HYDROCELE

DIFFERENT TYPES AND MANAGEMENT

ESSAY

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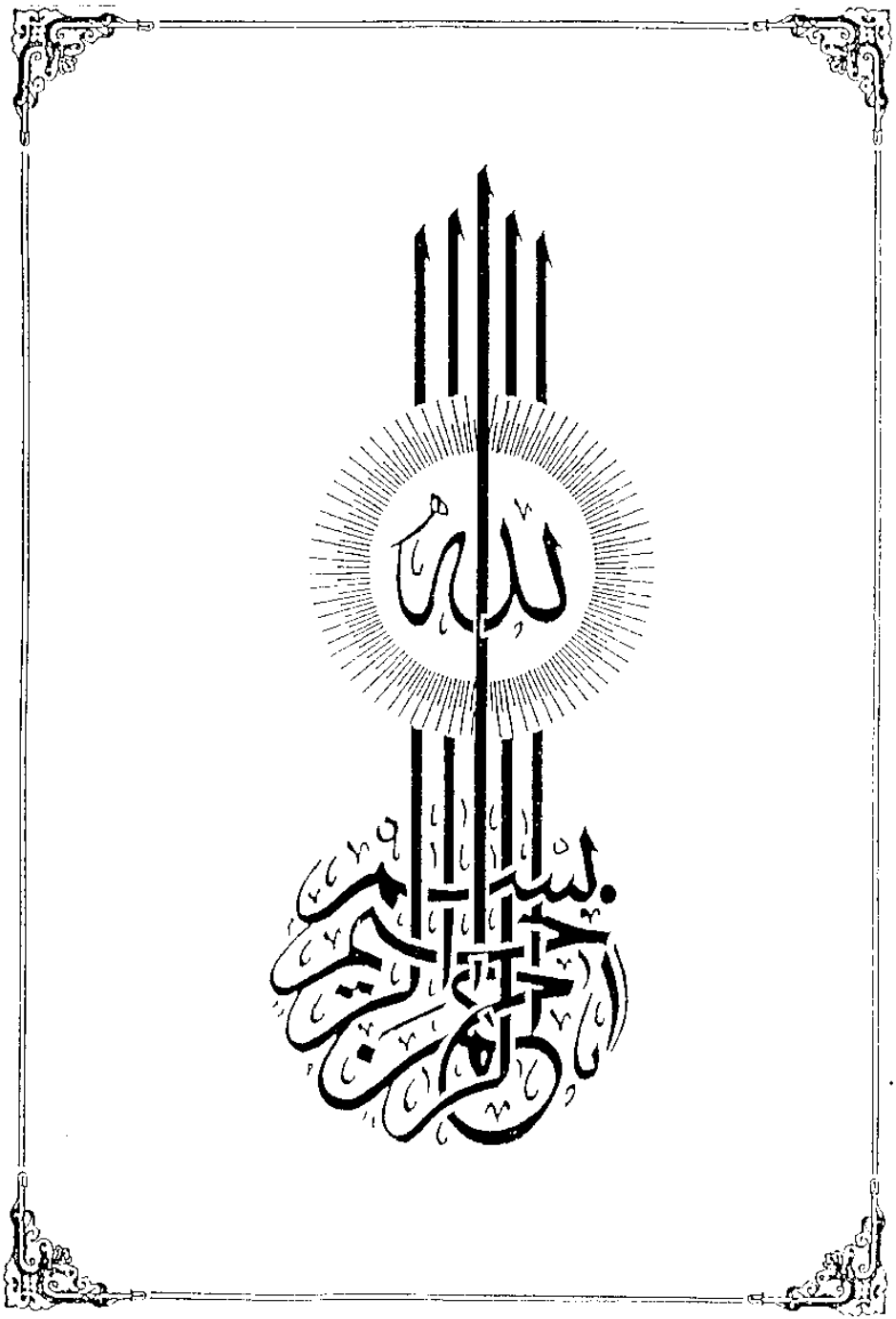

A C K N O W L E D G M E N T

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C O N T E N T S

INTRODUCTION

Hydrocele literally means a sac of water, (Gr. Hydro = water, kele = tumour). It can occur anywhere in the body but where the term hydrocele is given it usually means that of the tunica vaginalis.

It was recognised from very early times, and was much discussed in the 18th. century, particularly with regard to its aetiology, how best it should be treated. Perhaps Gibbon, the eminent historian is the best known patient to have suffered from his condition, his enormous hydrocele limited his physical activity in later years, and its drainage cost him his life (Landes and Leonhardt, 1967 & Wallace, 1960).

This thesis will be concerned with the discussion of the various types, aetiology, clinical picture, and the different lines of management of hydrocele.

ANATOMICAL CONSIDERATIONS BEHIND DIFFERENT TYPES OF HYDROCELE

A) Embryology of tunica vaginalis

Early in intrauterine life the testis lies on the posterior abdominal wall, at the level of the upper lumbar vertebrae. As it enlarges the cephalic end degenerates and the organ therefore assumes a caudal position. The testis is attached to the mesonephric fold by a peritoneal fold termed the Mesorchium; (the mesogenitale of the undifferentiated genital gland) which contain the testicular vessels and nerves with a quantity of undifferentiated mesenchyme. In addition it acquires a secondary attachment to the ventral abdominal wall, which has a considerable influence on its subsequent movments.

At the point where the mesonephric fold bends medially to form the genital cord, it becomes connected to the lower part of the ventral abdominal wall by a fold of peritoneum which is termed the "inguinal fold". The mesenchymal cells included in the inguinal fold form a cord, which extend from the part of the skin which later forms the scrotum, through the inguinal fold and the mesorchium to the lower pole of the testis. This cord later becomes a fibromuscular bundle

and it is termed " Gubernaculum testis" . It traverses the site of future inguinal canal, which is formed a round it by muscles of anterior abdominal wall as they become differentiated. Both testis and gubernaculum lie behind primitive peritoneum.

At the end of the second month the caudal part of the ventral abdominal wall is horizontal but, after the return of the intestine to the peritoneal cavity,it grows in length and assumes a vertical position. As a result the umblical artery pulls up a sickle-shaped peritoneal fold, as it runs ventrally from the dorsal to the ventral wall, and this fold forms the medial boundry of the peritoneal fossa into which the testis projects. This fossa termed the "Saccus vaginalis or lateral inguinal fossa, and its lower end protrudes down the inguinal canal along the gubernaculum, forming the processus vaginalis.

By the third month of feotal life the testis lies in the iliac fossa and by the seventh month it is near the deep inguinal ring. The lower pole of the testis is retained in apposition with the deep inguinal ring by the gubernaculum untile the seventh month, where it suddenly and rapidly passes through the inguinal canal and gain the scrotum. As it descends it is necessarily accompanied by its peritoneal covering, and the adjoining

peritoneum from the iliac fossa is down into processus vaginalis. The distal end of the processus vaginalis, into which the testis projects forms the"Tunica vaginalis testis", while the portion associated with the spermatic cord in the scrotum and in the inguinal canal normally becomes obliterated shortly after birth.

The fascial coverings of the testis and the spermatic cord, including cremasteric muscle are developed from the gubernaculum testis D.V. Davies and F. Davies, (1966) in Gray's Anatomy.

However R.J. Last, (1977) stressed upon the fact that the anterior surface of the testis is not covered by peritoneum, and the bare organ projects into the coelum. Also the ovary has no true peritoneal coat on the part that projects into the coelum from the posterior leaf of the broad ligament. The epithelium that surfaces the peritoneum is continued as a single layer over the ovary forming the germinal epithelium.

Few appreciate the fact that the same is true for the testis, the tunica vaginalis has strictly a parietal and no visceral layer. The surface of tunica albuginea that lies in the tunica vaginalis is coverd only by a single layer of flat cells, and there is no continuation of fibrous peritoneum over it. This arrangement resembles that of the eye, where the conjunctiva ends

at the limbus, and only the epithelium continues over the cornea. R.J. Last (1977) added that the tunica vaginalis is the cut- off part of processus vaginalis, a herniation of peritoneum that extend to the bottom of the scrotum ready to recieve the descending testis. The testis slides, so to speak, down the posterior abdominal wall, preceded by the retroperitoneal gubernaculum. It slides into a scrotal hernia which afterwards seals off spontaneously (Fig.1). The scrotum fully develops when the testis descends into it Campbell, (1951). The gubernaculum plays no rule in the mechanism of testicular descent.

Wells, (1943) stated that the gubernaculum fibres are attached to the scrotal fascia which is not a fixed point and therefore can't act as an anchor, he asked why not the scrotal wall goes up?

This coincides with what Bailey, (1933) stated, he said that gubernaculum acts only as a guide for proper testicular descent.

In (1965) Backhouse described the gubernaculum as a mass of mesenchyme which gives rise to a permanent development of the processus vaginalis and cremaster muscle. This does not coincide with what had been mentioned by D.V. Davies and F. Davis, (1966) in Grey's Anatomy.

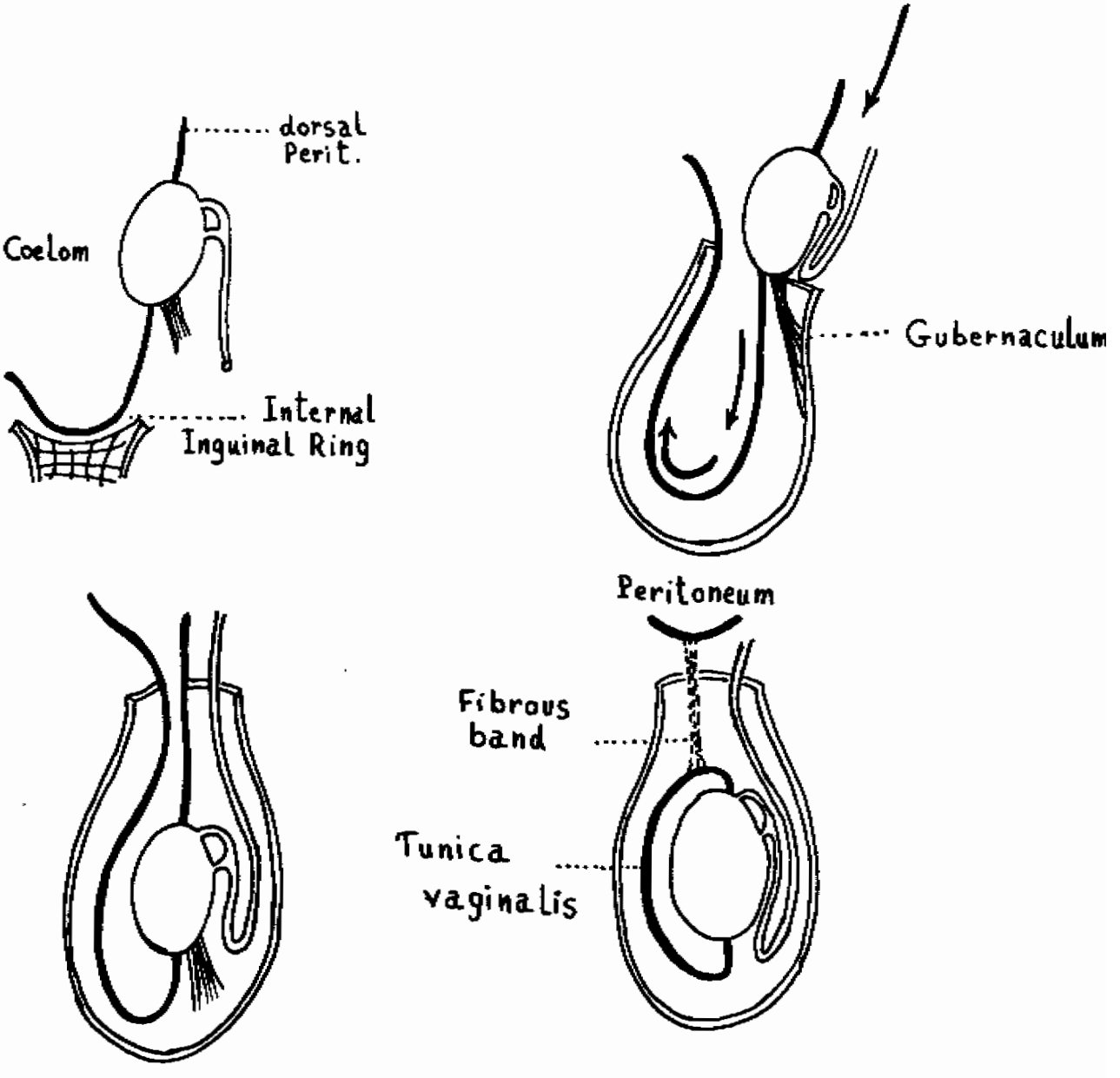

Fig 1. Descent of the testis and development of the processus vaginalis "After Last".

B) Anatomy of tunica vaginalis

The normal anatomy of the testicles, spermatic cord and inguinal canal in infants does not differ from that of adults except in the fact that the inguinal canal is much shorter, the younger the child the shorter will be the inguinal canal i.e, the external inguinal ring is nearly in direct apposition to the internal inguinal ring. With growth the inguinal canal gradually elongates R.J. Last, (1977). The vas accompanied by its artery, and the testicular artery and vein (the vein is usually doubled) enters the deep inguinal ring. As these structures pass along the inguinal canal and emerge from the superficial ring, they receive a covering from every layer through which they pass, three coverings in all, the first layer entered is the transversalis fascia, and its investment of vas and vessels constitute a fascial tube called "Internal spermatic fascia" Passing under the lower edges of transversus and internal oblique muscles, it receives a muscular contribution from each, together constituting the " Cremasteric layer". The transversus fibres spiral down the cord and return behind it to become attached to the pubic tubercle. The internal oblique fibres, a much layer contribution, spiral around the cord to return partly to the pubic tubercle, but mostly to the internal oblique itself, both together

constitute the cremaster muscle. The areolar tissue between the muscle fibres is continued down the cord as the cremasteric fascia. The cremaster muscle is supplied by the genital branch of the genitofemoral nerve, which is sensory to the tunica vaginalis and spermatic fascia. Emerging now through superficial ring the cord receives its final covering, the external spermatic fascia from the crura.

Historically, Galen in A.D. 176 (as sited by Singer in, 1956) was the first to describe the processus vaginalis as a participant in the formation of the testicular coverings.

Tunica vaginalis is a serous sac covers the testis in the scrotum. Tunica vaginalis is the part of processus vaginalis arround the testis. Tunica vaginalis is composed of visceral and a parietal layers seperated by cavity of tunica vaginalis which is potential space:-

1. Visceral layer; This covers the anterior border, medial and lateral surfaces of the testis, it does not cover the posterior border. On the medial side of the posterior border it is reflected anteriorly and become continuous with the parietal layer. On the lateral side, it forms a recess between the testis and epididymis which is known as the sinus

of epididymis. Then it covers the lateral side of epididymis, and becomes reflected anteriorly to be continuous with the parietal layer. Superiorly it covers the head of epididymis and becomes continuous with the parietal layer. At the lower pole of the testis it also becomes continuous with the parietal layer.

2. Parietal layer: this lines the inner surface of the scrotum.

* Blood supply

The cremaster muscle and the coverings of the cord are supplied with blood by cremastric artery at the deep inguinal ring from inferior epigastric artery. Venous return is carried by cremastric vein to inferior epigastric vein. In the vertical part of the cord's course in the scrotum, the testicular veins form a rich longitudinal plexus, the "Pampiniform Plexus". In the region of the epididymis there is an anastmosis between the testicular artery and the artery of the vas. However this anastmosis is inadequate, in most cases, to sustain the testis through the artery of the vas if the testicular artery is severed. The testicular artery arise from the aorta and run in the spermatic cord,

gives off a branch to the epididymis, and reaches the back of the testis, where it divides into lateral and medial branches. These don't penetrate the mediastinum testis, but sweep arround horizontally within the tunica albuginia. Branches from these vesseles penetrate the substance of the organ. Venules reach the mediastinum testis, from which several veins pass upward in the spermatic cord and surround the testicular artery with a mass of intercommunicating veins, the pampiniform plexus. In the inguinal canal they join to form two testicular veins.

Lymphatics of the testis run back with the testicular artery through the spermatic cord up to the paraaortic lymph nodes lying along side the aorta at the level of the origin of the testicular arteries (Lumbar 1 - 4).

McBrien et al, in (1972) demonstrated four or five lymph trunks passing up to those lumbar nodes cross over to the middle or contralateral chain of nodes occurs occasionally. They added that one lymphatic accompany the vas deferens passes to the ipsilateral internal iliac nodes, and then to the lumbar chains. Lymphatics of the coverings of the spermatic cord drains to external iliac group of lymph nodes, D.V. Davies and F. Davies, (1966) in Gray's Anatomy.