HYDROCELE

THESIS

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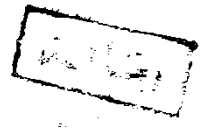

UNDER

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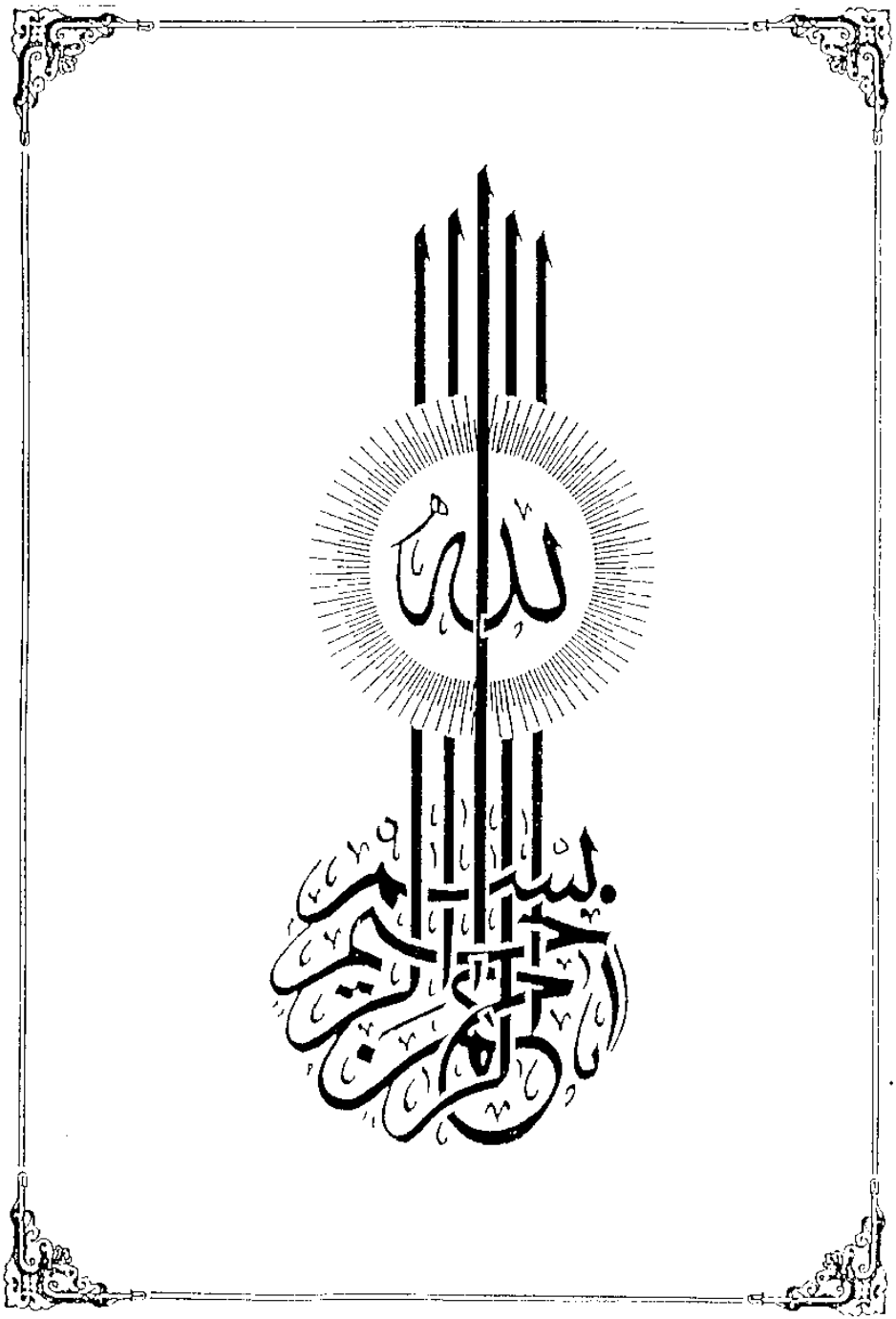

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INTRODUCTION

HISTORICAL REVIEW

Hydrocele is a collection of serous fluid in some part of the processus vaginalis, usually in the tunica. It might be congenital or acquired. The latter can be subdivided into primary or idiopathic, and secondary to disease of testis which may be acute or chronic. The idiopathic variety is a common endemic disease in Egypt and subtropical countries. Its cause is unknown, despite inquiries and theories that go back at least 250 years, and it is probably because the treatment of this relatively minor condition can be satisfactorily accomplished without a detaild knowledge of its cause. As long as 1755 Douglas recognized that the fluid in the tunica vaginalis resembled lymph. In Egypt Madden(1907) reported that hydrocele was an accompaniment of filariases but without definite evidence in favour of any causal factor. He believed that the disease was due to congestion of the intrascrotal structures from lack of support to the scrotum and sexual excess with a serous effusion. In 1927, Ibrahim did not believe the concept of Madden, and looked upon funculitis as the main, if not the only, cause of the hydroceles so prevalent in Egypt and labelled as idiopathic. In his opinion, he considered the effusion in the tunica vaginalis as the result of permanent obstruction of the testicular lymphatic drainage produced by one or more attacks of

funiculitis in the same way as filarial elephantiasis. In 1951, Burkett suggested that the disease may be due to filarial affection.

In 1955, Jordan believed that endemic hydrocele is due to a local tissue reaction of unknown nature with outpouring of fluid, and stated that the dead filarial worms may cause a partial blockage of the lymphatics of the spermatic cord in the long-standing cases, while in early stages the changes are mainly from local tissue reaction without partial blockage of the lymphatics.

Wallace (1960) suggested that the main cause of idiopathic hydrocele is a defect of lymphatic absorption of fluid from the tunica vaginalis.

Another variety of hydrocele is the abdominoscrotal, and it was first described by Dupuytren in 1834 and called it "hydrocele-en-bissac". The name abdominoscrotal was proposed by Bickle in 1919. Burkitt and Williams (1964) collected 59 cases from the world literature, and since then few additional cases have been reported (Tanga et al, 1973).

The counterpart of the abdominoscrotal hydrocele in males is the hydrocele of the canal of Nuck in females. After a comprehensive review of the historical medical

literature, Coley (1892) attributed to Aetius the first report of a hydrocele in a female subject in 543 A.D., and could find only 17 cases reported between that date and 1860.

Wechselmann (1890) published an extensive review with 62 cases. In 1892, Coley added 30 more cases. In 1941, Counseller and Black estimated that 100 cases had been reported in the world's literature since Coley's study, and they believed that their 17 cases brought the total to less than 350.

Operative procedures for hydrocele have been a source of debate for hundreds of years. The desirability of relatively bloodless surgery in the radical cure of hydrocele was recognized in operations described by Andrews (1907), Solomon (1955), Ozdiled (1957), and Lord (1964), and the method of the last author has been widely accepted with excellent results, as reported by Sharkey (1967) and Doyle and Rush (1968).

Recently an extrusion operation without sac excision or plication was described by Solomon (1955) and Mc Gowan and Howley (1969). Andrews (1907) 'bottle operation' has been well tried since the first decade of this century Jaboulays eversion operation is frequently referredto in

standard texts but the source of original account was surprisingly difficult to ascertain (Berard 1895 ; Jaboulay 1902).

The technique was also recorded by Vautrin (1893,1913) and Barral (1896). Doyen (1895) performed an eversion operation through 2.5 cm. incision which in some respects is comparable to the operation described by Wilkinson (1973).

EMBRYOLOGY AND ANATOMY

EMBRYOLOGY OF THE SCROTUM, TESTICLE AND TUNICA VAGINALIS

1. Embryology of the scrotum:

When the embryo is about 21 mm long, a pair of rounded lateral ridges - the labioscrotal swellings, or outer genital folds - are visible, one on each side of the base of the phallus, from which they are separated by a Y-shaped groove (Fig. 1 & 2). During the 38 - 45 mm. stage, the phallus elongates and the primitive urogenital opening is removed farther and farther from the anus by fusion of the margins of the urethral folds (inner genital swellings) in the midline. The fused margins of these folds constitute the perineal and penile raphe. During the elongation of the phallus, the labioscrotal swellings gradually migrate downwards and assume their permanent position between the base of the penis and the perineal body. They now become the scrotal swellings. The scrotal raphe is formed by fusion of the tissues of the labioscrotal swellings within the septum originally formed by the union of the urethral, or inner genital folds. As the scrotum develops , its mesenchyme differentiates into layers similar to that composing the anterior abdominal wall (Gray, 1973).

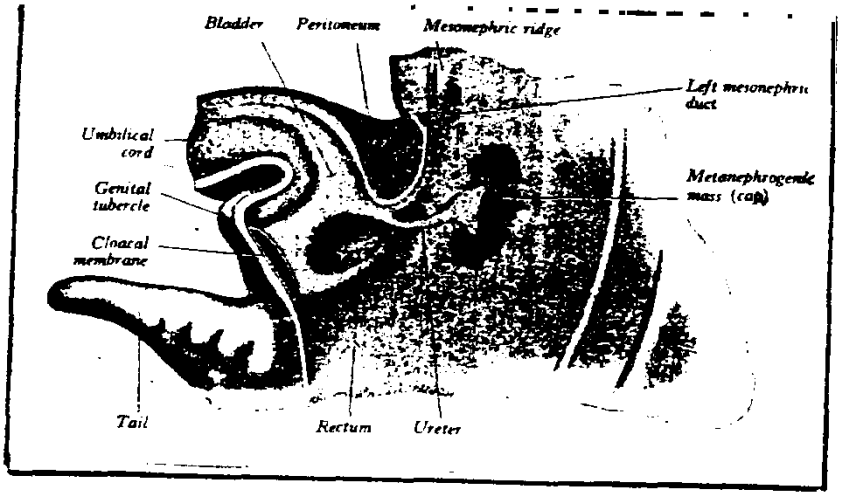

Fig. 1. Part of the caudal end of a human embryo (about 6 weeks old).

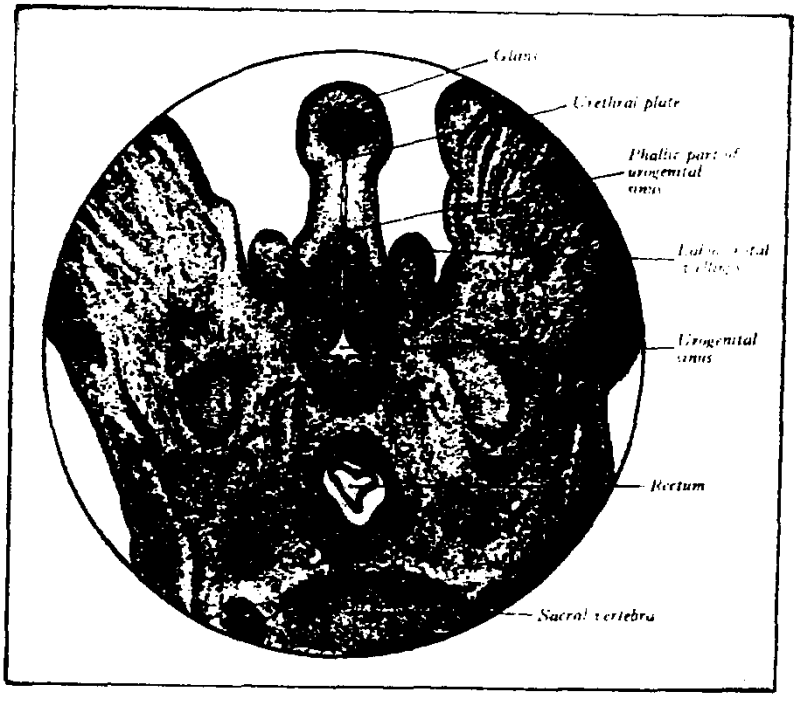

Fig. 2. Transverse section through the lower part of the pelvis of a 9-week old human fetus.

2. Embryology of the testicle:

a- The formation of the gonads.

It is first indicated by the appearance of an area of thickened epithelium on the medial side of the mesonephric ridge in the fifth week. Elsewhere in the surface of the ridge the coelomic epithelium is one or two cells thick, but over the genital area it is many layered. The thickening rapidly extends in a longitudinal direction until it covers nearly the whole medial surface of the ridge. The thickened epithelium continues to proliferate, displacing the renal corpuscles of the mesonephros in a dorsolateral direction, and forming a projection into the coelomic cavity, the gonadal ridge. Surface depressions form along the limits of the ridge which is thus connected to the mesonephros by an originally broad mesentry, the mesogenitale. In this way the mesonephric ridge becomes subdivided into a lateral part containing the mesonephric and paramesonephric ducts, which may be termed the tubal fold, and a medial part, termed the gonadal fold. The tubal fold contains the nephric tubules and glomeruli at its base. Up to the seventh week, the gonad possesses no differentiating feature. The proliferating epithelium now forms a number of cellular gonadal cords, separated by mesenchyme. These cords remain at the periphery of the primordium to form a

cortex; more centrally a proliferation of the mesenchyme of the mesonephros continues as a medulla. In the male all progenitors of the definitive sex cells become incorporated in the cords. At this stage in the male, an extension of the mesenchyme cuts off the gonadal cords from the surface and rapidly thickens to form the tunica albuginea. The cellular cords lengthen partly by addition from the coelomic epithelium and encroach on the medulla, where they unite with the network derived from the mesenchyme which ultimately becomes the rete testis. The primondial germ cells are incorporated into the cords, which later become elongated and canalized to form the seminiferous tubules. The cells derived from the surface of the gonad form the supporting cells (of Sertoli). The interstitial cells of the testis are derived from the mesenchyme and possibly also from the coelomic epithelial cells which do not become incorporated into the tubules. The cords of the testicular rete, which canalize later, become connected to the glomerular capsules in the cranial end of the persisting part of the mesonephros, and the glomerular tafts concerned become atrophied. The rete cords thus become connected to the mesonephric duct by the five to twelve most cranial persisting tubules and these become exceedingly convoluted and form the lobules of the head of epididymis.

The mesonephric duct, which was the primitive 'ureter' of the mesonephros, becomes the canal of the epididymis and the ductus deferens of the testis. The seminiferous tubules do not acquire lumina until the seventh month, but the tubules of the testicular rete do so somewhat earlier.

b- The descent of the testis: (Fig. 3)

It is not merely a simple migration. At first it lies on the dorsal abdominal wall, but, as it enlarges, its cranial end degenerates, and the organ therefore assumes a more caudal position. It is attached to the mesonephric fold by a peritoneal fold, the mesorchium, the mesogenitale of the undifferentiated gonad, which contains the testicular vessels and nerves and 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 movements. 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 an inguinal fold of peritoneum. The mesenchymal cells included in the inguinal fold form a cord, extending from the skin which will later form the scrotum through the inguinal fold and mesorchium to the caudal pole of