Recent Concepts in Immediate Breast Reconstruction Modalities Following Skin Preserving Mastectomy

Essay

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List of Contents

Page

List of Abbreviations

ACC ..... **A**dverse Capsular Contracture

ALND ..... **A**xillary Lymph Node Dissection

DCIS ..... **D**uctal Carcinoma in Situ

DIEP ..... **D**eep Inferior Epigastric Artery Perforator Flap

IDC ..... **I**nfiltrating Ductal Carcinoma

IGAP..... **I**nferior Gluteal Artery Perforator Flaps

ILC..... **I**nfiltrating Lobular Carcinoma

IMF ..... **I**nfra Mammary Fold

LCIS ..... **L**obular Carcinoma in Situ

LDM ..... **L**atissimus Dorsi Myocutaneous Flap

MSBOS..... **M**aximum Surgical Blood Order

NAC ..... **N**ipple Areola Complex

SGAP ..... **S**uperior Gluteal Artery Perforator

SIEA ..... **S**uperficial Inferior Epigastric Artery Flap

SSM ..... **S**kin Sparing Mastectomy

TRAM ..... **T**ransverse Rectus Abdominus Muscle Flap

VRAM ..... **V**ertical Rectus Abdominis Myocutaneous Flap

List of Figures

Figure No. *Page*

List of Figures (Cont.)

Figure No. *Page*

List of Figures (Cont.)

Figure No. *Page*

Introduction

Breast cancer is the commonest malignancy among women and an estimated 400.000 women die annually from this disease worldwide. Treatment of breast cancer was performed through mastectomy operation but had bad psychological effects on patients. Subcutaneous mastectomy is becoming an operation of choice in certain cases of malignancy provided that the breast is of moderate size, tumor mass not larger than 5cms, and the tumor doesn't extend to the skin ***(Millard and Garry, 2007)***.

The clinical trials demonstrated that mastectomy and breast conservation surgery were equivalent in terms of survival ***(Veronesi et al., 2002)***.

In patients who are candidates for a mastectomy, skin and nipple sparing mastectomy with immediate autologous reconstruction are oncologically safe techniques as they increase the patient's immunity ***(Gerber et al., 2009)***.

Breast reconstruction after mastectomy is associated with psychological, functional and sexual benefits. However, only a small percentage of women accept breast reconstruction. It has consistently been shown that post mastectomy reconstruction improves the patient's body image ***(Barnsely et al., 2008)***.

A team of oncology and plastic surgeons should be working together to perform skin preserving mastectomy and reconstruction by different methods including implants, latissimus dorsi flaps and contra lateral mammoplasty, free flaps such as transverse rectus abdominus muscle flap, deep inferior epigastric artery flap, superficial inferior epigastric artery flap, or gluteal flaps ***(Greenall, 2007)***.

Immediate reconstruction reduces the need for multiple operations, the cost, lessening psychological morbidity and even, improving body image. Delayed reconstruction often requires resection of irradiated scared skin with subsequent need for a larger flap volume and more transposed skin that is visible to the patient ***(Greenall, 2007)***.

Aim of the Work

This essay is made to spotlight the new modalities and concepts of breast reconstruction following skin preserving mastectomy to preserve the body image as well as the benefits of immediate over delayed breast reconstruction.

Surgical Anatomy of The Female Breast

The female breast is one of the signs of femininity that consists of a group of highly specialized sweat glands. The shape of the breast is best represented by as a cone with a spherical surface contour, an arched base and an eccentrically situated top deviated fifteen degrees laterally. Using the nipple as a reference point, each breast is divided into four quadrants, superio- lateral, superior- medial, infero- lateral and infero-medial, in addition to the retro-areolar area and axillary tail ***(Peck, 1951).***

There is a tremendous variation in the size and the weight of the female breast. The base of the cone is roughly circular, measuring 10-12cm in diameter. ***(Moore and Keith, 1992)***

Despite the individual variation in size the extent of the base is fairly constant: from the sternal edge to near the midaxillary line, and from the 2^{nd} to 6^{th} ribs overlying the pectoralis major and overlapping onto the serratus anterior and a small part of rectus sheath and external oblique muscles Spence which passes through a foramen in the axillary fascia known as the foramen of Langer ***(Monsen, 1992).***

The nulliparous females have typical hemispherical configuration, whereas the multiparous females, who

experienced hormonal stimulation associated with pregnancy and lactation, have pendulous and larger breasts. Postmenopausal, the breast usually decreases in volume. The typical non-lactating breast weights between 150-225gm, whereas the lactating one exceeds 500gm ***(Cody et al., 1984).***

The nipple is a conical or cylindrical prominence that is located in the center of the areola. In nulliparous females, the nipples are usually situated at the level of the fourth intercostal spaces. However, the position of the nipples varies even in the same woman. The tip of the nipple is formed of a circular arranged smooth muscle fibers that compress the lactiferous ducts and erect the nipple when they contract ***(Moore and Keith, 1992).***

The female breast is practically enveloped by the superficial fascia of the anterior chest wall (Fig 1) which is continuous with the superficial abdominal fascia of Camper below and the superficial fascia of the neck above, merging anteriorly with the dermis of the skin ***(Skandalakis et al., 1995).***

The superficial fascia completely envelops the lobes of the breast; each is formed by 15–20 lobes of glandular tissue, fibrous connective tissue that supports its lobes, and the adipose tissue that resides in parenchyma between the lobes. Strands of fibrous tissue forming the suspensory ligaments of Cooper

connect the dermis of the overlying skin to the ducts of the breast and the superficial fascia which is condensed to form the posterior capsule. The posterior capsule helps maintain the protuberance of the female breast ***(Kirby, 2007).***

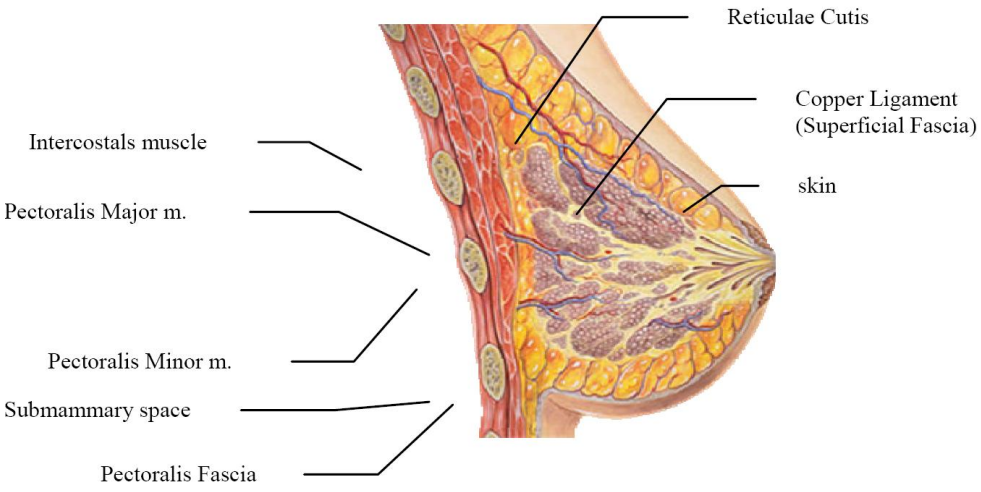

Fig. 1: Diagrammatic sagittal section through the non lactating female breast and anterior thoracic wall. ***(Skandalakis et al., 1983)***

The deep layers of superficial fascia that lie upon the posterior surface of the breast fuses with the deep (pectoral) fascia of the chest wall. The deep fascia envelops the pectoralis major muscle and travels below with the deep abdominal fascia. A posterior extension of this fascia is continuous with the fascia of the latissimus dorsi and forms the so-called suspensory ligament of the axilla. The suspensory ligament is found in the retromammary space which is a bloodless plane ***(Colborn and Skandalakis, 1993)***.

Another bloodless plane lies just deep to the dermis, in thin individuals 2-3 mm deep to the skin ***(Iglehart, 1991).***

VASCULAR SUPPLY OF THE BREAST (Fig. 2)

The blood of the breast skin depends on the sub dermal plexus, which is in communication with underlying deeper vessels supplying the breast parenchyma which include:

1) Lateral Thoracic Artery:

It is the main blood supply of the breast which is a branch from the second part of the axillary artery. In its absence, the thoracodorsal artery, which is the continuation of the subscapular artery from the third part of the axillary artery, becomes the main source of blood supply ***(Monsen, 1992).***

2) Internal Mammary Arteries:

The internal mammary arteries are branches from the first part of the subclavian artery. They course downwards along the lateral border of the sternum, sending branches through the intercostal spaces, to supply the medial part of the breast. The second and the third spaces arteries are the largest ***(McMinn, 1994).***

3) The Thoracodorsal artery

4) Intercostals artery perforators

The 2nd perforating artery is usually the largest supplying the upper region of the breast, the nipple, areola and adjacent breast tissue ***(Bannister, 1999).***

5) The Thoracoacromial artery.

It sends pectoral branches supplying the upper part of the breast ***(Monsen, 1992).***

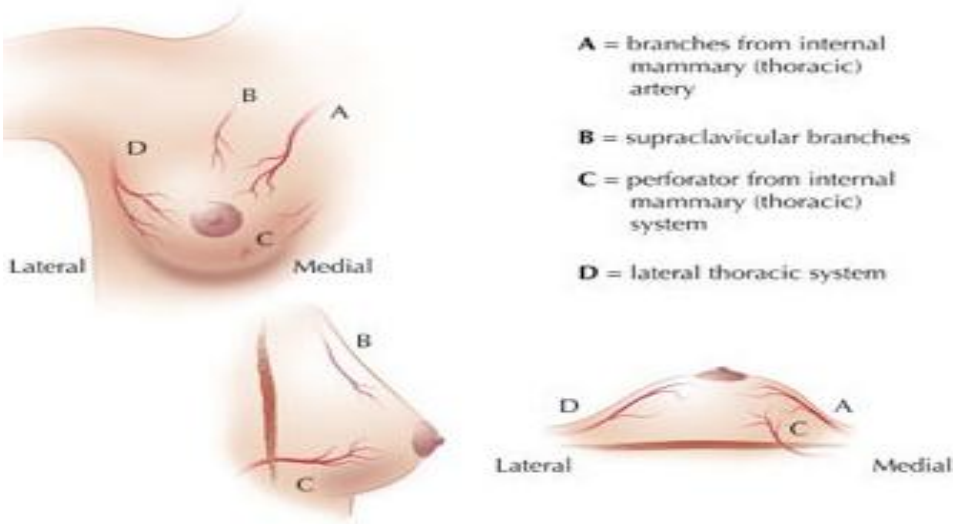

Fig. 2: Blood supply. The arterial supply is superficial (*A, B, D*) except for the deep perforator (*C*) that comes through the pectoralis muscle. The veins lie just under the dermis ***(Elizabeth and Hall-Findlay, 2007).***