SURGICAL DRAINS

ESSAY

Submitted In Partial Fulfilment For

The Degree of M.Sc. in

GENERAL SURGERY

By

MOSTAFA KAMAL MAHMOUD MORSY

M.B., B.Ch.

SUPERVISED By

Prof. Dr. **MOHAMMED RAGHEB**

Prof. of General Surgery,

Ain-Shams University

Dr. **KHALED AUF**

Lecturer of General Surgery,

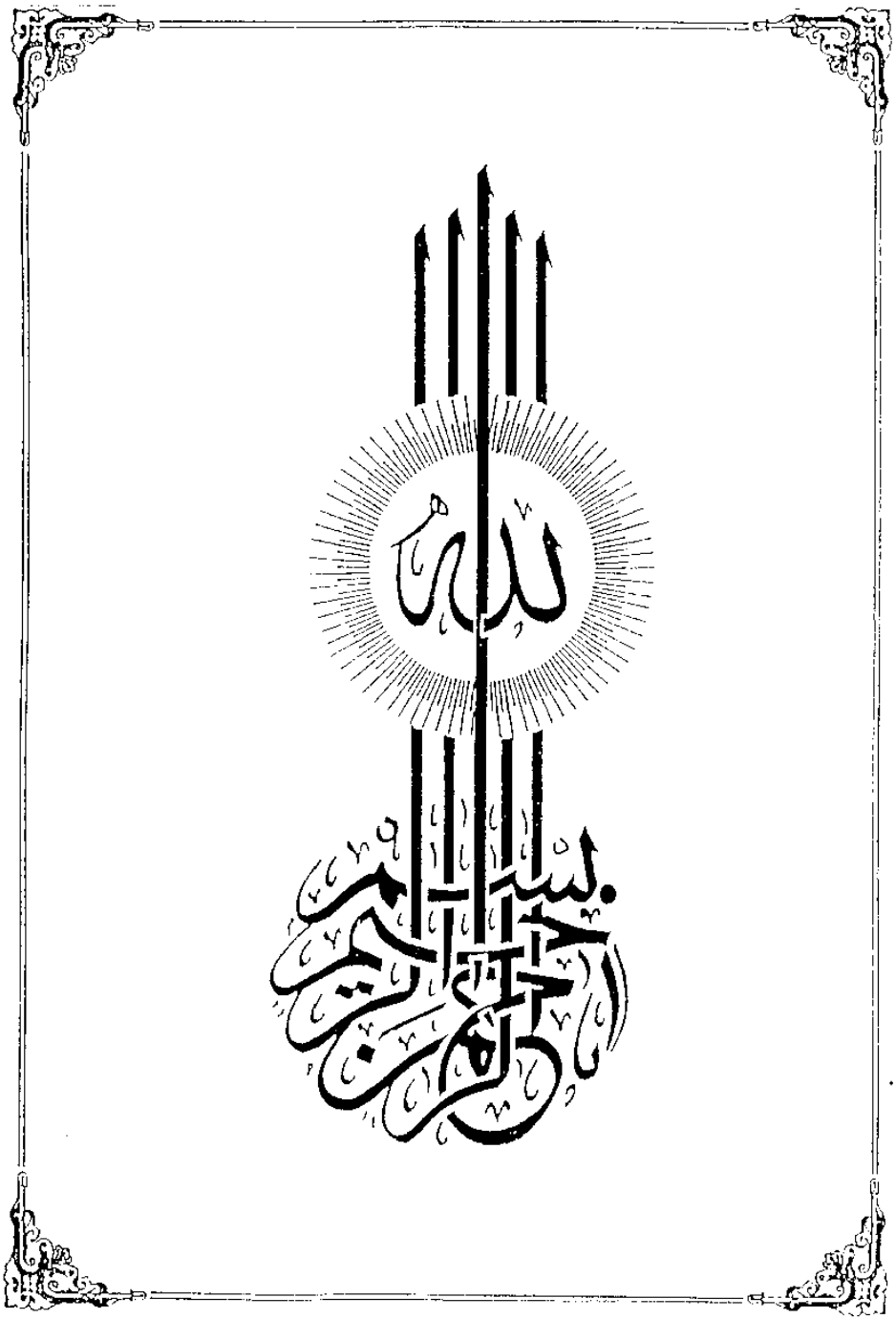
Ain-Shams University

FACULTY OF MEDICINE

AIN-SHAMS UNIVERSITY

- 1989 -

" TO MY PARENTS "



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

I would like to express my profound gratitude and appreciation to Prof. Dr. **Mohammed Ragheb,** Prof. of General Surgery, Faculty of Medicine, Ain-Shams University for his kind help, guidance and encouragement throughout this work.

I would also appreciate the help and kind supervision of Dr. **Khaled Auf,** Lecturer of General Surgery, Faculty of Medicine, Ain-Shams University.

I N D E X

** **

P R E F A C E

P R E F A C E

Although more than five million drains are used in the United states each year, their effectiveness, therapeutic indications remain an unresolved problem **(Moss, 1981).**

The need to drain has always been a controversial subject in surgery. There are those who believe that all intraperitoneal operations should be drained, those who feel that drainage is useless & those who sit on the fence and insert drain as a safety valve only. Their discussions are largely based on personal openions and the number of drains in the market is an evidence that no one is suitable for universal use in the wide field of surgery , **(Robinson, 1986).**

Throughout the surgical literature, in the past as well as currently, the issue of drainage has been subject of heated debate & remains the source of abundant confusion. When obvious collection of blood or pus exist, the need for drainage is little disputed. But the method of placement, the length of time drains should remain in place, and the wisdom of prophylactic drainage are matters of concern to all the surgeons **(Margaret, 1984).**

The purpose of this work is to discuss development, types, indications as well as complications of surgical drains.

HISTORICAL REVIEW

HISTORICAL REVIEW

History reminds us with picture that demonstrates the problems which our forefathers faced & which face us today about drainage. Their first concern was the release of fluids which were considered undesirable.

Hippocrate (460 - 377 B.C.) was the first physician in recorded history to describe the use of hollow tubes for surgical drainage **(Margarate, 1984).** In the Hippocrate era we find positive attempts to release pus from empyema of the chest which was detected in the thorax by shaking the chest by the shoulders and listening for the splashing sounds. He remarked "When empyema is treated either by cautery or incision. If pure & white pus flow from the wound, the patients recover, but if mixed with blood and fetid, they die". He recommended cutting down the ninth rib & then making a perforation with a trocar, but in some patients cautery was employed to burn a hole through the chest wall **(Robinson, 1986).**

It's probably that from these writings, Celsus in the second century received his inspiration to treat similarly abdominal ascites. Celsus's tubes were not cylindrical, but conical, with the distal end of the great circumference to prevent slipping within the abdomen. They were made of lead and brass to which he attached an adjustable plug

to allow for intermittent drainage as it was recognised that more than one sitting might be required to remove the fluid. Galen & Avicina, in the second century, upheld this treatment for ascites **(Yates, 1905).**

Drainage practices during the Middle Ages are not known. Again the curtain was lifted in 1363 by the French Surgeon Guy de Chauliac. In his Chirurgia Magna he described a "CHARPIE", which is a drain consisting of linen cut into small pieces and"tentes" which were made by rolling charpies between the hands to form a rather stiff tampon with a head at one end shaped rather like. They served as wicks to prevent premature closure of the wound or acted as a dilator to enlarge the wound for better drainage. Guy left contaminated wounds open, whereas the majority of surgeons in the thirteenth century urged primary closure. A few surgeons were to follow Guy's teaching. Many years later the Inter Allied Conference in World War I called for a rule that all contaminated wounds should be left open **(Wagensteen, 1975).**

Ambrose Pare (1510 - 1590), a prolific writer of the Renaissance period, described the use of tentes (drains) and messes (packs) in military surgery. He credited with advancing to the limits imposed by the lack of anaesthesia and antiseptics. In his writings, he outlined the indications for drains as follows:

wounds that required debridement or those in which pus collects, contaminated wounds, abscesses, bites & ulcerated wounds and orthopedic procedures. He also was the first to caution against the excessive use of drains & described the complications of the drains of his day **(Packard, 1922).**

John Scultetus (1595 - 1645) was the first person to recommend the principle of capillary drainage by inserting a wick into a drainge tube to increase its efficiency. This principle was given further impetus by another German surgeon Lorenz Heister in the latter part of the century and was the fore-runner of the much used Penrose drain **(Moss, 1984).**

In 1791, Benjamin Bell, recommended leaving the dependent portion of the wound open and securing drainage with a number of silk strands, or using drainage tubes for deep or septic wounds. **Ephraim Mcdwell, in (1809),** performed the first oophorectomy for benign ovarian tumour, left a long ligature from the ovarian pedicle which was brought out through the wound **(Yates, 1905).**

Gynaecology took rapid strides during the early part of the nineteenth century, more than general surgery. Gynaecologists were aware that early mortality was partly due to accumulation in the pelvis of blood and serum which

decompose & was thought to be reabsorbed as poisonous toxin, and that more efficient drainage was required **(Robinson, 1986).**

Surgeon, E.R. **Peaslee (1855),** introduced new concept in drainage of the pelvis. He initially used the vault of the vagina to insert a gum elastic tube drain into the pouch of Douglas, he recommended that it should be repeatedly irrigated with plain water and later advised the use of weak solution of chlorinat lime **(Bixby, 1875).**

Soft rubber tubes were introduced by **Chassaignae,** of France **in (1859),** a most important step in the development of drainage as these types of tubes are used to this day **(Robinson, 1986).**

In (1867), Eugene Koobrele, the pioneer of hysterectomy from Strasbourg, introduced a glass tubular drains described by **Yates** as appearing similar to a ten-pin, subsequently **Keith & Wells** modified this into cylindrical glass tube open at both ends and having side holes which allowed drainage but were sufficiently small to prevent omentum or intestine entering or obstructing them **(Yates, 1905).**

The last quarter of the nineteenth century was one of the most stimulating in history of surgery. Not only were new operations being introduced, old ones

modified and asepsis replacing antisepsis, but the complications associated with these advances were manifested. Prophylactic drainage of the peritoneal cavity was one of the greatest controverses. **Theodor Billroth,** believed that in gastrointestinal surgery it had saved many lives, others condemened it as useless **(Robinson, 1986).**

Mikulicz, in (1881), accepted the impossibility of intraperitoneal drainage and so did his friend **William Halsted** who expounded that "The more imperfect the technique of the surgeon; the greater the necessity for drainage....". **Mikulicz,** went on to emphasize the importance of closing all dead spaces by carefull technique, condemened any form of irrigation through tubes and advised the gauze tampon which not only obliterated dead spaces but it acted as a capillary drain. His tampon was constructed out of fenestrated sheet of rubber which was filled with long strips of gauze impregnated with iodine, which mainly functioned to tamponade raw oozing surfaces **(Berliner, 1967).**

During the same period, **Pasteur's** discoveries were introduced into the practice of surgery by **Joseph Lister,** antisepsis was so major contribution to surgery **(Moss, 1984).** The carbolic acid antiseptic spray bottles gave him the idea to use the Indian rubber tubing from the

bottle as a drain. In elective operations, **Lister** usually removed the drain within 24 hours. Drains remained in abscess cavities, being gradually withdrawn as the cavity obliterated. Oddy enough, although the use of drains was wide spread and generally accepted, when **Lister** spoke at the **American Surgical Association** in **(1882)**, there was much opposition of his antisepsis principles **(Traux, 1944).**

In **(1891), Hunter Robb** reported the first major bacterial study of drains at a time when glass rods were the most commonly used. He found that nearly 50% were contaminated with microorganisms and emphasized the importance of constant cleaning & meticulous care to the dressings. In addition, to the problem of infection there was other relatively common complications such as ventral hernia, evisceration, intestinal obstruction, adhesions and fistula formation **(Moss, 1981).**

The logical results was the introduction of the PENROSE drain, which was described by **Charles Brighham Penrose,** a professor of Gynaecology at the University of Pennsylvania. He used a condom from which he cut off the end & inserted a strip of gauze **(Robinson, 1986).**

IN (1905), J.L. yates, concluded from his famous study "An experimental study of the local effect of