Recent Oncoplastic Techniques in Breast Conserving Therapy

An Essay
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in General Surgery

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List of Abbreviations

ABBI	:	Advanced Breast Biopsy Instrumentation system
ALND	:	Axillary Lymph Node Dissection
BCS	:	Breast Conservative Surgery
BIRADS	:	Breast Imaging Reporting and Data System
BRCA	:	Breast Cancer susceptibility gene
BSE	:	Breast Self Examination
CMF	:	Cyclophosphamide, Methotrexate and Fluorouracil
CT scan	:	Computed Tomography Scan
DBT	:	Digital breast tomosynthesis
DCIS	:	Ductal Carcinoma In Situ
EIC	:	Extensive Intraductal Component
ER	:	Estrogen Receptor
FFDM	:	Full-field digital mammography
FISH	:	Fluorescence in situ hybridization
FNA	:	Fine Needle Aspiration
HER2/neu	:	Human Epidermal growth factor Receptor 2
IDC	:	Invasive Ductal Carcinoma
IHC	:	Immunohistochemistry
ILC	:	Invasive Lobular Carcinoma
LCIS	:	Lobular Carcinoma In Situ
MRI	:	Magnetic Resonance Imaging
MRM	:	Modified Radical Mastectomy
NAC	:	Nipple-areolar complex
NSM	:	Nipple-sparing total mastectomy
OPS	:	Oncoplastic surgery
PEM	:	Positron-emission mammography
PET	:	Positron Emission Tomography
PR	:	Progesterone Receptor
SA	:	Subareolar
SERM	:	Selective Estrogen Receptor Modulator
SLNB	:	Sentinel Lymph Node Biopsy

List of Abbreviations (Cont)

SSM	:	Skin-sparing total mastectomy
Tc 99	:	Technetium 99
TNM	:	Tumor/Nodes/Metastasis staging
U/S	:	Ultrasound
WHO	:	World Health Organization

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Introduction

The breast is an important symbol of femininity. It plays an important role in the woman's life whether functionally, psychologically or emotionally. Those with breast deformities often experience loss of self confidence that may affect their everyday life and may lead to adverse consequences including anxiety, depression and change in body image. **(Roth and Lowery, 2005).**

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. (**Ferlay J et al.,2008**).

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 **(Dey S et al.,2010).**

Surgical treatment is aimed at removal of the whole tumour with clear margins. Breast conserving operations remove the tumour with a rim of surrounding normal tissue and leave behind the rest of the breast tissue. Mastectomy is recommended for large tumours, widespread, multifocal or advanced local disease. Removal of lymph nodes from the axilla (armpit) on the side of the tumour is used to

determine further treatment and prognosis **(Jacqueline Lewis 2011**).

Breast conservation surgery (BCS) is established as a safe option for most women with early breast cancer. Recently , advances in oncoplastic techniques have reduced surgical trauma and thus are capable of preserving the breast form and quality of life . In spite of the most BCS defects can be managed with primary closure, the aesthetic outcome may be unpredictable **(Alexandre Mendonça et al., 2013).**

Breast reconstruction following mastectomy can be carried out either immediately or as a delayed procedure. Immediate reconstruction is carried out at the same time of surgery while delayed may be performed at any time following mastectomy **(John Wiley , 2011).**

Immediate reconstruction is clearly preferred over delayed reconstruction, as it is associated with fewer complications, easier administration of postoperative radiation therapy, better aesthetic results, and possibly lower rates of local recurrence. Patients are more satisfied with the cosmetic outcome of oncoplastic procedures compared with breast conservation therapy alone. Successful oncoplasty requires thorough patient counseling and comprehensive preoperative planning among patient, oncologist, and general and plastic surgeons **(Glough KB 2002).**

Through different approved 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. (**Fisher B et al.,2002).**

Oncoplasty 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 (**Rew DA 2005).**

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 (**Rew DA 2005).**

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 (**Asgeirsson KS et al.,2005**).

There are two fundamentally different types of approach to breast-conserving reconstruction: volume displacement techniques and volume replacement techniques. In volume displacement techniques, the resection defect is reconstructed from 'pedicles' that are raised within the breast tissue itself. These 'pedicles' or parenchymal flaps, are moved into the gaps

left behind after resection. As a result, there is a net loss in volume of the breast so, although the shape of the breast is good, the volume of the affected breast is less than the other side. Because of that, it is common to carry out a mirror-image procedure to match the breasts **(Alexandre Mendonça et al., 2013).**

Volume displacement techniques are based on well-established methods of breast reduction or reduction mammoplasty:

- Superior pedicle
- Round block
- Inferior pedicle

(Alexandre Mendonça et al., 2013)

In volume replacement techniques, the defect caused by the tumour resection is reconstructed, usually with autologous tissue from outside the breast, so you are importing volume into that defect, which is moved and sutured into the gap. The big difference here is that the volume of the breast is much the same as before surgery, and sometimes a little greater. Because of this, there is no need for a contralateral procedure to achieve symmetry **(Alexandre Mendonça et al., 2013**).

Volume replacement techniques also fall into three main subgroups, using either:

- myocutaneous flaps of latissimus dorsi
- myosubcutaneous flaps of latissimus dorsi, or
- lateral adipose tissue

(Alexandre Mendonça et al., 2013)

Aim of the Work

This essay is made to review the most commonly performed oncoplastic breast conserving procedures for optimizing tumor resection and cosmosis.

Chapter one

Surgical Anatomy of the Breast

Embryology & Development of the breast

During the second month of gestation, two bands of slightly thickened ectoderm appear on the ventral body wall extending from above the axilla to below the groin. These bands are the milk lines and represent potential mammary gland tissue (Fig.1). In humans, only the pectoral portion of these bands will persist and ultimately develop into adult mammary glands. ***(Velanovich V. 1995)***

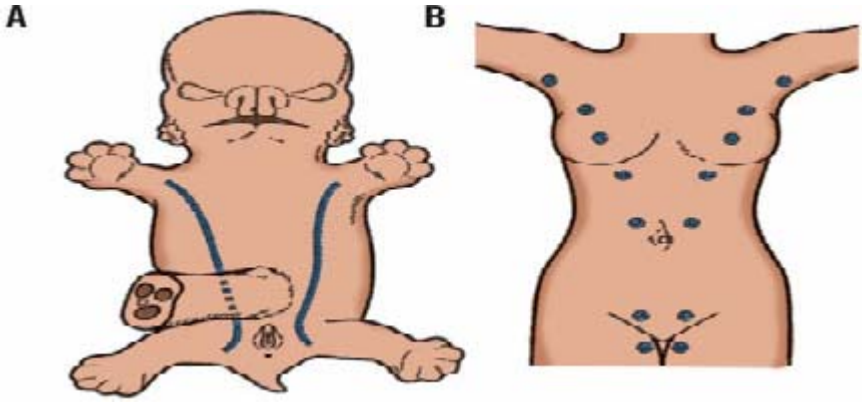

Fig.(1): A. The milk lines in a generalized mammalian embryo. Mammary glands form along these lines. B. Common sites of formation of supernumerary nipples or mammary glands along the course of the milk lines in the human. ***(Velanovich V. 1995)***

The glandular portion of the breast develops from the ectoderm . It arises from the local thickening of the epidermis (Fig. 2A). From this thickening, 16 to 24 buds of ectodermal cells grow into the underlying mesoderm (dermis) during the twelfth week (Fig. 2B). These buds, at first solid, will become canalized near term to form the lactiferous ducts (Fig. 2C). The tips of the buds will give rise to the secretory acini during lactation. The epidermal surface of the future nipple is at first a

shallow pit (Fig. 2D). Near term it becomes everted (Fig. 2E) . ***(Skandalakis JE and Gray SW. 1994)***

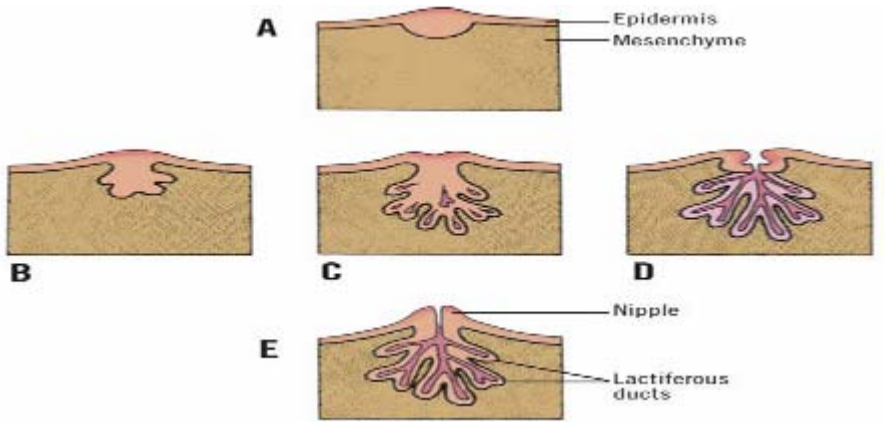

Fig. (2): Development of the breast. A-D. Stages in the formation of the duct system and potential glandular tissue from the epidermis. Connective-tissue septa are derived from the mesenchyme of the dermis. E. Eversion of the nipple near birth. ***(Skandalakis JE, et al., 1983)***

The mammary glands are often considered to be modified sweat glands. The areolar glands (of Montgomery) around, but not on the nipple, appear to be transitional between sweat and lactiferous glands. They serve to lubricate the nipple during lactation (milk production and nursing). The connective-tissue stroma of the breast forms from the mesoderm, which will form the dermis of the skin and the superficial fascia (tela subcutanea) as well. Fibers forming the suspensory ligaments (of Cooper) will develop from both layers. ***(Yerra L, et al., 1997)***

Morphology

Each breast is composed of between 15 and 20 lobes within the superficial fascia, which is loosely connected with the deep fascia. These lobes, together with their ducts, are anatomic units, but not surgical units. Between the superficial