ONCOPLASTIC SURGERY FOLLOWING BREAST

CONSERVATION FOR MALIGNANCY

nA Essay

Submitted For partial Fulfillment of Master

Degree in General Surgery

detneserP By

MOHAMED FARAG MOHAMED

M.B. B.Ch.,

Supervised By

Prof. Dr. SAMY AHMED ABD AL RHMAN
Professor of General Surgery
Faculty of Medicine - Ain Shams University

Dr. AHMED EL SAYED MORAD
Lecturer of General Surgery
Faculty of Medicine - Ain Shams University

2011
Faculty of Medicine
Ain shams University

Acknowledgments

*Praise to "**ALLAH**", The Most Gracious and The Most Merciful Who guides me to the right way.*

*I wish to express my deepest sincere gratitude to **Prof. Dr. Samy Ahmed Abd Al Rhman**Professor of Surgical oncology, Faculty of Medicine, Ain-Shams University, for his kind supervision, great support and encouragement, also for the generous and numerous facilities he had offered all through this essay. It has been a great honor to work under his supervision.*

*I am all appreciative for the kind help offered to me by **Dr.Ahmed El SaydMorad**Lecturer of Surgical oncology, Faculty of Medicine, Ain-Shams University. His scientific guidance, interest, valuable criticism and comments were helpful throughout the course of this essay.*

TABLE OF CONTENTS

Introduction

No other solid cancer has witnessed such a tremendous change and improvement in terms of diagnosis and management as breast cancer in the last 2 decades. This remains the most common cancer among women worldwide[1].

Oncoplastic surgery for the management of breast cancer has been receiving worldwide attention and gaining widespread acceptance. Simply stated, oncoplastic surgery is defined as tumor excision with a wide margin of resection followed by immediate reconstruction of the partial mastectomy defect [2] .

It is difficult to state with certainty who first began performing immediate partial breast reconstruction; however, the individual who is most credited with the introduction and popularization is Melvin J Silverstein MD. This occurred in 1982 following the excision of a fibroadenoma. The breast was immediately repaired using a reduction mammoplasty approach [3].

In an effort to reduce the incidence of local recurrence and maintain natural breast contour, the concept of oncoplastic surgery was introduced[4-5].Oncoplastic surgery differs from standard breast conserving surgery in that the margin and volume of excision are typically greater than in lumpectomy or quadrantectomy. Excision margins typically range from 1 to 2 cm and resection volumes typically range from 180 to 220 cm^3, although much greater margins and volumes are possible [2] .

The resultant deformity is reconstructed immediately using techniques related to volume replacement or volume displacement that include adjacent tissue rearrangement, reduction mammoplasty, or distant flaps. Contralateral procedures can be performed immediately at the time of partial breast reconstruction or on a delayed basis.Oncoplastic techniques have resulted in survival and

local recurrence rates that are essentially equal to those of modified radical mastectomy [6-7].

The techniques that are currently used for the reconstruction of the partial mastectomy defect are based on two different concepts: volume displacement and volume replacement.

Volume displacement procedures include local tissue rearrangement, reduction mammoplasty, and mastopexy. Volume replacement procedures include local and remote flaps from various regions of the body [2] .

All of these techniques have been utilized extensively and found to be useful. IN general, women with smaller breasts with minimal ptosis were found to be better candidates for volume replacement procedures, e.g. local flap, latissimusdorsi, lateral thoracic flap; whereas women with larger and more ptotic breasts would be better candidates for volume displacement procedures, e.g. adjacent tissue rearrangement, reduction mammoplasty,mastopexy[2] .

List of Abbreviations

KB	KILO BASE
CIS	CARCINOMA IN SITU
LCIS	LOBULAR CARCINOMA IN SITU
DCIS	DUCTAL CARCINOMA IN SITU
NST	NO SPECIAL TYPE
AJCC	AMERICAN JOINT COMMITTEE OF CANCER
TRAM	TRANSVERSE RECTUS ABDOMINUS MYOCUTANEUS RECONSTRUCTION
BASO	BRITISH ASSOCIATION OF SURGICAL ONCOLOGY
BAPS	BRITSIG ASSOCIATION OF PLASTIC SURGERY
BCT	BREAST CONSERVING SURGERY
LD	LASTISMUSS DORSI
NAC	NIPPLE AREOLA COMPLEX

Aim of The Essay

Reviewing literature about oncoplastic surgery for breast conservation in malignancy, focusing on different techniques, indications and safety.

Acknowledgments

*Praise to "**ALLAH**", The Most Gracious and The Most Merciful Who guides me to the right way.*

*I wish to express my deepest sincere gratitude to **Prof. Dr. Samy Ahmed Abd Al Rhman**Professor of Surgical oncology, Faculty of Medicine, Ain-Shams University, for his kind supervision, great support and encouragement, also for the generous and numerous facilities he had offered all through this essay. It has been a great honor to work under his supervision.*

*I am all appreciative for the kind help offered to me by **Dr.Ahmed El SaydMorad**Lecturer of Surgical oncology, Faculty of Medicine, Ain-Shams University. His scientific guidance, interest, valuable criticism and comments were helpful throughout the course of this essay.*

Anatomy

Embryology

During the fifth week of human fetal development, the ectodermal primitive milk streak, or “galactic band,” develops from axilla to groin on the embryonic trunk (figure 1-1)[8]. The ectoderm over the thorax invaginates into the surrounding mesenchyme, with subsequent epithelial budding and branching. In the region of the thorax, the band develops to form a mammary ridge, whereas the remaining galactic band regresses. Incomplete regression or dispersion of the primitive galactic band leads to accessory mammary tissues, found in 2% to 6% of women in the form of accessory nipples or axillary breast tissue [9].

Figure 1-1 The milk lines [10].

At 7 to 8 weeks' gestation, a thickening occurs in the mammary anlage (milk hill stage), followed by invagination into the chest wall mesenchyme (disc stage) and tridimensional growth (globular stage). Further invasion of the chest wall mesenchyme results in a flattening of the ridge (cone stage) at 10 to 14 weeks' gestation. Between 12 and 16 weeks' gestation, mesenchymal cells differentiate into the smooth muscle of the nipple and areola. Epithelial buds develop (budding stage) and then branch to form 15 to 25 strips of epithelium (branching stage)at 16 weeks' gestation; these strips represent the future secretory alveoli . The secondary mammary anlage then develops, with differentiation of the hair follicle, sebaceous gland, and sweat gland elements, but only the sweat glands develop fully at this time. Phylogenetically, the breast parenchyma is believed to develop from sweat gland tissue. In addition, apocrine glands develop to form the Montgomery glands around the nipple. The developments described thus far are independent of hormonal influences [(11)].

During the third trimester of pregnancy, placental sex hormones enter the fetal circulation and induce canalization of the branched epithelial tissues (canalization stage) [(12)]. This process continues from the 20th to the 32nd week of gestation. At term, 15 to 25 mammary ducts have been formed, with coalescence of approximately 10 major ducts and sebaceous glands near the epidermis. Parenchymal differentiation occurs at 32 to 40 weeks with the development of lobuloalveolar structures that contain colostrum (end-vesicle stage). A fourfold increase in mammary gland mass occurs at this time, and the nipple–areolar complex develops and becomes pigmented. Externally the nipple is small and flattened, although rudimentary sebaceous glands and Montgomery tubercles are present. The circular smooth muscle fibers that lead to the erectile function of the nipple are developed by this stage [(13)].

In the neonate, the stimulated mammary tissue secretes colostral milk (sometimes called witch's milk), which can be expressed from the nipple for 4 to 7 days postpartum in most neonates of either sex. At birth, the withdrawal of maternal steroids results in the secretion of neonatal prolactin. It is this hormone that stimulates newborn breast secretion. In the newborn, colostral secretion declines over a 3- to 4-week period owing to involution of the breast after withdrawal of placental hormones. During early childhood, the end vesicles become further canalized and develop into ductal structures by additional growth and branching [13].

Morphology

The adult breast lies between the second and sixth ribs in the vertical axis and between the sternal edge and the midaxillary line in the horizontal axis. The average breast measures 10 to 12 cm in diameter, and its average thickness centrally is 5 to 7 cm. Breast tissue also projects into the axilla as the axillary tail of Spence. The contour of the breast varies but is usually dome-like, with a conical configuration in the nulliparous woman and a pendulous contour in the parous woman. The breast is comprised of three major structures: skin, subcutaneous tissue, and breast tissue, with the last comprising both parenchyma andstroma. The parenchyma is divided into 15 to 20 segments that converge at the nipple in a radial arrangement. The collecting ducts that drain each segment are 2 mm indiameter, with subareolar lactiferous sinuses of 5 to 8 mm in diameter. Approximately 10 major collecting milk ducts open at the nipple [14].

The skin of the breast is thin and contains hair follicles, sebaceous glands, and eccrine sweat glands. The nipple, which is located over the fourth intercostal space in the nonpendulous breast, contains abundant sensory nerve endings, including Ruffini-like bodies and end bulbs of Krause. Moreover, sebaceous and apocrine sweat glands are present, but not hair follicles. The areola is circular and pigmented, measuring 15 to 60 mm in diameter. The Morgagni tubercles, located near the periphery of the areola, are elevations formed by openings of the ducts of the Montgomery glands. The Montgomery glands are large sebaceous glands capable of secreting milk; they represent an intermediate stage between sweat and mammary glands. Fascial tissues envelop the breast; the superficial pectoral fascia envelops the breast and is continuous with the superficial abdominal fascia of Camper. The undersurface of the breast lies on the deep pectoral fascia, covering the pectoralis major and serratus anterior muscles. Connecting these two fascial layers are fibrous bands (Cooper suspensory ligaments) that represent the "natural" means of support of the breast.

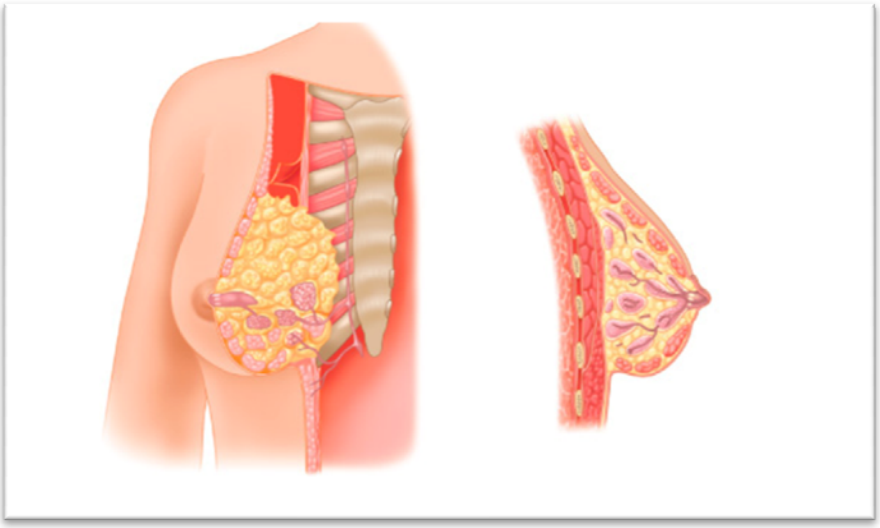

Figure 1-2 Anatomy of the breast. Tangential and cross-sectional (sagittal) views of the breast and associated chest wall[15].

Vascular Anatomy of the Breast

The principal blood supply to the breast is derived from the internal mammary and lateral thoracic arteries (figure 1-3). Approximately 60% of the breast, mainly the medial and central parts, is supplied by the anterior perforating branches of the internal mammary artery. Approximately 30% of the breast, mainly the upper, outer quadrant, is supplied by the lateral thoracic artery. The pectoral branch of the thoracoacromial artery; the lateral branches of the third, fourth, and fifth intercostal arteries; and the subscapular and thoracodorsal arteries all make minor contributions to the blood supply[16].

The principal veins involved in the venous drainage of the thoracic wall and the breast are the perforating branches of the internal thoracic vein, tributaries of the axillary vein, and perforating branches of posterior intercostal veins (figure 1-3).

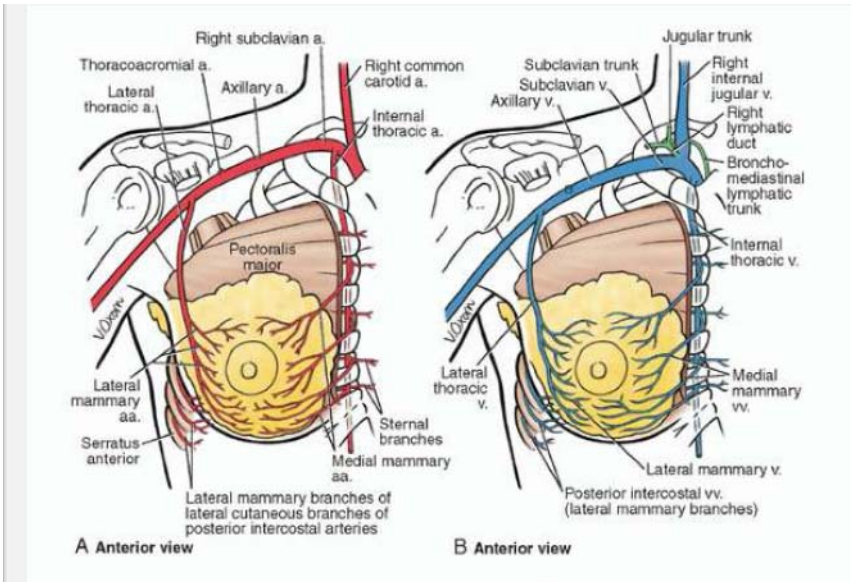

Figure 1-3 arterial supply (A) and venous drainage of the breast (B) [17].

Lymphatic Drainage of the Breast

Lymph Vessels

The lymphatic drainage of the breast is of great importance in the spread of malignant disease of the breast. The subepithelial or papillary plexus of the lymphatics of the breast is confluent with the subepithelial lymphatics over the surface of the body. These valveless lymphatic vessels communicate with subdermal lymphatic vessels and merge withthe Sappey subareolar plexus. The subareolar plexus receives lymphatic vessels from the nipple and areola and communicates by way of vertical lymphatic vessels equivalent to those that connect the subepithelial and subdermal plexus elsewhere [(18)]. Lymph flows unidirectionally from the superficial to deep plexus and from the subareolar plexus through the lymphatic vessels of the lactiferous ducts to the perilobular and deep subcutaneous plexus. The periductal lymphatic vessels lie just outside the myoepithelial layer of the duct wall [(19)]. Flow from the deep subcutaneous and intramammary lymphatic vessels moves centrifugally toward the axillary and internal mammary lymph nodes (figure 1-4). Injection studies with radiolabeled colloid [(20)] have demonstrated the physiology of lymph flow and have countered the old hypothesis of centripetal flow toward the Sappey subareolar plexus [(21)]. Approximately 3% of the lymph from the breast is estimated to flow to the internal mammary chain, whereas 97% flows to the axillary nodes [(22)].

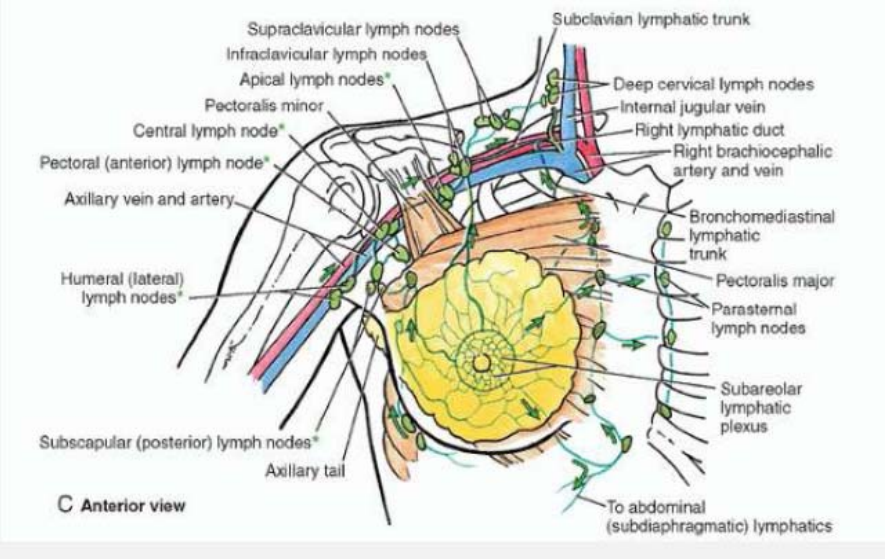

Figure 1-4 lymphatic drainage of the breast [17].

Axillary Lymph Nodes

The anatomy of the axillary lymph nodes has been studied as the major route of regional spread in primary mammary carcinoma. The anatomic arrangement of the axillary lymph nodes has been subject to many different classifications. The most detailed studies are those of Pickren, which show the pathologic anatomy of tumor spread [23].

Axillary lymph nodes can be grouped as the apical or subclavicular nodes, lying medial to the pectoralis minor muscle, and the axillary vein lymph nodes, grouped along the axillary vein from the pectoralis minor muscle to the lateral limit of the axilla; the interpectoral (Rotter) nodes, lying between the pectoralis major and minor muscles along the lateral pectoral nerve [24,25]; the scapular group, comprising the nodes lying along the subscapular vessels; and the central nodes, lying beneath the lateral border of the pectoralis