# BILHARZIAL STRICTURE OF THE LOWER THIRD OF URETER

THESIS

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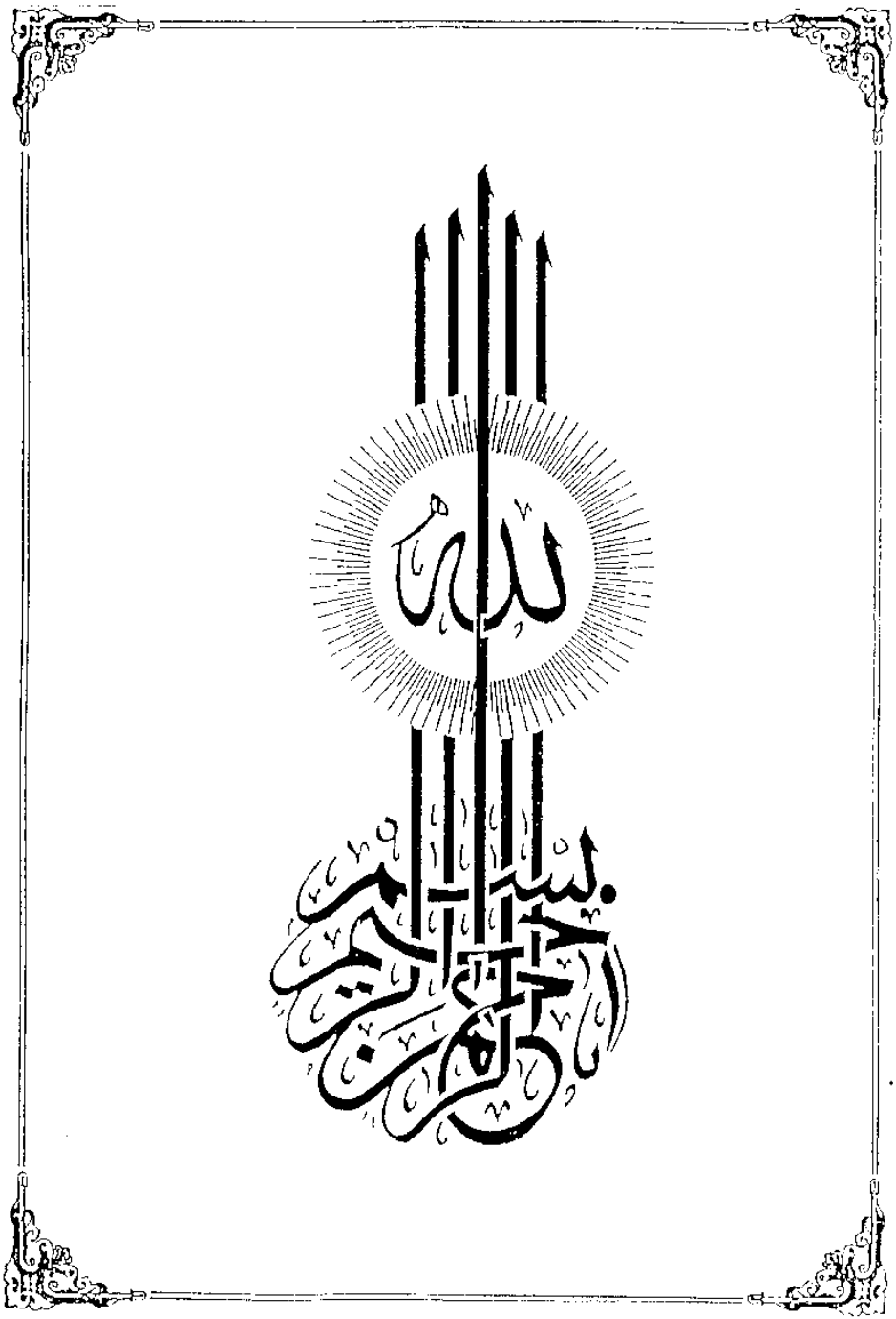
بسم الله الرحمن الرحيم

رب اشرح لى صدرى ويسر لى أمرى

صدق الله العظيم



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C O N T E N T S

# INTRODUCTION

Bilharziasis is a very common endemic disease in Egypt especially among farmers. The only species of the parasite present in Egypt are schistosoma haematobium and schistosoma mansoni.

The ureter is one of the main targets of bilharziasis causing various pathological manifestations, the most common of which is the stricture of the lower third. If neglected this stricture results in severe damage to the kidney through obstruction, infection and stone formation.

This work includes 30 cases of bilharzial stricture of the lower third of ureter. These cases were subjected to clinical examination, laboratory investigations, radiological studies, cystoscopic examination, operative techniques and follow up studies.

The aim of this thesis is to evaluate the different lines of surgical treatment of bilharzial stricture of the lower third of ureter.

## EMBRYOLOGY OF THE URETER

The development of the ureteric bud and collecting system may be divided into four periods (Osathanondh and Potter, 1963).

1- First period : It includes development from the fifth to the fourteenth week, the ureteric bud, arises from the postero-medial wall of the mesonephric duct near its junction with the cloaca. The ureteric bud grows dorsally and at the same time its origin migrates to the posterior wall, and, later, to the postero-lateral wall of the mesonephric duct. Shortly after its appearance the ureteric bud becomes swallen at its cranial end to form an ampulla which comes into contact with the metanephric cap. The ampulla of the ureteric bud swells and then undergoes a series of dichotomous branchings to form the future pelvis of the ureter, the major calyces, the minor calyces and the collecting tubules at the end.

As the result of the progressive shortening of the common mesonephric duct (or trigonal precursor) through its absorption into the ventral segment of the cloaca, the caudal end of the ureteric bud gradually approaches the cloaca. Finally (seventh week), the ureteric bud achieves an independent opening into the cloaca. The accumulated absorbed tissue of the mesonephric duct expands and forms the trigone, maintaining

direct continuity with the ureter. The trigone, which is purely mesodermal, constitutes, with the lower end of the ureter, an anatomical and functional entity and act as the link between the mesodermal ureter and the endodermal urinary bladder.

2- The second period : It is characterized by the formation of nephron arcades from approximately the fourteenth to the twenty two week.

3- The third period : It is from approximately the twentieth to the thirty sixth week beyond the points at which the aracdes continue to induce hephrons.

4- The fourth period : It is the last month of gestation where the formation of nephrons come to an end.

## ANATOMY OF THE URETER

The ureters are the 2 muscular tubes whose peristaltic contraction convey the urine from the kidneys to the urinary bladder. Each ureter is 25 to 30 cm. long. Nearly half of its course is in the abdomen, while the other half is in the pelvis. The diameter of the ureter is about 3 mm.

### Surface Anatomy :

It is represented by a line from a point on the transpyloric plane 5 cm. from the median plane drawn almost vertically downwards, with a very slight medial inclination, to the pubic tubercle.

### Course and relations of the right abdominal part of the ureter :

It descends behind the peritoneum of the posterior abdominal wall in front of the psoas major, muscle, opposite the tips of the lumbar transverse processes.It descends on the right side of the inferior vena cava.Its uppermost part is covered by the third part of the duodenum. As the ureter descends it is crossed anteriorly by the right colic vessels, testicular (or ovarian) vessels ileocolic vessels, root of the mesentry and terminal part of the ileum.

Course and relations of the left abdominal part of the ureter :

It descends behind the peritoneum of the posterior abdominal wall, in front of the psoas major muscle, opposite the tips of the lumbar transverse processes. It is crossed anteriorly by the superior and inferior left colic vessels, and the left testicular (or ovarian) vessels. Its lower part is crossed by the pelvic colon and its mesocolon. This last relation is of surgical importance because the ureter may be damaged in operations on the pelvic colon.

Course and relations of the pelvic part of the ureter :

The abdominal part of the ureter on each side enters the pelvis by crossing the end of the common iliac or the begining of the external iliac artery. On the right side it is closely related to the appendix, which frequently lies anterior to it. This relation is of surgical importance due to an inflamed appendix may irritate the ureter and so confuse the diagnosis.

Course of the pelvic part of the ureter in the male :

The ureter crosses the origin of the external iliac artery, passes backwards and downwards along the lower border of the internal iliac artery and reaches

the level of the ischial spine; it then curves forwards and medially in the fat above the levator ani to reach the postero-superior angle of the bladder. It pierces the posterior wall of the bladder very obliquely-medially and downwards-and opens into it at the upper angle of the trigone.

Relations of the pelvic part of the ureter in the male :

Until the ureter approach the bladder, it is immediately under cover of closely-adherent peritoneum. In the first part of its course, the internal iliac artery is above and behind it; the peritoneum clothes it medially and below; and it crosses the structures on the side wall of the pelvis. In the second part of its course, peritoneum still clothes it, and the fat separates if from the levator ani beneath; but, near the bladder, it is surrounded by a plexus of veins, is crossed by the ductus deferens, and is overlapped by the upper end of the seminal vesicle.

Course of the pelvic part of ureter in the female :

The ureter crosses the origin of the external iliac artery and runs backwards and slightly downwards into the pelvis closely applied to the lower border of the internal

iliac artery. Near the base of the ischial spine it curves forwards and medially, passes below the root of the broad ligament, and reaches the bladder at its pastero-superior angle. Its course in the wall of the bladder is similar to that in the male.

Relations of the pelvic part of ureter in the female :

In the first part of its course, the internal iliac artery is above and behind it; the peritoneum clothes it medially and inferiorly separating it from the ovary; and it crosses the structures on the side wall of the pelvis. In the second part of its course; it passes below the broad ligment, and the uterine vessels cross above it. Then it lies on the upper end of the side of the vagina, and it usually has to pass for a short distance obliquely in front of the vagina to reach the bladder, so it most often injured in the female pelvis operations.

## THE URETERO-VESICAL JUNCTION

The ureter consists of 3 coats, outer fibrous, middle muscular and inner mucous. The fibrous coat is continous at one end with the fibrous capsule of the kidney, while at the other end it is lost on the wall of the bladder.

The ureter proper has only one muscular coat where the muscle fibres are orientated in almost every direction. This multiple orientation results from the basic irregular helical formation of the ureteric muscle bundles. It seems that originally the mesenchymal cells were orientated transversely across the ureteral bud. With lengthening and widening, these fibres assume a helical arrangement but since this process is not uniform, the final orientation is that of an irregular helix (Tanagho, 1972).

All the muscle fibres of the juxtavesical ureter continue in the intravesical ureter. They simply change their orientation and become parallel to the lumen without any loss of the ureteric muscular mass (Tanagho and Pugh, 1963). The length of the intravesical ureter is about 1½cm. It is divided into :

(1) An intramural segment, totally surrounded by the detrusor.

(2) A submucosal ureter which is directly under the bladder mucosa. The average length of the latter is about 1 cm. (Tanagho, Meyers and Smith,1968).

All of the ureteric musculature of the lower end of the ureter continues uninterrupted into the base of the bladder as the trigone. Where they approach the ureteric orifice the roof fibres split and swing to the sides, forming the lips of the ureteric orifice, they then join the floor fibres, where all of them accumulate just distal to the ureteric orifice before they start to fan out into the trigone (Tanagho and Pugh, 1963). A proportion of the roof fibres decussate at the ureteric orifice before they join the floor fibres (Debled, 1968), where they play a minor role in the ureteric closure mechanism.

Waldeyer's Sheath :

The juxtavesical ureter (distal, 3-4 cm) as well as the intramural segment of the intravesical ureter,is surrounded by a fibromuscular sheath known as Waldeyer's sheath (Waldeyer, 1892; Wesson, 1920). As the sheath is