ABDOMINAL WOUND CLOSURE

An essay presented in partial fulfilment of

Master's degree in General Surgery

Presented by Dr/ NAGUI ABDEL MALAK ROSS

M.B.B.CH

Supervised by

Professor Dr. SHAMEL ABD ALLAH ALI

Prefessor of General Surgery Ain Shams

Faculty of Medicine

And

Dr. ALAA OTHMAN

Lecturer of Surgery Ain Shams

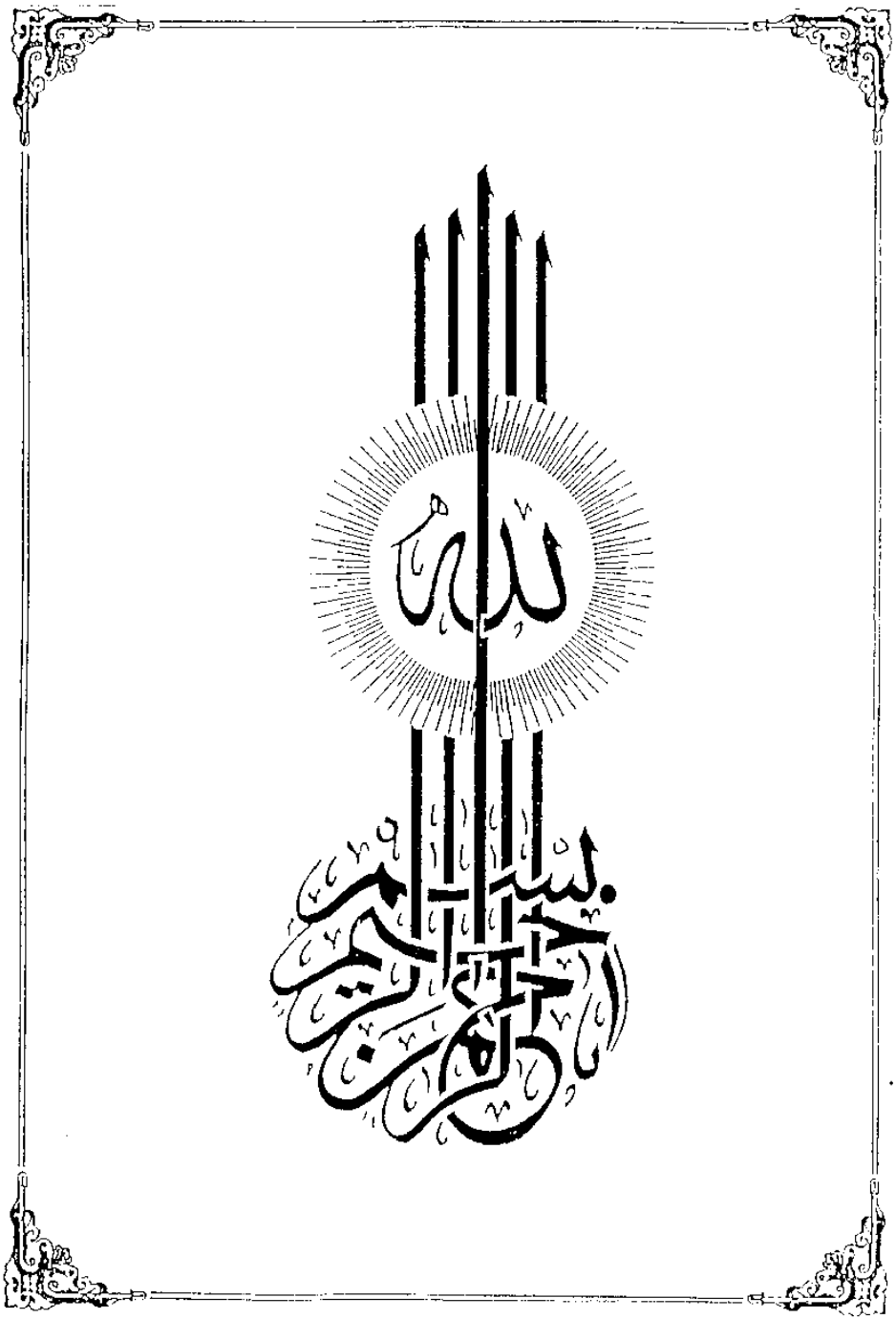
Faculty of Medicine

College of Medicine

Ain Shams University

1988

To My Parents



Acknowledgment.

I would like to give my personal gratitude to Professor Dr. Shamel Abd Allah and Dr. Alaa Othman for their fruitful and sincere co-operation , help and advice .

It was a pleasure to work under their guidance. Without their intimate supervision , this work would not have been completed.

Contents

Introduction

The ideal method of abdominal wound closure is yet to be discovered , however as modern science has evolved and new techniques came into use every effort should be taken to prevent the major complications of abdominal wound closure namely wound dehiscence.

The aim of this essay is to review the major advances in such techniques which are now in hand to give more secure closures after laparotomies.

As prophylaxis is better than remedy , every effort should be taken to prevent the catastrophe of abdominal wound dehiscence which carries high risks in either morbidity or mortality. Most of the scientific papers dealing with that subject which were published in major surgical and medical journals were reviewed , discussed and criticized in this essay as to highlight the best measure to prevent wound dehiscence from taking place.

ANATOMY OF THE ANTERIOR ABDOMINAL WALL.

Although the anterior abdominal wall is not supported by bone, it can support the viscera by its strong expansible musculature.

Such a function is mediated via a three-layered arrangement of muscle corresponding to the three layers of muscles in the wall of the thorax.

Moreover, its fibres run in the same directions. The outermost layer is formed by the external oblique muscle.

The middle layer is formed by the internal oblique and the innermost layer is formed by the transversus abdominis muscle. The latter runs more or less horizontally like the transversus thoracis. The mechanical strength offered by this construction is increased by thickening of the deepest layer of the superficial fascia. (Cunningham's, 1981)

The three layers of muscles are all supplied segmentally from T_7 to L_1 by anterior primary rami (Last,1981)

The muscles of the abdomen may be divided into anterolateral and posterior groups.

The first group of muscles include the external oblique, internal oblique, transversus abdominis, Pyramidalis and rectus abdominis muscles.

While the second group of muscles includes, psoas major. Psoas minor, iliacus and quadratus lumborum muscles (Grey's,1979)

EXTERNAL OBLIQUE MUSCLE.

It is the outermost of the three layers of muscles on the anterior and lateral aspects of the abdominal wall.
It arises from the outer surfaces of the lower right ribs by slips of origin which interdigitate with serratus anterior and latissimus dorsi muscles.
Its fibres goes parallel to the fibres of external intercostals. They radiate downwards and forwards towards the middle line. The most posterior ones being almost vertical.
The posterior vertical fibres are commonly overlapped by latissimus dorsi.
It happens occasionally that there may lie an interval between the two. Such an interval is known as the lumbar triangle. Which is considered a weak point of the abdominal wall. The lower posterior part of the muscle is inserted by fleshy fibres into the anterior two thirds of the outer lip of the iliac crest. The remainder gives rise to an aponeurosis.
The upper part of the aponeurosis of the external oblique covers the insertion of rectus abdominis and affords an origin for fibres of pectoralis major, the lower free border of the aponeurosis which lies between the anterior

superior iliac spine and the pubic tubercle forms what is known as the inguinal ligament.

(Cunningham's 1981)

THE INTERNAL OBLIQUE MUSCLE.

It arises by fleshy fibres from the lateral two thirds of the grooved upper surface of the inguinal ligament. And from the anterior two thirds of the ventral segment of the iliac crest. It arises also from the thoracolumbar fascia.

The posterior fibres pass upwards and laterally to be inserted into the inferior borders of the lower three or four ribs and are there continuous with the internal intercostals.

The fibres arising from the inguinal ligament arch downwards and medially across the spermatic cord in the male and the round ligament of the uterus in the female. As it becomes tendinous they are inserted conjointly with the aponeurosis of the transversus abdominis into the pubic crest forming what is known as the conjoint tendon.

The rest of the fibres of the internal oblique diverge and end in an aponeurosis.

The upper two thirds of it splits at the lateral border of the rectus abdominis into two lamellae ensheathing the muscle, and reunite at the linea alba.The whole aponeurosis

passes with that of the transversus anterior to the rectus muscle. (Last,1978)

THE TRANSVERSUS ABDOMINIS MUSCLE.

It corresponds to the transversus thoracis and is the innermost of the three flat muscles of the abdominal wall. It arises from the deep surfaces of the costal cartilages of the lower six ribs interdigitating with the origin of the diaphragm and from the thoracolumbar fascia, the anterior two thirds of the inner lip of the iliac crest. It arises also from the lateral third of the inguinal legament and from the fascia covering the iliacus muscle.

As its name suggests, its fibres run horizontally round the abdominal wall, and they end in an aponeurosis which fuses with the posterior layer of the aponeurosis of the internal oblique.

The upper three quarters of the resultant fibrous sheet passes behind rectus abdominis to reach the linea alba and the xiphoid process.

However the lower quarter is fused with the entire thickness of internal oblique apeneurosis and passes with it anterior to the rectus abdominis and to the linea alba.

This changeover takes place approximately half way between the umbilicus and the pubis at the arcuate line.

(Cunningham's 1981)

THE RECTUS ABDOMINIS MUSCLE.

It is a long flat muscle extending along the whole length of the front of the abdomen.

It arises by two heads, a medial head from infront of the symphysis pubis and a lateral head from the upper border of the pubic crest.

The muscle becomes wider as it passes upwards and is inserted into the anterior surfaces of the xiphoid precess and of the fifth, sixth and seventh costal cartilages in the anterior part of its substance. There are three or four transverse tendinous intersections, which are firmly adherent to the anterior wall of the rectus sheath.

The lowest is at the level of the umbilicus.

The highest at the xiphoid process and the third about half way inbetween.

At its lateral margin, the aponeurosis of the internal oblique splits into two layers. One of which passes in front of the rectus and the other behind it. The anterior layer is joined by the aponeurosis of the external oblique and the posterior layer by the aponeurosis of transversus abdominis.

Below a point midway between the umbilicus and the symphysis pubis the aponeurosis of the internal oblique

does not split, and the posterior wall of the sheath is defecient here,the rectus is directly in contact with the fascia transversalis, and the anterior wall of the sheath in this region is formed by the aponeurosis of external oblique, internal oblique and transversus abdominis. Such an aponeurotic envelope is known as the rectus sheath it encloses besides the rectus muscle, the pyramidalis muscle, the superior and inferior epigastric vessels, and the terminal portions of the lower five intercostal and the subcostal vessels and nerves.

(Cunningham's 1981)