The Value of mechanical closure of the dead space after mastectomy in reducing post operative drainage and seroma formation

Thesis

Submitted for partial fulfillment of M.S.C master degree

In general surgery

By

Alaa Eldin Ezzat Ali Mohamad Amin

M.B.B.Ch.

Under supervision of:

Prof. Dr. Adel Ahmad Hossni

Professor & head of general surgery department

Faculty of medicine, Cairo university

Dr. Mostafa Abd El Tawab El Sakkary

Lecturer of surgical oncology,

National cancer institute, Cairo University

Dr. Mohamad Abdul-Moneim El Masry

Lecturer of general surgery

Faculty of medicine, Cairo University.

Cairo, 2010

LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Acknowledgment

I would like to express my great thaks for my supervisor Prof. Dr. Adel Ahmed Hosny , Dr. Mostafa Abd- Eltawab and Dr. Mohamad Elmasry.

I would like to express great and special thanks to Prof. Dr. Adel Ahmed Hosny my senior supervisor for providing me with his valiable advise and directing me throughout the work of this study .

Also great and special thanks to Dr. Mostafa Abd-Eltawab for chosing the topic of this study and for all the efforts that he did to complete the study as he has been the senior operator in most operations for patients involved in this study.

Also great and special thanks to Dr.Mohamad El-Masry for all the efforts that he did with me in this study by helping me with advise , guiding and directing me to the right way.

I would like also to express my great thanks to Prof. Dr.Saed Abd-Elhalim and Prof. Dr.Hessain Khalil for accepting to dicuss the results of this study with me and guiding me to some modififications that I did after their instructions.

Lastly I woud like to present this study as a gift to my mother and to the soul of my father for all what they have done for me thoughout their lifes and up till now.

Abstract

Seroma formation is the most frequent post opevative complication after mastectomy. Seroma is thought to be caused due to the empty space left under the skin after mastectomy operations. Suture flap fixation is a surgical technique for securing skin flaps to urderlying tissues , thus closing the dead space and decreasing the incidence of seroma formation. The technique of suture flap fixation has been proved to be the most effective method for decreasing seroma formation after mastectomy.

Key words :

- Seroma.
- Post mastectomy seroma.
- Mechanical closure of dead space after mastectomy.
- Suture flap fixation after mastectomy.

INTRODUCTION

Breast cancer is the most common female cancer and the second leading cause of cancer death among women. The surgical treatment of choice for these patients is either modified radical mastectomy or breast conservation depending upon stage of disease. Seroma formation is the most frequent post operative complication after breast cancer surgery. It occurs in most patients after mastectomy. Some studies suggest that between thirty & ninety percent of mastectomy patients develop a seroma ***(Esmat Hashemi et al, 2004).***

Post mastectomy seroma remains an unresolved quandary as the risk factors for its formation have still not been identified. However, seroma is thought to be caused by the fact that the mastectomy operation leaves a lot of an "empty space" under the skin where the breast tissue used to be. The walls around this empty space are raw and can ooze serous fluid causing it to gather up in the space beneath the wound ***(Kumar et al., 1995).***

Several factors make fluid accumulation likely after breast surgery. For example, if the dissection is extensive, it will result in a large dead space beneath the flaps. Irregularity of the chest wall, especially in the deep axillary fossa, makes it difficult for flaps to adhere. Constant chest wall movement due to respiration and shoulder use creates shearing forces that delay flap adhesion ***(Kuroi et al., 2005).***

Although seroma is not life threatening, it can lead to significant morbidity (eg.: flap necrosis, wound dehiscence, predispose to sepsis, prolonged recovery period, multiple physician visits, and may delay adjuvant therapy ***(Esmat Hashemi et al, 2004).***

Sometimes repeated skin punctures are used to drain the seroma, but these are uncomfortable and can lead to local infection. Rarely if infection develops, a seroma can lead to a delay in starting chemotherapy ***(Marjory & Gordon, 2006).***

For this, several techniques of flap fixation or wound drainage, as well as limitation of postoperative shoulder movement, injecting different chemical substances as thrombin, tranexam acid and fibrin glue. Also new research project is exploring an injection of steroid after surgery may help prevent seroma formation ***(Marjory &Gordon, 2006).***

Therefore, ideal wound closure should minimize lymph spillage and serum oozing, provide a means of holding skin flaps securely to the chest wall structures, obliterate dead space, and allow rapid removal of fluid as it forms ***(Aitkin and Minton. 1983).***

There are two mechanical methods for closure of the dead space beneath skin flaps; compression by external pressure, and fixation of flaps by sutures. There is no evidence to suggest that the routine use of pressure garment or compression dressing is beneficial. ***O'Hea et al. 1999*** reported that an external compression dressing failed to decrease postoperative drainage.

However it appears that suture flap fixation does reduce seroma formation ***(Katsumasa et al, 2006).***

Several retrospective and prospective studies, as well as randomized controlled trials have found it useful to close the dead space by securing the flaps to the chest wall with sutures. This method allowed smoother, more prompt recovery, and less disability after radical mastectomy. Similarly, this technique significantly reduced the incidence of seroma formation, prolonged serous discharge, breakdown of wound edges, and did not lead to a reduced functional range of shoulder motion among patients who underwent modified radical mastectomy. Moreover, it allowed the early and safe removal of drains after-surgery ***(Larsen et al., 1955; Purushotham et al., 2002)***

ANATOMY

The mammary glands lie in the subcutanues tissue of the pectoral fat pad beneath the skin of the chest. Each breast bears a small conical projection called the nipple, where the ducts of under lying mammary glands open on to the body surface. The skin surrounding each nipple has a reddish brown coloration, and this region is known as the areola. Large sebaceous glands beneath the areola surface give it a granular texture.

The glandular tissue of the mammary gland consists of separate lobes, each containing several secretary lobules. Ducts leaving the lobules converge giving rise to a single lactiferous duct in each lobule. Near the Nipple, that lactiferous duct expands forming usually 15-20 lactferorus sinuses open onto the surface of each nipple.

Dense connective tissue surrounds the duct system and forms partitions that extend between the lobes and lobules. These bands of connective tissue, known as the suspensory ligaments of the breast, originate in the dermis of the overlying skin. A layer of loose connective tissue separates the mammary complex from the underlying pectoralis muscles. Braches of internal thoracic artery supply blood to each mammary gland ***(Fredric, 1995)***.

The female breast overlies the 2^{nd} to the 6^{th} rib, two-thirds of it rests on pectoralis major, one third on serratus anterior, while its lower medial edge just over laps the upper part of the rectces sheath ***(Harold Elis, 2002).***

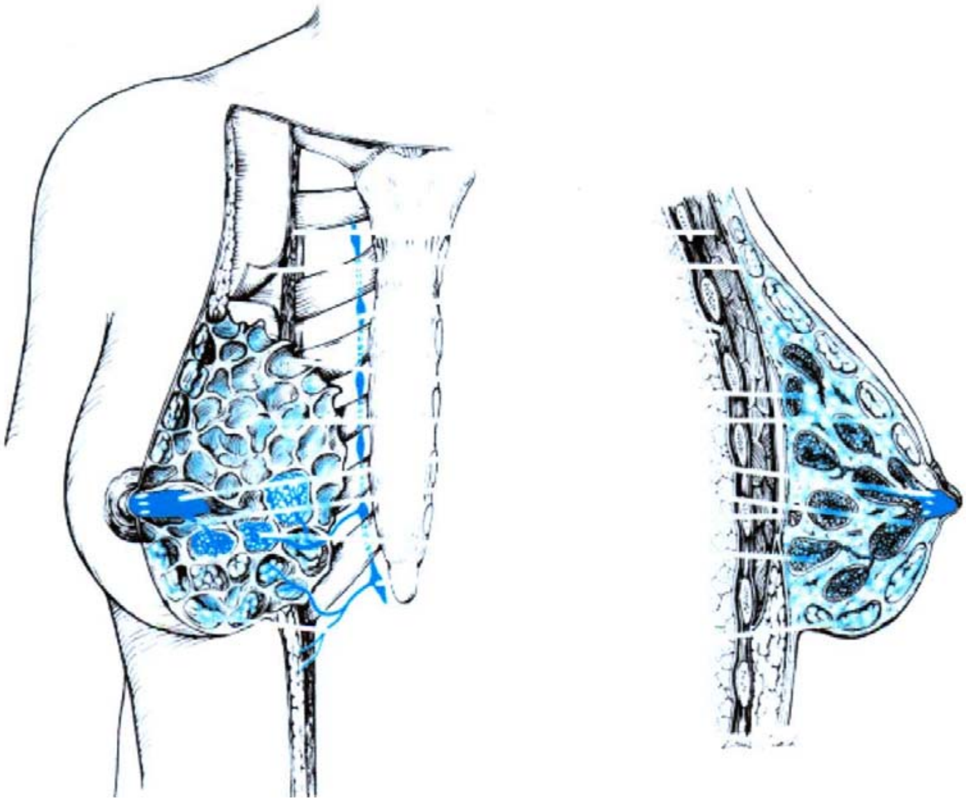

Fig. (1) : Anatomy of the breast. Tangential and cross-sectional (sagittal) views of the breast and associated chest wall. (*From Romrell et al,* 10 *p 20, with permission*.)

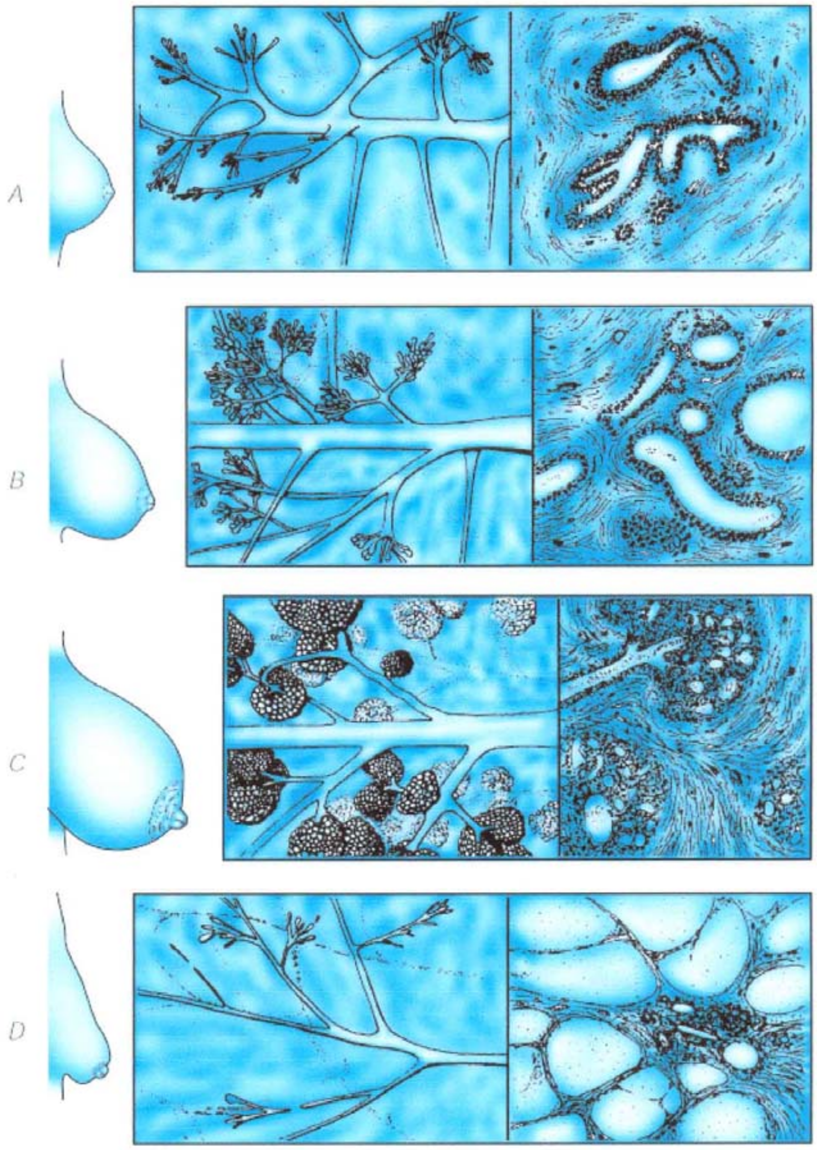

Fig. (2): The breast at different physiological stages. The central coloumn contains three-dimensional depictions of microscopy structures. A. Adolescence. B. Pregnancy. C. Lactation. D. Senescence.

Blood Supply of the breast:

Blood Supply

a) Arterial Supply

With considerable variation, the breast is supplied with blood from three sources: the internal thoracic artery, branches of the axillary artery, artery, and the intercostal arteries .

Internal Thoracic Artery

The internal thoracic branches supply most of the blood to the breast. The internal thoracic (or internal mammary) artery is a branch of the subclavian artery; it courses parallel with the lateral border of the sternum behind the transversus thoracis muscles. From the internal thoracic artery, perforating branches pass through the intercostal muscles of the first six interspaces and the pectoralis major muscle to supply the medial half of the breast and surrounding skin. The mammary rami of the first two of these perforating branches are the largest, although in some cases, the first and third or second and fourth are the largest. Typically these arteries descend laterally toward the nipple-areolar complex so that most of the arterial supply arises above the level of the nipple. Therefore, radial incisions in the upper half of the breast are less likely to injure the major arterial supply than transverse incision. We agree with Morehead that the inferior parts of the breast below the level of the nipple are almost free of major vessels ***(Van de Perre, 2003).***

Branches of the Axillary Artery

Four branches of the axillary artery may supply the breast. They are, in order of appearance, (l) the supreme thoracic branch, (2) the pectoral branches of the thoracoacromial artery, (3) the lateral thoracic arteries, and (4) unnamed mammary branches. The lateral thoracic artery is the most important of these vessels. The axillary vasculature supplies the lateral portion of the breast.

Intercostal Arteries:

The lateral half of the breast may also receive branches of the third, fourth, and fifth intercostals arteries. Only about 18 percent of breasts are supplied by all three of these sources. Only the branches from the internal thoracic artery are always present to some degree (Fig.3). In most breasts, there are free anastomoses between the arteries supplying the breast; occasionally all three arterial sources remain separate.

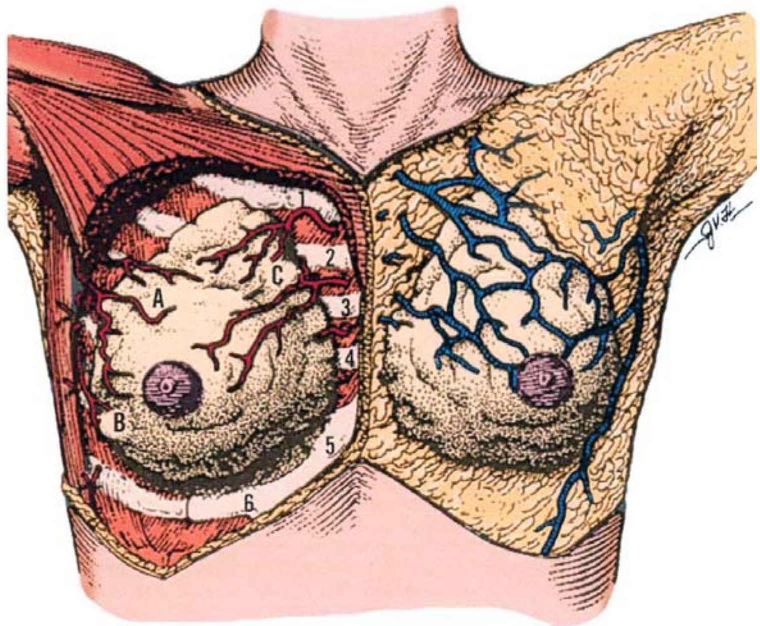

Fig.(3): **Blood supply of the breast; drawing from a dissection photograph. The arterial supply is here derived chiefly from (A) direct mammary branches of the axillary artery; (B) branches of the lateral thoracic artery; (C) perforating branches of the internal thoracic artery. The venous drainage is comparable, and is illustrated on the right side of the drawing. The rib levels are indicated by numbers. (Modified from Colborn GL, Skandalakis JE. Clinical Gross Anatomy. Pearl River NY: Parthenon, 1993; with permission.)**