صدق الله العظيم

سورة البقرة آية (32)

Recent Oncoplastic Approaches in Breast conserving surgery

An Essay

Submitted For partial Fulfillment of Master degree of

General Surgery

By:

Assem Mohamed Abo-Yousef

(M.B., B.Ch)

Supervised By

Dr. Mohey El-Din Ragab El-banna

Professor of General Surgery
Faculty of Medicine, Ain Shams University

Dr. Ahmed Gamal El-Din Osman

Lecturer of General Surgery
Faculty of Medicine, Ain Shams University

Dr. Sherief Mohamed Mohsen Ismail

Lecturer of General Surgery
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain shams University
2014

Acknowledgement

First of all, all gratitude is due to ***God*** *almighty for blessing this work, until it has reached its end, as a part of his generous help, throughout my life.*

Really I can hardly find the words to express my gratitude to ***Dr., Mohey El-Din Ragab El-banna*** *Professor of general surgery, faculty of medicine, Ain Shams University, for his supervision, continuous help, encouragement throughout this work and tremendous effort he has done in the meticulous revision of the whole work. It is a great honor to work under his guidance and supervision.*

I would like also to express my sincere appreciation and gratitude to ***Dr., Ahmed Gamal El-Din Osman*** *lecturer of general surgery, faculty of medicine, Ain Shams University, for his continuous directions and support throughout the whole work.*

I would like also to express my sincere appreciation and gratitude to ***Dr., Sherief Mohamed Mohsen Ismail*** *lecturer of general surgery, faculty of medicine, Ain Shams University, for his continuous directions and support throughout the whole work.*

Last but not least, I dedicate this work to my family and my wife, whom without their sincere emotional support, pushing me forward this work would not have ever been completed.

Assem Mohamed Yousef

Contents

ASR : Age Standardized Rate

BCS : Breast Conserving Surgery

IMF : Inframammary Fold

NAC : Nipple and Areola Complex

SSM : Skin Sparing Mastectomy

SN : Sentinel Node

TRAM: Transverse Rectus Abdominis Myocutaneous

NCI : National Centre Institute

DCIS : Ductal Carcinoma In Situ

HT : Hormone Therapy

ERT : Estrogen Replacement Therapy

ET : Estrogen Therapy

IDC : Invasive Ductal carcinoma

ILC : Invasive Lobular Carcinoma

MRI : Magnetic Resonance Imaging

FNA : Fine Needle Aspiration

ALND : Axillary Lymph Node Dissection

SLNB : Sentinel Lymph Node Biopsy

SERM : Selective Estrogen Receptor Modulator

LHRH : Luteinizing Hormone Releasing Hormone

Introduction

The World Health Organization has ranked breast cancer as the most common type of cancer among women world-wide. The incidence rates of breast cancer vary worldwide, with higher rates in North America, Northern and Western Europe; intermediate rates in South America and Southern Europe; and lower rates in Africa and Asia[1].

Breast cancer accounts for 38% of all new cancer cases among women living in Egypt. The age standardized rate (ASR) for breast cancer incidence in Egypt is 37.3 compared to 76 in the United States. Although incidence remains significantly lower than in highly developed countries, rates are steadily increasing [2].

Since the Early Breast Cancer Trialists' Collaborative Group established the equivalency of mastectomy and breast conserving therapy in 1985, breast conserving surgery has remained the optimal surgical treatment for the breast cancer patient. The goals of breast conserving surgery are the removal of breast cancer with an adequate surgical margin and maintenance of a breast that is cosmetically acceptable to the patient.

Mastectomy with or without breast reconstruction is the treatment of choice when tumor resection and cosmesis is unattainable. Given the understandable desire to preserve a sense of wholeness, it is not surprising that many women consider mastectomy to be an unacceptable cosmetic alternative to breast conserving surgery [3]Other trials are now well understood and accepted that prove the importance of combining surgery with adjuvant radiation therapy to lower local-regional recurrence and systemic adjuvant treatment to reduce distant metastatic disease and improve survival.

Through these many studies, a methodological approach was developed to improve multidisciplinary cancer therapy to evaluate, treat, and study women with breast cancer. This scientific approach has become an accepted cornerstone for obtaining optimal patient outcomes and is similarly relevant to the introduction of new oncoplastic surgical techniques [4].

The goal of optimizing the cosmetic and oncologic outcomes of BCS has been addressed in recent years by the emergence of the field of oncoplastic surgery. Originally defined as an assortment of volume replacement techniques performed by plastic surgeons to replace all or part of the resected breast volume with myocutaneous tissue flaps, the definition of oncoplastic surgery has more recently been expanded to include a wide range of volume displacement or volume redistribution procedures performed by breast surgeons and general surgeons to optimize breast shape and breast volume following breast cancer surgery [5]

Also included in the definition of "oncoplasty" is the surgical correction of breast asymmetry achieved by reducing or reconstructing the contralateral breast. The emergence of oncoplastic surgery reflects a growing appreciation for the importance of breast cosmesis and the willingness of many surgeons to obtain advanced training to improve cosmetic outcomes for their patients [5]

A recent study has demonstrated that oncoplastic approaches add to the oncologic safety of breast-conserving treatment, because a larger volume of breast tissue can be excised and more widely negative surgical margins can be obtained [6].

Oncoplastic techniques are especially indicated for large tumors, for which standard breast-conserving approaches have a high probability of leaving positive margins associated with heightened local recurrence risk and/or creating unacceptable deformity of the breast[7].

Oncoplastic surgery requires a multidisciplinary approach to breast cancer care characterized by close collaboration between the breast surgeon, radiologist, radiation oncologist, and, when appropriate, plastic surgeon, medical oncologist, genetic counselor, and psychologist all working together to help the patient achieve the best possible surgical & psychological outcome[8]

Aim of the Work

Reviewing literature about recent trends in Oncoplastic approaches for breast conserving surgery. Special emphasis will be explained about indications, recent techniques, potential complications, protocols of adjuvant therapy and future prospects.

Aesthetic Anatomy of The Breast

Breast cancer surgery has gone through various changes over the past decades. New techniques have been introduced and others have been applied to already existing models, which have made the surgical approach more complex, and biologically individualized. Although concern with local control of disease still persists as an essential element, this is currently associated with an aesthetic– functional concept. Therefore, breast anatomy itself, or the way it is traditionally approached, needs updating. Form, volume, Inframammary fold (IMF), height, and breast projection as well as the size and shape of the nipple and areola complex (NAC), liposubstitution level, and ptosis are some of the points concerning surface anatomy that have acquired more importance within the oncoplastic and reconstructive context.[9]

Similarly, the abdominal wall and the dorsal structure of the thorax must be part of the surgeon's background, as one needs to have a reconstructive and oncoplastic view in order to make more suitable surgical decisions. Patient requests were rarely considered as part of medical decisions in the past, in contrast with current breast cancer management, where oncologic and reconstructive surgery, chemotherapy (before or after definitive treatment), and radiation therapy are not separate issues, and should be combined with patient desires. So, it is expected that all surgeons involved in breast cancer surgery are comfortable with all alternatives for breast reconstruction, as well as the anatomic and functional relationships.[9]

Advances in Breast Surgery and Anatomic Repercussions

The decision to perform a mastectomy or breast-conserving therapy is based on local recurrence rates, and on aesthetic functional outcomes, including the relationship between the tumor size and the breast size, as well as the location of the tumor inside the breast and its relation to the skin and the NAC and IMF. Oncoplastic surgery combines plastic surgery techniques with oncologic breast surgery. This combination has resulted in multiple benefits for patients, as it allows larger resections, with wider margins, aiming to avoid compromising aesthetic– functional outcomes. [10]

However, oncoplastic surgery implies knowledge of advanced mammoplasty techniques As a consequence, the vascularization and innervation of the NAC acquires fundamental importance in the choice of which mammoplasty technique should be used. Skin-sparing mastectomy (SSM), initially described by Toth and Lappert in 1991, in which the breast, the NAC, the biopsy sites, and the skin above the tumor are removed, is already established for ductal carcinoma in situ and invasive cancers. In such a procedure most of the skin and the IMF are preserved, which makes it easier for immediate reconstruction performed by temporary expanders, definitive implants, or autologous tissues.[10]

Histological studies of local recurrences in Skin-sparing mastectomy do not identify significant residual mammary tissue as a causative factor in the great majority of cases. These recurrences remain constant throughout time and are proportional to tumor size and to positive axillary lymph nodes. The mean time for local recurrence is between 2 and 4 years, and concomitant distant metastases are frequent. This shows that this type of local recurrence, in contrast to the type that occurs after breast-conserving therapy, is rarely an isolated event, or one that may have any relationship with incomplete surgery, although representing a biological marker of tumor aggressiveness and risk of metastasis. Instead of having a minor importance in the oncologic context, the anatomy and the histology of the IMF became the basis for immediate breast reconstruction, and the IMF became one of the most important structures to be preserved.[11]

Another recent technical alternative is nipple-sparing mastectomy. The results are considered better from the aesthetic–functional point of view. Therefore, preserving the NAC has a positive psychological influence. However, the long-term local recurrence rate is unknown for biologically different kinds of invasive tumors. Anatomical, histological, and electron-microscopic studies have been performed to ascertain the oncologic safety of this type of surgery, and trials are currently ongoing.[11]

Sentinel node (SN) biopsy was introduced in the 1990s. Over 1,500 clinical studies have been performed around the world, involving over 11,000 patients. The SN is the first lymph node in the chain of breast lymphatic drainage. It is considered one of the greatest examples of success of applying evidence-based medicine to surgery.

It is the standard procedure in patients with a clinically negative axilla, owing to two fundamental advantages: better axillary staging, when compared with axillary dissection, as the examination in the first lymph node is more detailed; And lower morbidity among patients with a negative axilla, owing to less extensive surgery[11] Concern with lymphatic anatomy was reborn after the introduction of SN biopsy. Axillary dissection is currently recommended only for patients with SN metastasis and inflammatory breast cancer. The most feared side effect is lymphedema, which can occur in 10–20 % of patients, in various degrees of severity, and mostly as an irreversible morbidity.[11, 12]

Regarding breast reconstruction, currently there is a preference for immediate reconstruction, as the psychological impact is positive and aesthetic results are generally better without compromising adjuvant treatments or detection of future recurrences. Techniques employing temporary expanders and implants are the most frequently used .They bring the advantage of a faster procedure with low risk of complications. Among the techniques that use autologous flaps, the most frequently used ones are the transverse rectus abdominis myocutaneous (TRAM) flap and the latissimus dorsi flap, with or without addition of an implant. [11, 12]

The TRAM flap allows the correction of excessive adipose tissue in the abdominal region as in an abdominoplasty, with transposition of skin islands and fat to reconstruct the breast. It can be monopedicled using only one rectus abdominis muscle or bipedicled, when both muscles are sacrificed. Microsurgical techniques represent a great advance in reconstructive surgery. They have the advantage of not causing major damage to the abdominal wall, and the risk of hernia is basically nonexistent. So, anatomic concepts for reconstructive breast surgeons are not limited to the breast. [11, 12]

Surface Anatomy

The breasts, vertically, are found on the anterior thoracic wall, extending between the second and sixth ribs, overlying the pectoralis major muscle superomedially, and the serratus anterior muscle in the lower third and medial areas. Considering the horizontal dimensions, they lie from the side edge of the sternum to the mid axillary line.

This extension is critical, as it represents the size of the IMF, the so-called breast base, which is frequently used as a reference for the choice of implants or flaps in breast reconstruction. Differences in this base are known as a significant cause of asymmetry, and it is critical that the IMF be maintained or reconstructed in breast cancer surgery. In the axillary region there is a prolongation beyond the anterior axillary line called the tail of Spencer. In adult women (i.e., after puberty), this has the shape of a drop, assuming the shape of a cone in nulliparous women and a more pendulous contour in multiparous women. Determining factors for mammary aesthetics are volume, parenchyma distribution, tissue elasticity, location and appearance of the NAC, quality of the skin envelope, and the relation between the final shape of the breast, thoracic wall, and the body. The normal breast has good skin and parenchyma elasticity, and most of the volume is located at the inferior and lateral pole.[13]

The NAC in a young person will be at a higher projection point, where all breast lines converge. The areola is usually round and from 15 to 45 mm in diameter. The nipple, placed at the central region of the areola, has between 4 and12 mm of projection and is where the lactiferous ducts converge in a number ranging from 15 to 20 (five to nine true mammary duct orifices and other sebaceous glands, tubercles, and tubes). It contains a huge concentration of nerve sensorial terminations and an abundant lymphatic system called the subareolar or Sappi plexus. The blood is supplied to the NAC by the internal mammary artery via its perforating branches, by the anterior intercostals arteries, by the lateral thoracic artery, and by branches from the axillary artery. The internal mammary artery is the main and constant contributor of blood to the NAC by means of its perforating branches numbering from one to four and anterior intercostals branches numbering from four to six. The color of the NAC has particular importance as it differs according to ethnicity. It is a factor to be considered for reconstruction and for the final aesthetic result of the breast. It contains sebaceous and sudoriferous glands as well as an intermediate type of mammary and sudoriferous gland called Montgomery's glands. These open at the Morgagni tubercles and are able to secrete milk. [13]

There are also smooth muscle fibers in the areola, and through certain stimuli they can contract, reducing the size of the areola and projecting the papilla forward. The relationship between the NAC and the IMF, within this context, can also differ according to the breast and the patient's age.