BREAST CONSERVING PROCEDURES FOR TREATMENT OF FEMALE BREAST CANCER

Essay Submitted for Partial
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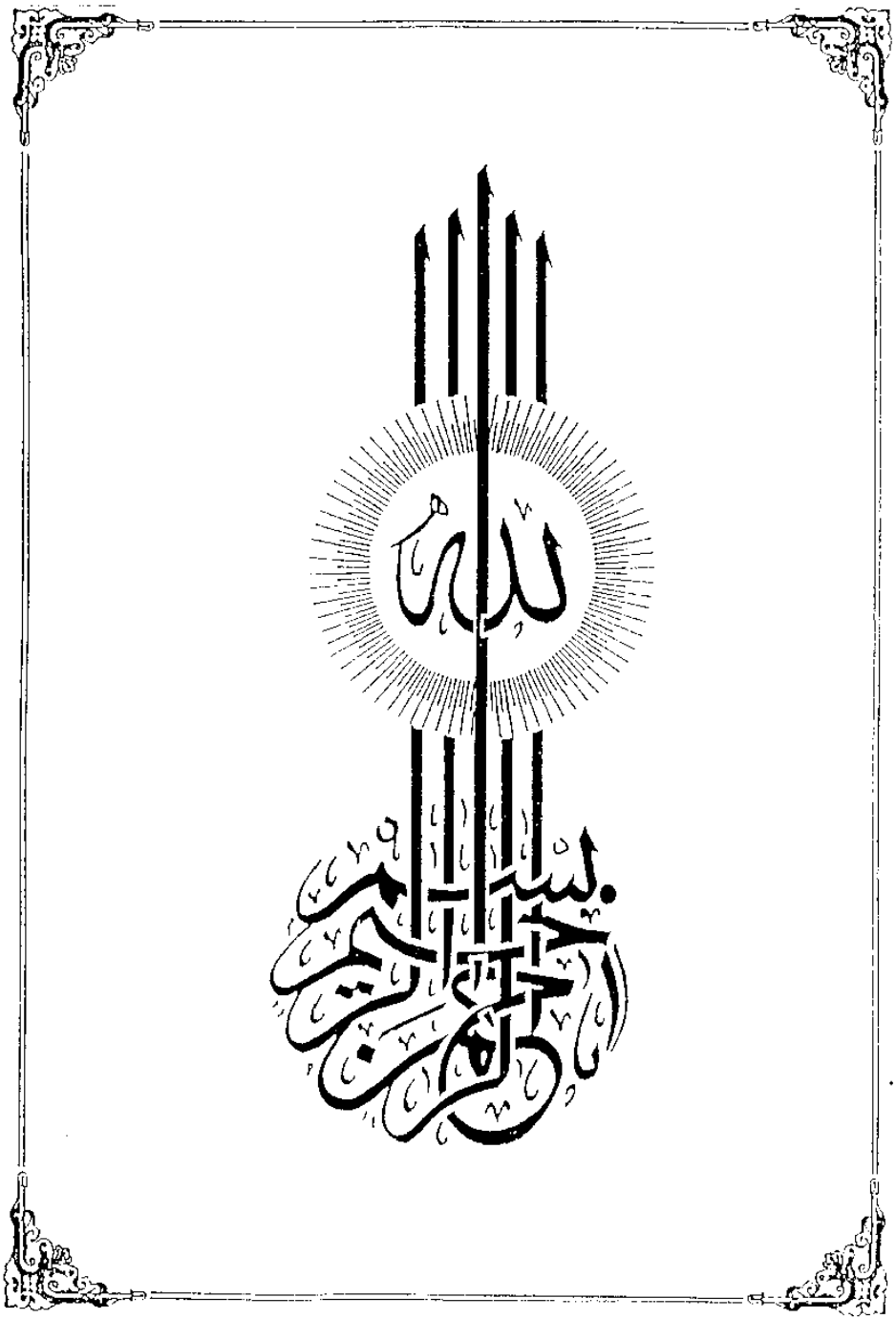
To my Wife, My Parents

and My Children

For their continuous encouragement



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INTRODUCTION

Introduction

Breast cancer is the most common malignancy affecting women and most of the affected women died by its complications. However, management of breast cancer had been subjected to marked changes over the last 15 years. Some of the important advances are, the discovery of hormone-receptor proteins for estrogen and progesterone, the use of adjuvant chemotherapy for node-positive and some node-negative patients and continued development of mammographic screening. Also, Halsted radical mastectomy fell from favor and was replaced by the less disfiguring breast conservative surgical modalities.

The aim of this essay is to present the different "breast conservative surgical modalities and their effects on the locoregional tumour control in comparison to the effect of radical mastectomy". Moreover, this essay will discuss the limitations for such conservative modalities.

Anatomy of the breast

Anatomy of the female breast

The mammary glands are considered to be accessory organs of the female reproductive system (Romanes, 1981). Each gland is situated in the superficial fascia of the anterior chest wall (Wilson, 1986).

Developmental anatomy:

Mammary glands are basically ingrowths from the ectoderm, which forms ducts and alveoli, supported by vascularized connective tissue derived from the mesenchyme. In embryos at about the fifth to sixth week two ventral bands of thickened ectoderm, the mammary ridges, extend from axilla to inguinal region. The ridges disappear later in embryonic life, but before this, the cranial third of each begins to show proliferation to form the two rudiments of the glands (Williams & Warwick, 1980).

Each human mammary gland begins as a localized thickening on its appropriate epidermal ridge, in the region of the future breast. At first, lens-shaped, the primordium gradually becomes globular, then bulbous and lobed. During the fifth month, 15-20 solid cords begin to bud inward, pushing aside the dermal connective tissue as they advance. These primary milk ducts continue to grow and branch throughout fetal life (Arey, 1974). During the last two months of gestation the ducts become canalized, and the epidermis at

the point of original development of the glands forms a small mammary pit, into which the lactiferous tubules open. Around the time of birth, or slightly after it, the nipple is formed by mesenchymal proliferation (Williams & Warwick, 1980). The areola is first recognisable as a circular area, free of hair, but acquiring the branched alveolar glands of Montgomery in the fifth month (Arey, 1974). In females, as pubetry is reached the rudimentary gland buds grow rapidly and multiply, with resulting formation of acini and gland lobules (McVay, 1984).

Topographic anatomy:

Usually, the breast is divided into 4 quadrants (upper outer, upper inner, lower outer and lower inner) taking the nipple as the center, as well as a retroareolar area and an axillary tail. During the initial clinical diagnosis, it is important to make this topography precise as it is valuable regarding nodal management and irradiation fields (Genin & Omar, 1984).

In the lateral plane, the breast base extends vertically from the second to the sixth rib, and horizontally from the side of the sternum to the mid-axillary line (Williams & Warwick, 1980). About two-thirds of the breast rests upon the pectoralis major, one third on the serratus anterior. At its lower medial quadrant the gland rests on the aponeurosis

of the external oblique, which separates it from the rectus abdominis (Du Plessis, 1975). The superlateral part of the breast is prolonged upwards and laterally towards the axilla, forming the axillary tail of spence, which extends along the lower border of the pectoalis major and may pass through the deep fascia to lie in close relationship to the pectoral group of axillary lymph nodes (Williams & Warwick, 1980). It follows that the axillary tail is under the deep fascia, and not, like the rest of the breast, superficial to this layer (Du Plessis, 1975).

Beneath the breast there is a condensation of superficial fascia, the continuation upwards of the fascia of scarpa. Between this fascia and the deep fascia over pectoralis major is a submammary space in which the lymphatics run. Submammary infusions can readily be given into this space (Last, 1984).

Nipple and Areola:

The mammary papilla or nipple is a cylindrical or conical projection from just below the center of the anterior surface of the breast; it commonly lies at the level of the fourth intercostal space in nulliparous females. It is pink or light brown in colour and is traversed by 15-20 lactiferous ducts, which open by minute orifice on its wrinkled tip (Williams and Warwick, 1980). It contains a considerable

number of plain muscle fibres and it becomes firmer and more prominent as a result of mechanical stimulation (e.g. by suckling) (Romanes, 1981).

The base of the nipple is encircled by a coloured area of skin called the areola, which is rose-pink in the nulliparous female. During the second month of pregnancy it becomes larger and darker in colour and as pregnancy advances it becomes dark brown, the depth of the colour varying with the female's complexion. It contains numerous sebaceous areolar glands, which become much enlarged during pregnancy and lactation to form tubercles beneath the skin (Williams and Warwick, 1980). The skin of the nipple and areola is devoid of fat (Osteen and Soliman-Fam, 1983).

Tegument:

The skin is more or less thin (1-2mm) but it is thinner at the aerola. Thickening of the skin as revealed by mammography is a sign of malignancy. Skin is elastic but yields more downwards and outwards, rather than upwards and inwards. This fact is important during undermining the skin flaps when needed for the closure of the surgical wound following radial surgery (Genin et al., 1988).

Structure of the breast:

The mammary gland consists of glandular tissue of the tubulo-alveolar type; fibrous tissue connecting its lobes and adipose tissue in the intervals between the lobes (Cowie, 1974).

The subcutaneous tissue encloses the gland, but does not form a distinct capsule, and sends numerous septa into it to support its various lobules. From the part of the fascia which covers the gland fibrous processes pass forwards to the skin and the papilla; these are better developed over the part of the breast and constitute the suspensory ligaments (of Astley Cooper = Cooper's ligament) (Williams & Warwick, 1980). When these ligaments become atrophic they allow the organ to droop and when become contracted from the fibrosis around a carcinoma they cause pitting of the skin (Last, 1984).

The adult female breast has two components. These are the epithelial elements responsible for milk formation and transport, they are named the acini and ducts, and the supporting tissue muscle, fascia and fat. The epithelial elements consists of twenty or more lobes. Each lobe drains into a mammary duct, each of which ends separately at the nipple. The lobe consists of lobules, the number of which is very variable. Each lobule is a collection of ten to a

hundred acini grouped around, and converging on a collecting duct. Each acinus is a sphere of cells capable of milk secretion, draining into a terminal duct. The collecting duct consists of the confluence of the terminal ducts. The major mammary ducts lie behind the aerole while the lobules occupy the more peripheral part of the breast (Fig. 1) (Preece, 1988).

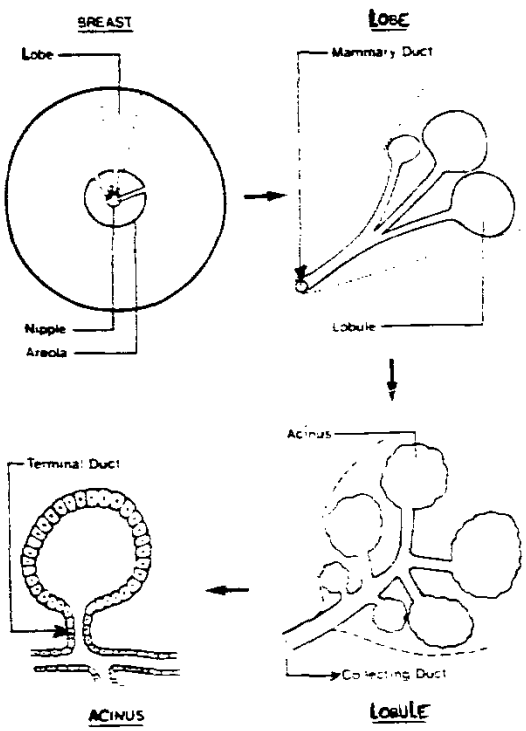

Fig. 1: Schematic anatomy of breast (Preece, 1988).