# MANAGEMENT OF THE HIGH-RISK GROUP OF BREAST CANCER

**ESSAY** 

SUBMITTED FOR PARTIAL FULFILLMENT OF THE MASTER

DEGREE IN

**GENERAL SURGERY** 

BYIMES

KHALED A. HASSAN

M.B., B.Ch.

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SUPERVISED BY

Prof. Dr.

## ALI BAHGAT LASHEEN

Professor of General Surgery
Ain Shams University

Dr.

KHALED A. EL-FIKY

Lecturer of general surgery

Ain Shams University

Faculty of Medicine
Ain Shams University
1994







Acknowledgement

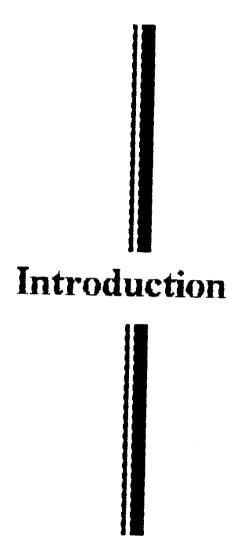
I wish to express my sincere gratitude to professor Dr. ALI BAHGAT Lasheen, Professor of General Surgery, Ain Shams University, not only for his patient supervision, continuous support and meticulous revision of this owrk but also for his valuable advices and moral support. I am indebted to hem for his continuous encouragement to complete this work.

Sincere apperciation and gratitude is extended to Dr. KHALED ABDALLA EL-FIKY, Lecturer of General Surgery, Ain Shams University, for his constant supervision and advice in the preparation and arrangement of this work.

Finally, i would like to thank Dr. AYMAN ABDALLA ABDRABU, Lecturer of General Surgery, Ain Shams University, very much for his help and support in the preparation and arrangement of this work.

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### Introduction

Cancer of the breast has been the prime example of malignant disease. The myth behind its aetiology and the efforts towards its prevention and treatment has always been present since antiquity (*Omar et. al., 1984*).

A ten years report (1970 - 1981), from the National Cancer Institute, Cairo, showed that breast cancer is the most frequent malignancy among females attending the institute accounting for 34.7% of all female cancer cases, and 14% of all cases of cancer registered (*Ibrahim and Aref, 1982*).

In recent years, our knowledge of breast cancer ha progressed rapidly resulting in new approaches and techniques in early detection and diagnosis, improved methods of treatment, prognosis and rehabilitation (*Omar et. al.*, 1984).

This work aims at the study of risk factors of breast cancer and the tools of management of the high risk group of patients. The prediction and follow up of this group will allow early diagnosis of breast cancer developing in them.

Surgical anatomy of the breast

# SURGICAL ANATOMY OF THE BREAST

#### **GENERAL**

The two mammary glands, or breasts, are specialized sweat glands, which develop in the subcutaneous fascia of the anterior thoracic wall, and which, when functional, secrete milk. They are seldom exactly equal in size, and are separated from each other by a cleft. A little below and lateral to the center of each, the skin is specialized to form the *nipple* and a surrounding pigmented area, the *areola*. The nipple is present in both sexes at birth, but the gland as such does not normally develop in the male ( *Hamilton 1981*).

Development in the female begins at puberty, when the areola begins to protrude to form a cone-shaped breast bud. This usually happens at about the age of 11 years, but the variation is considerable (9 years to 14 years). During the second stage of development the areola protrudes further, whilst the nipple remains embedded; the breast bud also becomes separated by fat from the underlying muscle. This change, which is observed during the period from 9 years to 16 years, usually lasts about 15 months. During the third stage of development, which is usually completed in about 12 months, the areola becomes part of the mass of breast tissue and the nipple protrudes. Whenever puberty begins, the prefunctional development of the gland is thus rapid, being usually completed in just over 2 years (*Hamilton 1981*).

The size and shape of the mature mammary glands vary according to their functional state as well as from individual to individual. In the non-parous young adult they are usually hemispherical in shape. They become enlarged in the pregnant or lactating woman and usually undergo atrophy after the menopause (Keith 1990).

The superficial surface of the gland is convex (Fig. 1) The deep surface is slightly concave and overlies the pectoralis major and, to a lesser degree, the serratus anterior and external oblique muscles. The gland extends vertically from the second to the sixth rib, and horizontally from the sternal border to the mid-axillary line. The upper outer quadrant is prolonged over the lateral border of the pectoralis major towards the axilla, where it pierces the deep fascia. This part of the gland is usually called the *axillary tail*. The nipple usually overlies the fourth intercostal space (*Hamilton 1981*).

#### **EMBRYOLOGY**

It develops, in the ectoderm of the ventral body wall, as a linear thickening which in the 10 mm. foetus extends all the way from the axilla to the region of the groin. This thickening, called the *mammary line or ridge*, disappears by the 20 mm. stage, except for an intermediate part of the cephalic third, where a downgrowth of the ectoderm into the underlying dermis forms the *mammary bud*. In embryos of about 150 mm. length 15 to 25 solid processes start

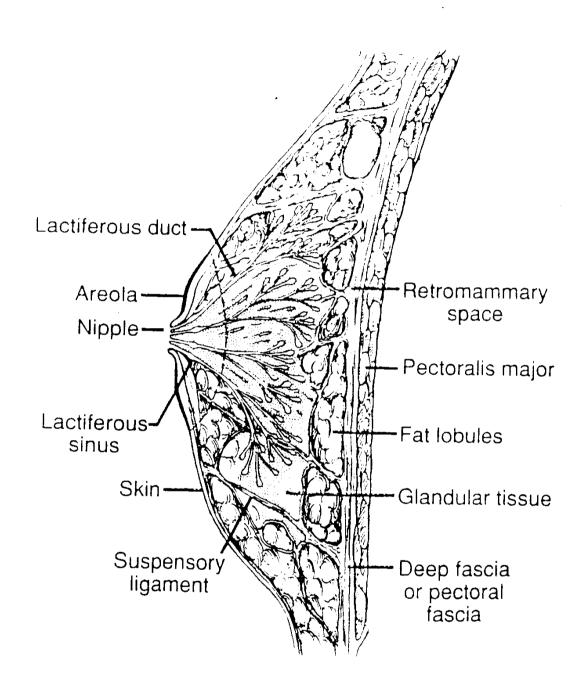


Figure (1): Sagittal Section of a woman's breast. (Keith 1992)

growing out from this bud into the surrounding connective tissue. These primordial lactiferous ducts become canalized by the 8th and 9th months of intra-uterine life, and at first open into an epidermal pit at the site of the original epithelial downgrowth. At the time of birth, as a result of the growth of subepidermal connective tissue, the pit everts to from the nipple ( *Hamilton 1981* ).

#### **STRUCTURE**

Each mammary gland has:

- 1) An epithellal component which is derived from the ectoderm, and which constitutes the essential glandular tissue (parenchyma); and
- 2) a connective tissue component of mesodermal origin which forms the supporting and enclosing framework (stroma) (*Lynn and Kirby 1991*).

The epithelial elements are arranged as 15 to 25 lactiferous ducts which usually open separately on the nipple (Fig. 1). The ducts run radially from the base of the nipple and branch repeatedly, their terminal branches draining the alveoli which secrete the milk. Each duct is dilated to form an ampulla or sinus lactiferous, just before it opens on the nipple. The glandular tissue that develops from a single lactiferous duct constitutes a lobe of the breast. Each lobe is subdivided into lobules which correspond to the branchings of the duct system. The lobes vary considerably in size (Lynn and Kirby 1991).

The ducts and their glandular terminations are intimately surrounded by subcutaneous *connective tissue* which acts as a packing material and supporting framework. The gland does not have a definite capsule, and its connective tissue component consequently merges imperceptibly with the subcutaneous connective tissue around it. For convenience of description, any particular part of the connective tissue is named *inter-lobar*, *inter-lobular* or *intra-lobular* according to its position (*Hamilton 1981*).

Except under the nipple and areola, the connective tissue contains relatively large deposits of fat. These serve to smooth the superficial contour of the gland. Irregular pyramidal processes of glandular tissue extend through the fat towards the skin, to which they are attached by strands of connective tissue which are continuous with the deep fascia, and which are called the *suspensory ligaments of Cooper*. These glandular processes are most numerous in the upper part of the breast. The connective tissue which separates the deep surface of the gland from the fascia on the muscles on which it lies is very loose, and in it may be spaces, sometimes called retromammary bursae. Nerves, blood and lymph vessels run to and from the gland through the connective tissue (*Hamilton 1981*).

The skin covering of the breast is thinner and also more translucent than the skin of the rest of the body. The areolar skin is

the most specialized and also the thinnest. In addition to being pigmented, it contains complex sweat and sebaceous glands, and also numbers of hair follicles. Rudimentary lactiferous duct systems also open on the areolar surface. These are the so-called areolar glands, and some authorities believe them to be intermediate between true mammary gland tissue and sweat glands. The surface of the areola is marked by a number of small elevations, the *tubercles of Montgomery*. They are said to be caused by the ducts of either the areolar glands or enlarged sebaceous glands (Fig. 1) (*Hamilton 1981*).

The *nipple* is conical or cylindrical in shape; dark in colour due to the thinness and pigmentation of the skin; and soft or firm according to the tone of the smooth muscle fibers found within it. On to its fissured tip open the mammary ducts. While sweat glands and hair are absent, sebaceous glands are present in great numbers. The connective tissue of the nipple and areola contains smooth muscle fibers which are arranged longitudinally, radially and concentrically to the axis of the nipple (*Hamilton 1981*).

#### NERVE SUPPLY

The breast is supplied by lateral and anterior cutaneous branches of the second to sixth intercostal nerves. These nerves include both sensory and sympathetic fibers, which supply the skin, smooth muscle of the areolae and nipples, blood vessels, and mammary glands (*Keith 1990*).

#### **BLOOD VESSELS**

#### A. Arterial Supply.

The principal arteries of the mammary gland are :-

- 1- The perforating (medial) branches of the internal thoracic (mammary) artery which pass through the second, third and fourth intercostal spaces just lateral to the sternum,
- 2- the external mammary artery, a branch of the lateral thoracic artery which arises from the axillary artery. In addition,
- 3- branches of the **anterior intercostal arteries** of the second, third and fourth intercostal spaces may enter the posterior surface of the gland, and
- 4- the pectoral branch of the **acromiothoracic artery** may supply the upper lateral quadrant of the breast.

#### B. Venous Drainage.

Venous blood from the gland drains into the axillary, internal mammary and intercostal veins through channels which accompany the arteries. A superficial subcutaneous plexus of veins connects freely with the veins in the gland stroma, and is drained by the same channels, and also by small veins which join tributaries of the external jugular vein. The superficial venous plexus is often visible through the skin, especially during pregnancy and lactation (Hamilton 1981).