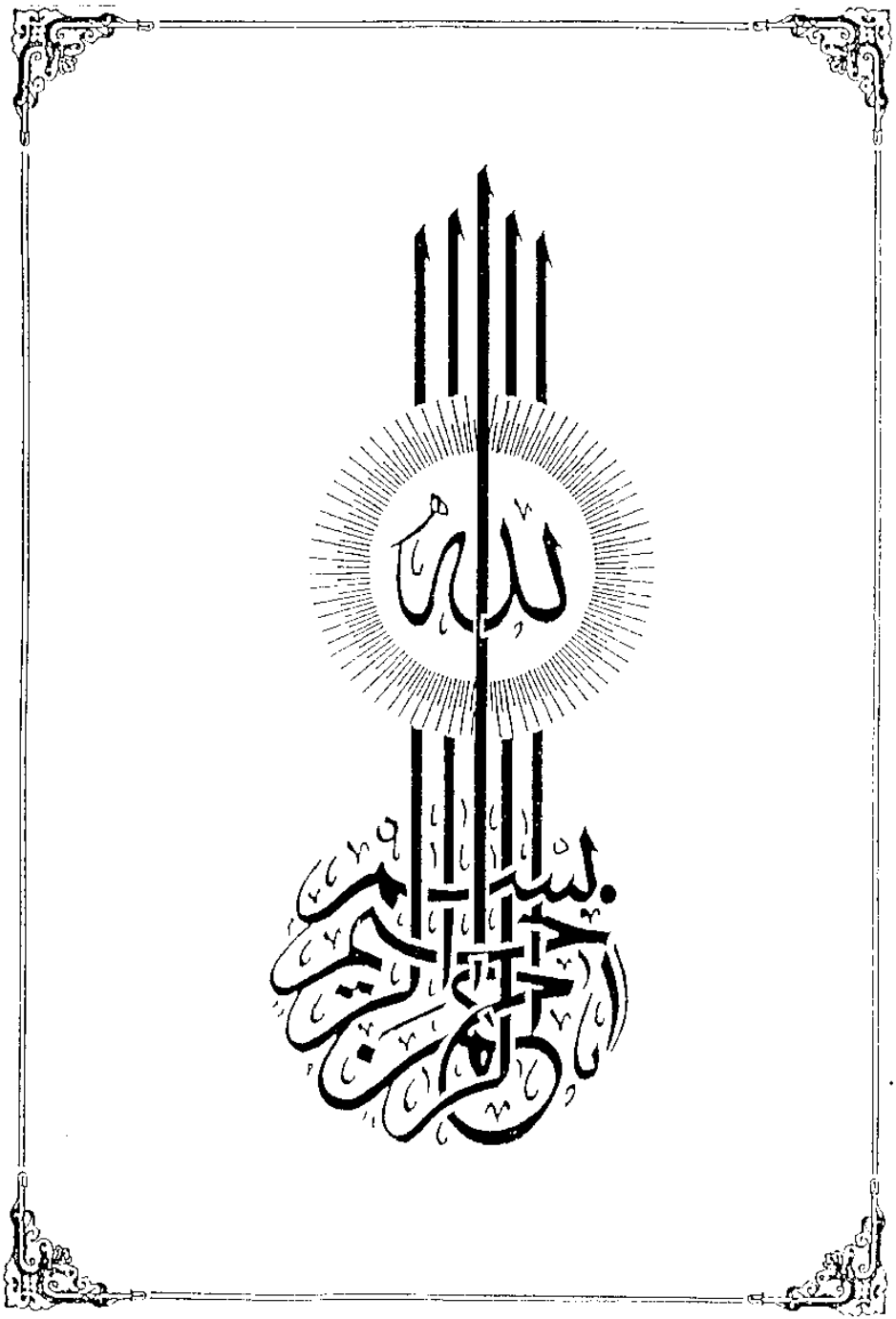

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Introduction and The Aim of the Work

The relationship between infertility and presence of a varicocele has been argued by many investigators over the last century.

The presence of a varicocele in a patient who is being examined for infertility may be a significant finding, especially if the patient has a low sperm count with reduced motility of the sperms and change in sperm morphology.

The methods of treatment either surgically or non surgically have been developed and modified especially with the development of technology in the field of surgery and radiology.

Unfortunately, varicocele surgery does not produce predictable results. Many patients fail to show any improvement in their sperm count.

Infertility is a multifactorial condition and even in varicocele patients, other causes must be sought and treated.

This work aiming at studying the various factors that may affect the results of treatment of varicocele associated with infertility, and also the causes of recurrence or persistance of varicocele after management.

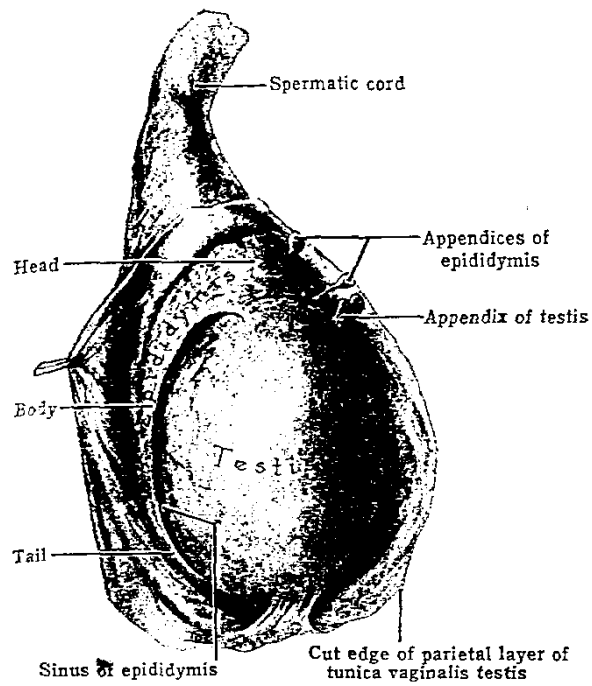
ANATOMY AND PHYSIOLOGY

Anatomical and Physiological aspect of varicocele

A. THE TESTIS

Gross Anatomy

The testis is an oval organ possessing a thick covering of fibrous tissue, ***the tunica albuginea****. To its posterolateral surface,* ***the epididymis*** *is attached.* ***The vas*** *lies medial to the epididymis, connected to its inferior pole (Fig. 1).*



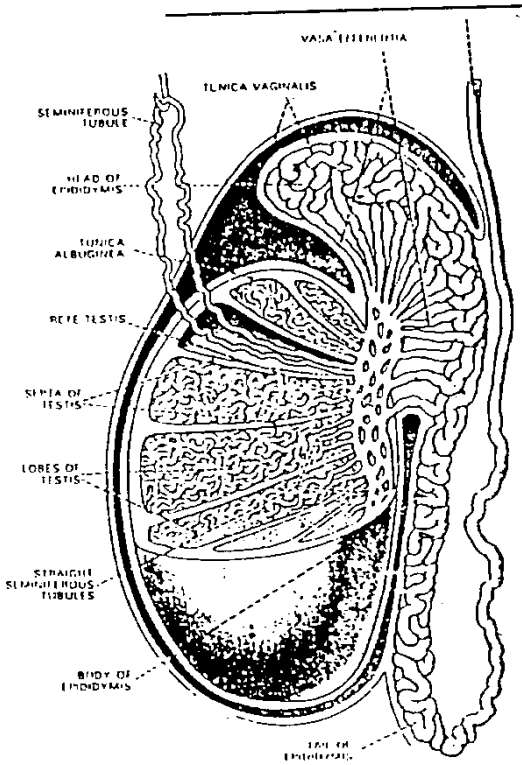
(Fig. 1): Testis, lateral view
The tunica vaginalis testis has been incised longitudinally
(Boileau Grant, 1991)

The front and lateral surfaces of the testis lie free in a serous space formed by the overlying ***tunica vaginalis****, a remenant of foetal* ***processus vaginalis****. This serous membrane covers also the anterolateral part of the epididymis. A slit like space, which lies between the testis and the epididymis, called* ***the sinus of the epididymis****, which lies within the tunica vaginalis.*

Testis, epididymis and tunica vaginalis lie in the scrotum surrounded by thin membranes, adherent to each other, these are downward prolongations of coverings of the spermatic cord. Right and left sides are separated by ***the median septum scroti. The appendix testis*** *is a sessile cyst 2 x 3 mm. in diameter attached to the upper pole of the testis, within the tunica vaginalis* **(Last, 1994)**.

Minute Anatomy

(Figs. 2) shows that the testis has a thick white capsule called ***the tunica albuginea*** *which is thickened along its posterior border to form the* ***mediastinum testis****, from the mediastinum testis, fibrous septa radiate into the testis dividing it into 400 lobules. Each lobule contains 2 - 3* ***seminefrous tubules****, each one shows several layers of cells. The basal of which is the germinal epithelium which produces the spermatids.*



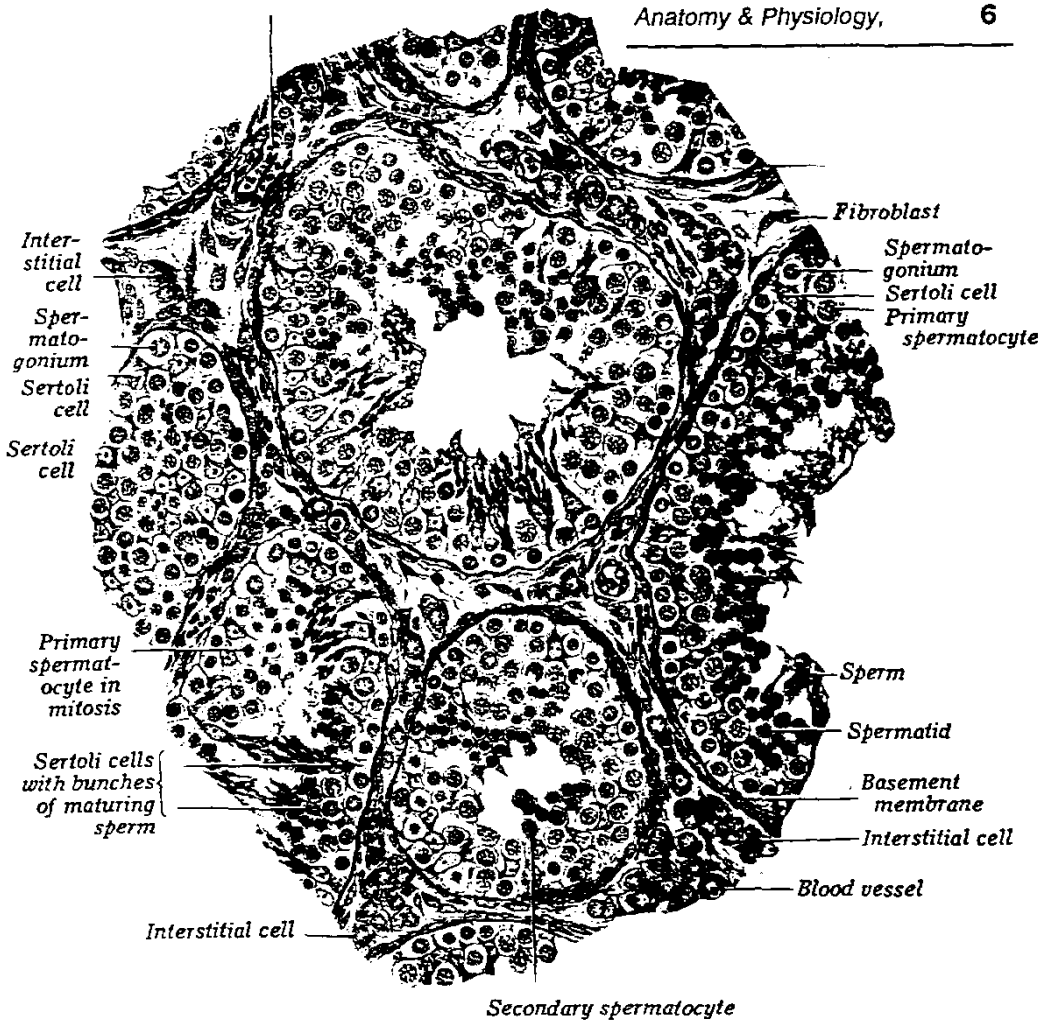
(Fig. 2): Schematic section of the testis to show the arrangement of It's tubules and ducts

Each two seminefrous tubules unite to form a single straight tubule, the straight tubules enter the mediastinum testis and break into a network of canaliculi known as ***the rete testis****. From the upper part of the rete testis arise about 15-20 vasa efferentia, these enter the commencement of the canal of the epididymis, thus attaching the head of the epididymis to the testis* **(Last, 1994)**.

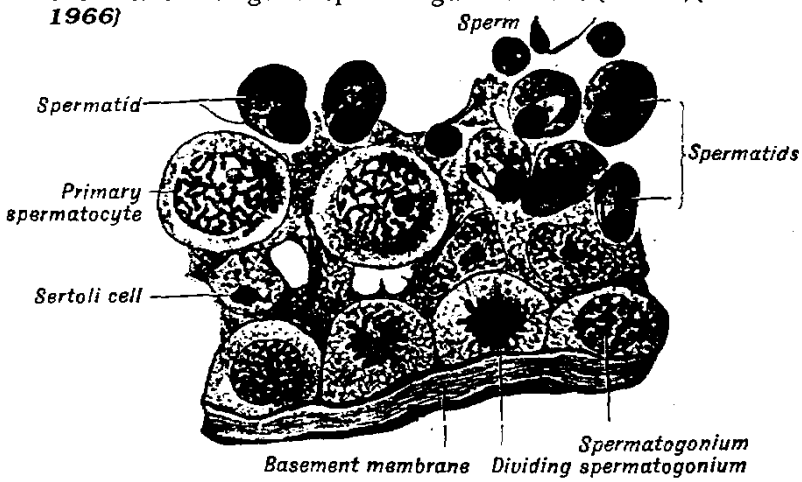
Microscopic Anatomy

We can easily recognize, the dense fibrous tissue of the tunica albuginae is thick, and fibrous septa divide the field into loculi (Figs. 3, 4). The seminiferous tubules, convoluted within the loculi. Each tubule shows several layers of cells, and the slender tails of spermatids project into the lumen. Between supporting cells ***(the Sertoli cells)*** *the testicular cells are undergoing spermatogenesis. The basal cells are called* ***spermatogonia*** *- gonal cells. These divide*

into ***primary spermatocytes*** *- sperm cells. The next generation is by meiosis, to produce* ***secondary spermatocytes*** *- sperm cells with half the adult number of chromosomes. These mature into spermatozoa by migration of the nucleus to one end (the head) and thinning out of the cytoplasm into a tail that projects into the lumen. While still attached by the head, the cell is named* ***a spermatid****. Only when free in the lumen of the tubule is it a separate creature -* ***the spermatozoan*** **(Last, 1994).**

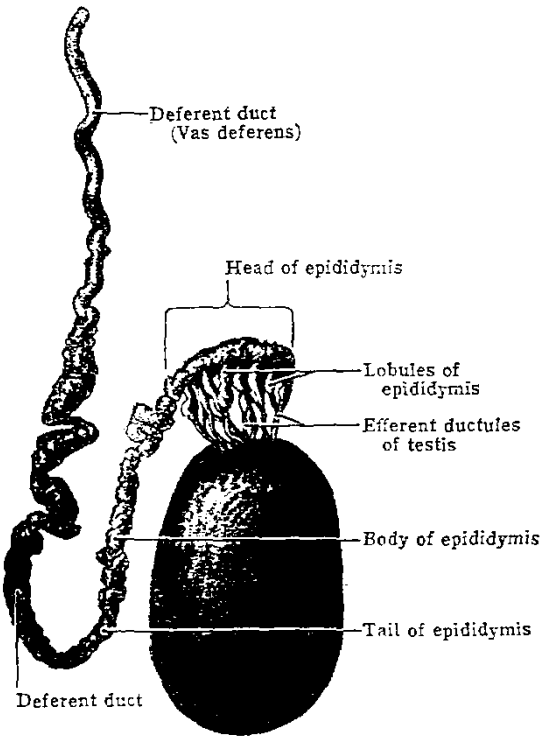


(Fig. 3): Section of human testis (obtained at operation). The transected tubules show various stages of spermatogenesis x 170 (A.A.M.) ***(William Bloom, 1966)***



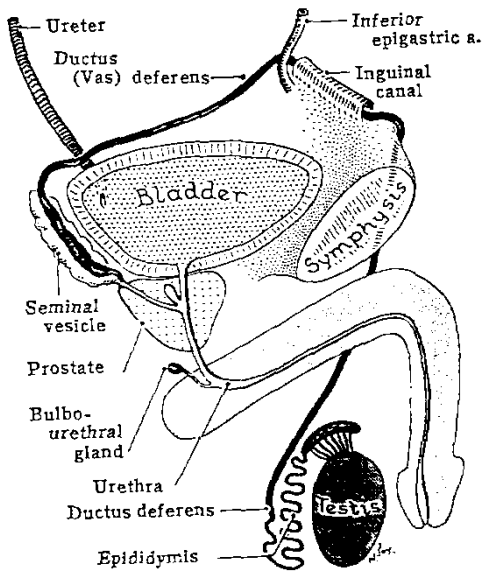
(Fig. 4): Human testis, from young adult; seminiferous epithelium with mitoses of spermatogonia.
The spermatids show a caudal sheath. Iron-hematoxylin stain x 750 (A.A.M.) ***(William Bloom, 1966)***

B. THE EPIDIDYMIS



(Fig. 5): Epididymis
Note the eight efferent ductules uniting the epididymis to the upper pole of the testis ***(Boileau Grant, 1991)***

This is a firm structure, attached behind the testis with the ductus deferens to its medial side (Fig. 5). It consists of a single tube 6 meters (20 ft) long, highly coiled and packed together by fibrous tissue. The mass resulting has a large head (upper pole, ***globus major****) and a small tail (lower pole,* ***globus minor****) connected by the intervening body, which is applied in a crescentic manner to the back of the testis. The head receives the vasa efferentia from the rete testis and is thus firmly attached to the testis. Elsewhere the epididymis has no functional connection with the testis, to which it is, however, fairly firmly bound by fibrous tissue. From the tail* ***the vas deferens****, a direct continuation of the canal of the epididymis, provided with a thick wall of smooth muscle, passes upward medially (Fig. 6).*



(Fig. 6): Diagram of the male genital system indicating the course of the deferent duct. ***(Boileau Grant, 1991)***

It enters the spermatic cord, passes through the inguinal canal, across the side wall of the pelvis just under the peritoneum, and crosses the pelvic cavity. It pierces the prostate and opens by the ejaculatory duct into the prostatic urethra **(Last, 1994)**.

BLOOD SUPPLY OF THE TESTIS AND EPIDIDYMIS

Arterial Supply

There are 3 principal arteries (Fig. 7)