Prevention of ureteral injuries during abdominal hysterectomy

Thesis

Submitted in partial fulfillment for
Master Degree in Gynaecology & Obstetrics

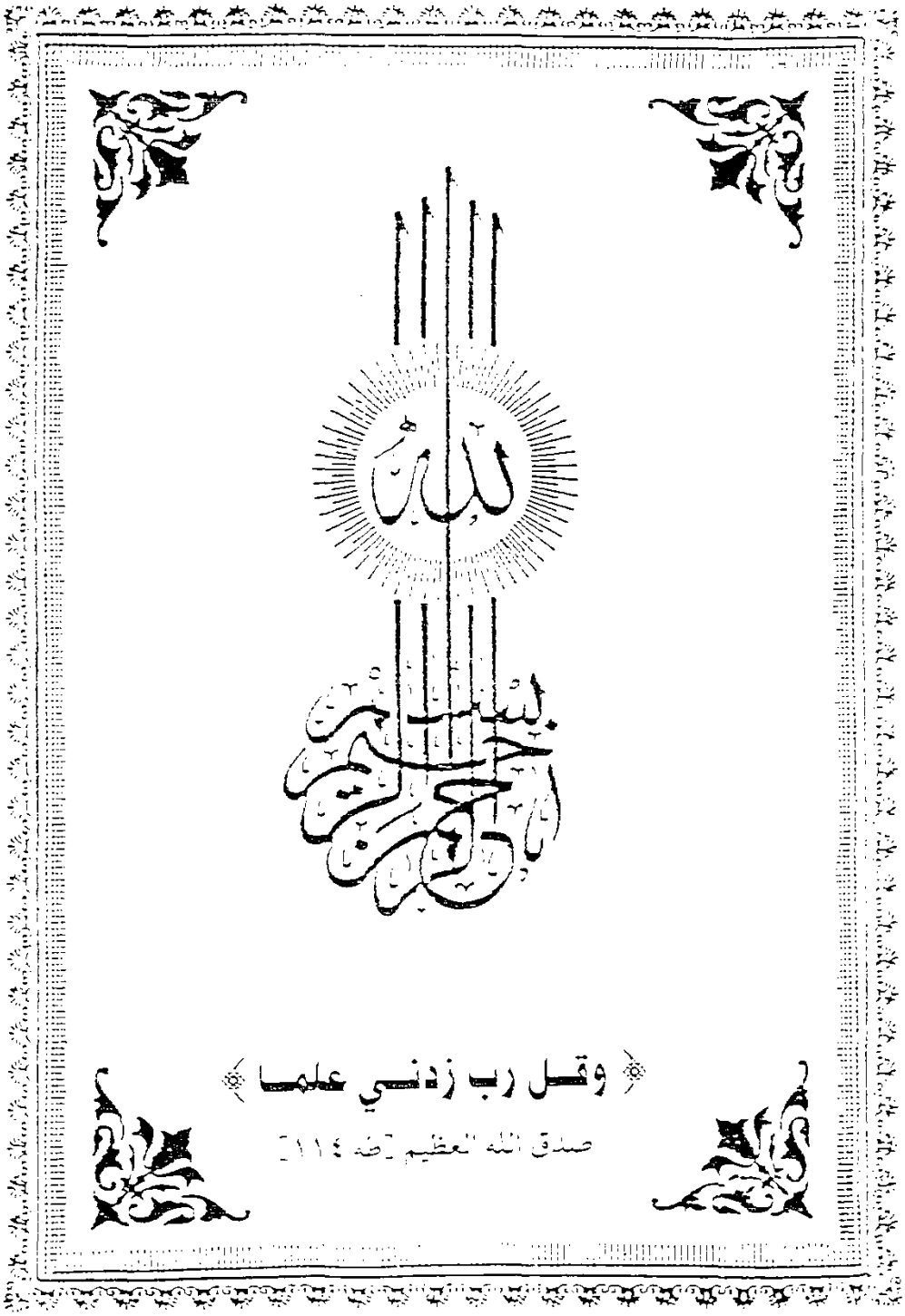
By
Amira Anwar Hassan Ali
M. B. B. Ch

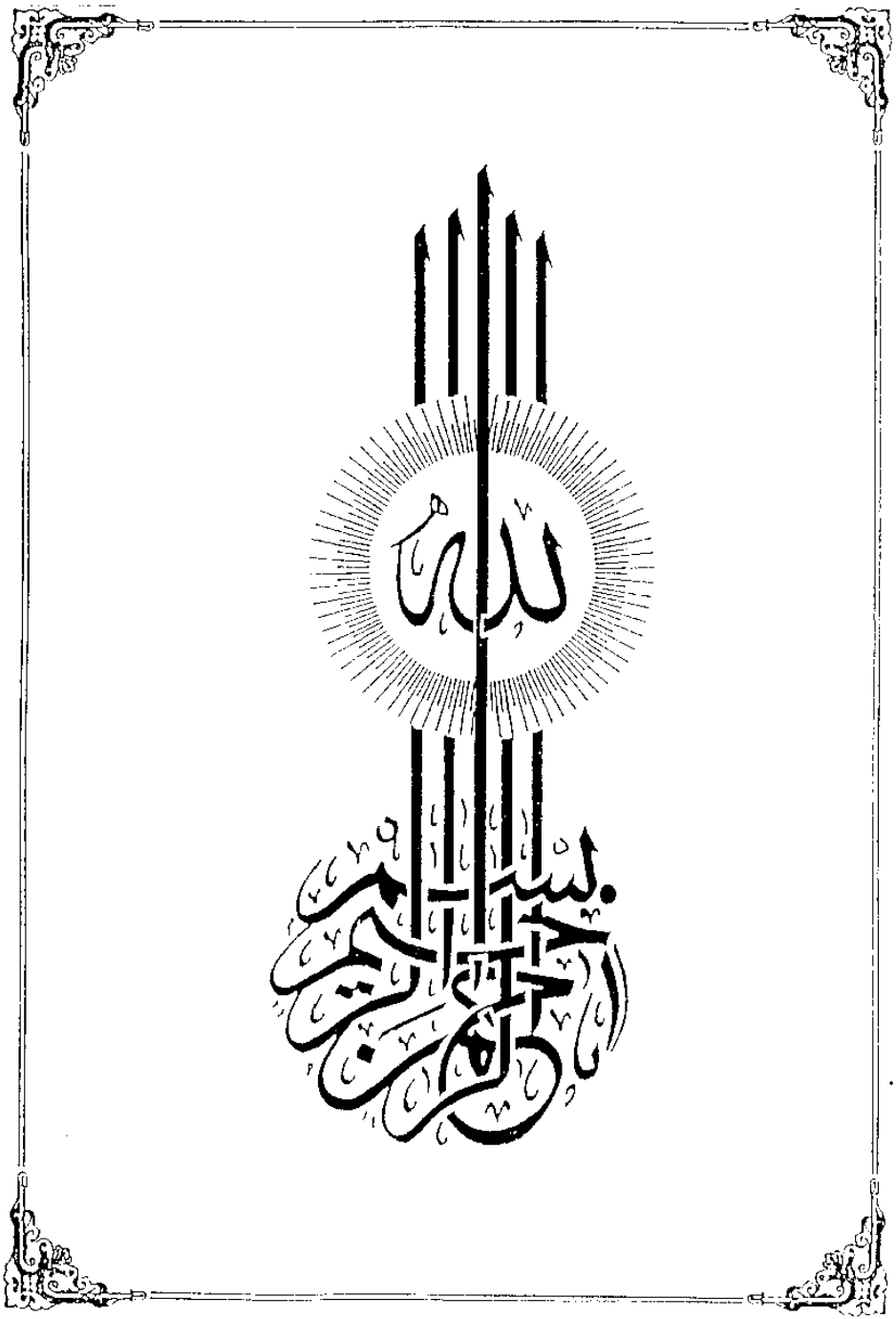
Supervised By

Prof. Dr.
Mohamad Farouk Fikry
Professor of Gynaecology & Obstetrics
Faculty of Medicine, Ain Shams University

Prof. Dr.
Essam Mohamad Khater
Assist. Professor of Gynaecology & Obstetrics
Faculty of Medicine, Ain Shams University

FACULTY OF MEDICINE
AIN SHAMS UNIVERSITY
1995





Acknowledgement

First of all, I could'nt find the words that can express my thanks to GOD.

I wish I could tell about may endless gratitude to Prof. Dr. Mohamad Farouk Fikry, Professor of Gynaecology and Obstetrics, Faculty of medicine, Ain Shams University, for the suggestion and supervision of this work and for his valuable criticism and advices during the practical part of the work and also for his constructive suggestion during writing of this thesis.

I would like to express my deepest thanks to Dr. Essam Mohamad Khater, Assist. Professor of Gynaecology and Obstetrics, Faculty of Medicine, Ain Shams University, for his energetic help, precious advice and for his valuable help during writing of this thesis.

I wish also to express my gratitude to Dr. Ahmad Mohamad Hashaad, Lecturer of Gynaecology and Obstetrics, Faculty of Medicine, Ain Shams University, for his help during the course of this work.

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INTRODUCTION AND AIM OF THE WORK

INTRODUCTION

Ureteral injuries usually occur during pelivc operations in females. The ureteral damage occurs mainly at its crossing level with uterine artery. The risk of ureteral damage is increased when the normal course of the ureter is altered by the primary pathologic lesions but when the ureter is insufficiently identified, every dissection in the neighborhood of the ureter, eventually complicated by bleeding, carries the risk of injury (Witters et al., 1986; Neuman et al., 1991). The actual incidence of injuries to the ureter during surgical procedures is difficult to be estimated because many instances are not reported and many others are almost asymptomatic and therefore undiagnosed (Higgins, 1987).

Of all injuries of urinary tract those involving the ureter are the most difficult to recognize and produce the most serious complications. Untreated ureteral injuries may result in fistula formation or loss of kidney function. The gynecologic surgeon must be vigilant in every operative procedure to identify the location of the ureters and take the necessary steps to avoid iatrogenic injury.

However, according to the available literature, incidence of surgical injury to the ureter varies from 0.5 to 2.5 per cent for routine pelvic operation (Gangi, 1976).

Witters (1986) reported that two thirds of all iatrogenic ureteral trauma occur during gynecologic operations, most often from abdominal hysterectomy or excision of uterine adnexae.

The most important factor in prevention of surgical injuries to the ureter is sound knowledge of the pelvic anatomy, the traditional means of avoiding ureteral injury are to stay well clear of it and the ureter should be identified at the pelvic brim and along its whole length in the pelvis especially at the level of crossing with the uterine artery . Proper identification of the ureter provided statistically significant reduction of iatrogenic ureteral injuries.

AIM OF THE WORK:

A comparative study between routine identification of ureters in the total abdominal hysterectomy versus nonidentification as the initial step and evaluate the effect of this step on the incidence of ureteral injuries.

REVIEW OF LITERATURE

ANATOMY OF THE URETER

Ureters are muscular tubes whose peristaltic contractions convey urine from the kidneys to the urinary bladder. Each measures 25-30 cm in length and is thick-walled, narrow and continuous superiorly with the funnel-shaped renal pelvis, a slight constriction may mark this junction. Each descends slightly medially anterior to psoas major, entering the pelvic cavity to open into the bladder.

Its surface markings are of use in palpating it for tenderness and in identifying radiographic shadows. On the anterion abdominal wall it can be marked from the tip of the ninth costal cartilage to the bifurcation of the common iliac artery. This latter point is found by joining the point of bifurcation of the abdominal aorta (2 cm below and to the left of the umbilicus) to a point midway between the anterior superior iliac spine and the pubic symphysis. The common iliac artery bifurcates one third of the way down this line.

More important is the line of projection of the ureter on a radiograph. It lies medial to the tips of the transverse processes of the lumbar vertebrae and crosses the pelvic brim at the sacroiliac joint. From here its pelvic shadow passes to the

ischial spine and thence, fore shortened, to the pubic tubercle. *(Mcminn, R.M.H. 1990).*

The diameter of the ureter is about 3 mm but slightly less at its junction with the renal pelvis, the brim of the lesser pelvis near the medial border of psoas major, and where it traverses the vesical (bladder) wall (its narrowest part) *(Williams et al., 1989).*

The ureter is divided into approximately equal abdominal and pelvic portions 15 cm. Each portion, in turn, may be further classified, somewhat artificially, into two divisions. The abdominal ureter consists of lumbar and iliac divisions, each approximating 8 cm in length, traversing the lumbar and iliac fossae, respectively. The pelvic ureter is divided into the longer parietal and shorter interfacial divisions *(Walsh, et al., 1986).*

Relation of the ureter:

Abdominal part:

The abdominal part of the ureter descends posterior to the peritoneum on the medial part of psoas major, which separates it from the tips of the lumbar transverse processes. Anterior to the muscle it crosses infront of the genitofemoral nerve and is obliquely crossed by gonadal vessels. It anters the lesser pelvis

anterior to either the end of the common or the beginning of the external iliac vessels. At its origin the right ureter is usually overlapped by descending part of the duodenum it descends lateral to the inferior vena cava, crossed anteriorly by the right colic and ileocolic vessels, near the superior operature of the lesser pelvis it passes behind the lower part of the mesentery and terminal ileum *(Williams et al., 1989).*

The medial border of the right ureter lies in close approximation to the lateral margin of the vena cava. This has created some anatomical difficulty in dissecting the para-caval lymph nodes from the inferior vena cava and necessitates the careful lateral retraction of the ureter, should a lymph node dissection be performed in this region *(Mattingly, R.F., Thompson, J.D. 1985).*

Also on the right side, the relationships of the gonadal vessels to the ureter account for those rare circumstances in which overian vein dilatation results in interference with ureteral drainage (so-called overion vein s-syndrome) *(Walsh, et al., 1986).*

The left ureter crossed by the left colic vessels, passes posterior to the sigmoid colon and its mesentery in the posterior

wall of the intersigmoid recess. At operation, the abdominal part of the left ureter is hence easier to expose than the right.

The pelvic part, about the same length as the abdominal, lieks in both sexes in extra-peritoneal areolar tissue. At first it descends posterolaterally on the lateral wall of the lesser pelvis along the anterioir border of the greater. Sciatic notch. Opposite the ischial spine it turns anteromedially into fibrous adipos tissue above the levator an to reach the base of the bladder. On the pelvis wall it is anterior to the internal iliac artery and the beginning of its anterioir trunk, posterioir to which are the internal iliac vein, lumbosacral nerve and sacro-iliac joint. Laterally it lieks on the fascia of abturator internus. it progressively crosses medial to the umbilical artery, the obturator nerve, artery and vein, the inferior vesical and middle rectal arteries.

In females, the pelvic part at first has the same relation as in males, but anterioir to the internal iliac artery it is immediatly behind the ovary, forming the posterior boundary of the overian fossa. In the anteromedial part of its course to the bladder it is related to the uterine artery, uterine cervix and vaginal fornices. It is in extraperitoneal connective tissue in the inferomedial part of the broad ligament of the uterus, here the

uterine artery is anterosuperior to the ureter for 2.5 cm and then crosses to its medial side to ascend along side the uterus. "The ureter turns forwards slightly above the lateral vaginal fornix and is here generally 2 cm lateral to the supra vaginal uterine cervix". It then inclines medially to reach the bladder, with a variable relation to the front of the vagina. As the uterus is commonly deviated to one side, one ureter may be more extensively opposed to the vagina, usually the left, which may cross the midline, the reverse may occur and sometimes one ureter is not anterior to the vagina, a much longer part of the other then being infront of it. In the distended bladder, the ureteric openings are about 5 cm apart, somewhat less in the empty viscus. In its oblique course through the vesical wall, the ureter is compressed and flattened as the bladder distends, perhaps preventing regurgitation, though ureteric peristalsis is also a factor *(Williams et al., 1989)*.

Histology of the ureter

The ureter shares the renal pelvis and calices the same basic structure, there is a gradual increase in the wall thickness as the ureter passes towards the bladder. The wall of the ureter consists of three distinckt layers, the inner most layer is the mucosa, which consists of a transitional epithillium and laminal propria of loose or dense connective tissues. it has not have a

distinct submucosa, on the average it is four or five cells thick. The second layer is a sheeth of smooth muscle, which are interspaced by collagenous connective tissue. In proximal ureter, this layer consists of an inner circular and outer longtujdinal layer, both of which are thin and poorly defined. Else where the musclar is consists of three distinct layers; inner longitudinal, middle circular and outer longitudinal fibers *(Motola et al., 1988).*

The muscle bundles are branching to form a complex meshwork of interweaving and interconnecting smooth muscle bundles *(Golsing et al., 1983).* However Tanagho, 1992, mentioned that the muscle bundles are a mixture of spiral and longitudinal smooth muscle fibers. They are not arranged in definite layers.

The outer most layer is adventitial connective tissue, which cover the muscularis, but also merges with connective tissues of surrounding structures. The distal 2-3 cm of the ureter are also covered by waldayers sheath, a fibromusculakr layer whose muscular portion fuses with the muscular coat of the ureter proximally.

Blood supply of the ureter