BREAST CANCER
AETIOLOGY AND DIAGNOSIS

ESSAY

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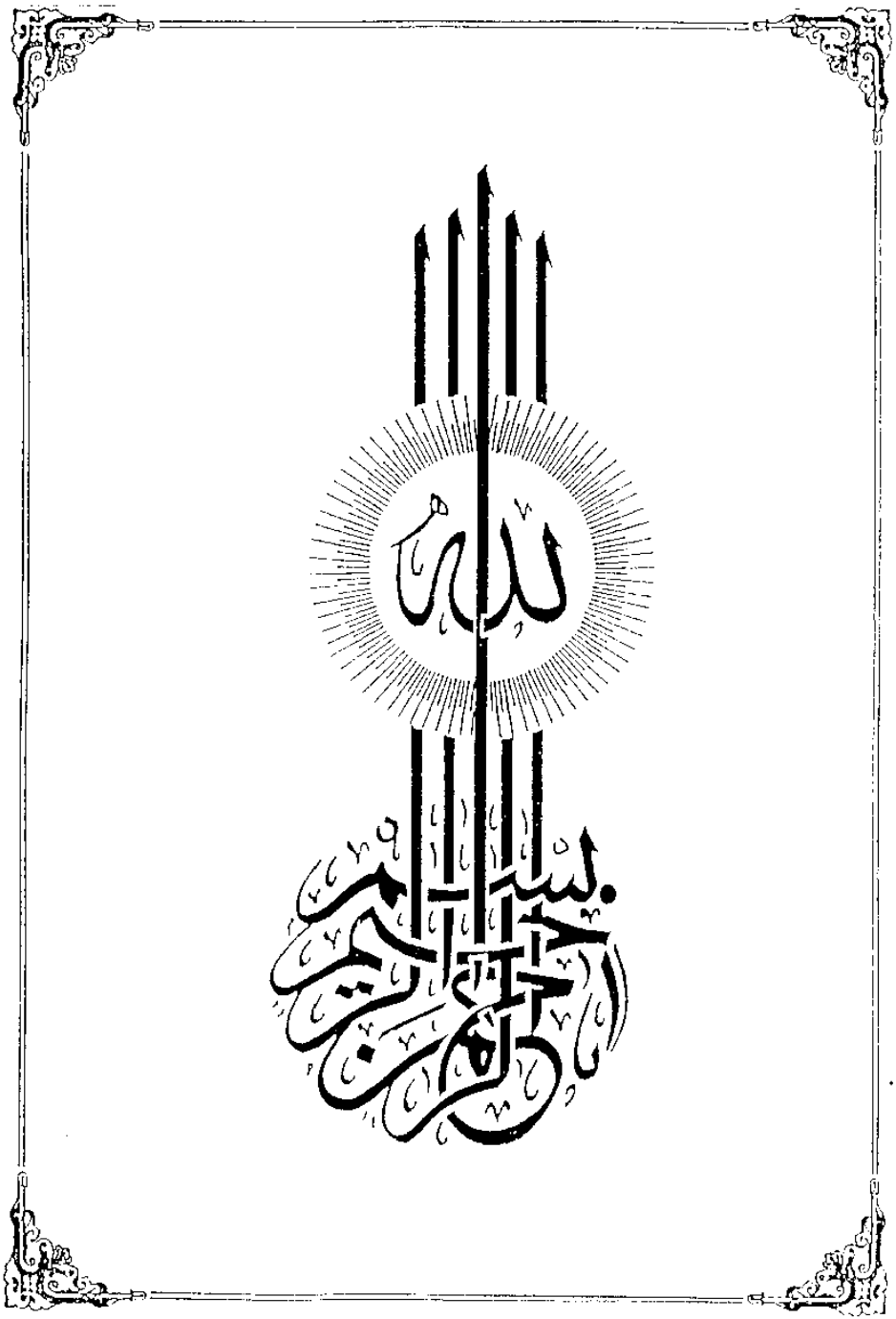

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INTRODUCTION

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INTRODUCTION

The breast is the most common site of cancer in females, and breast cancer is the most common cause of death from cancer in women, and its definite cause up till now is unknown.

Physiology of mammary gland is controlled by the ovarian, adrenal, and pituitary hormones. This fact led investigators to study the relationship of these hormones and others to the development of mammary carcinoma. Hormones (especially estrogen) are well known to induce cancer in rats, but their role in human mammary carcinogenesis remains incompletely defined and controversial. Beatson (1896) had performed bilateral oophrectomy in two women with disseminated breast cancer and obtained notable tumour response.

The notion of the dependence of cancer cells on various hormones has been strengthened in vitro which has shown that some human breast cancers are in fact dependent on estrogen for survival (Chayen et al.1970). It was detected that many receptors in cancer cells of particular tumours for a particular hormone and these tumours might be at least theoretically dependent on these hormones. Much clinical, experimental and therapeutic evidence has accumulated to suggest that

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hormonal factors play a role in genesis and growth of breast cancer. (Gross et al 1977). In recent years our knowledge of breast cancer has progressed rapidly resulting in new approaches and techniques in early detection and diagnosis.

Public education with self examination, mammography, thermography, Xero-radiography. Sonography, C.T.Scan and Nucleomagnetic Resonance (N.M.R.) are the recent trends for early diagnosis. Early detection is the most benificial means to overcome the breast cancer tragedy.

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ANATOMY AND HISTOLOGY

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ANATOMY OF THE BREAST

The breast exists in both sexes. In the male it is rudimentary throughout life. In female it is under-developed before puberty, but undergoes considerable growth and elaboration, at and after puberty.

The Female Breast:

The breast is a modified sweat gland lying on the pectoral fascia and the musculature of the chest wall over the upper anterior rib cage surrounded by a layer of fat and encased in a skin envelope. The base of the breast extends from the 2nd to the 6th rib vertically and from the lateral margin of the sternum to the mid axillary line transversely (Snell 1981).

A part of the breast extends upwards and laterally towards the axilla, pierces the deep fascia at the lower border of pectoralis major muscle (foramen of Langer) and comes in close relation to the axillary vessels. (Axillary taile of Spense). It may give rise to tumour which is mistaken for enlarged axillary lymph nodes. The deep surface of the breast is related to the pectoralis major muscle and serratus muscle and external oblique abdominis muscle. The breast is separated from these

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muscles by the deep fascia. Between the breast and the fascia there is a zone of loose areolar tissue called retro-mammary space (Last 1978).

Topographically the breast is divided into 4 quadrants (upper lateral, upper medial, lower lateral and lower medial) taking the nipple as the centre, as well as a retro-areolar area in addition to the axillary tail.

The upper outer quadrant is thicker than the remainder of the breast. It contains the greater bulk of the mammary parenchyma which may account for the fact that both benign and malignant tumours are frequently in that site 60%, of breast cancer arises in that quadrant. (Haagensen 1971).

Areola and Nipple:

The areola in the young female is convex and lens-shaped, pigmented, hairless. It is surmounted at its centre by the nipple which lies in the 4th intercostal space, 10 cm, from the mid line. Its axis points downwards, outward. The breast is anchored to the overlying skin and underlying pectoral fascia by bands of fibrous tissue called Cooper's ligaments, which account for dimpling of the skin covering breast cancer or other lesions accompanied by fibrosis (Plessis 1975).

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Blood Supply:

Arterial Supply:

The breast receives its arterial supply from three major arteries and other additional supply. The three major arteries are:

1. The perforating branches of the internal mammary artery; pass through the 1st, 2nd, 3rd and 4th intercostal spaces.
2. The lateral thoracic artery: arises from the axillary artery and courses down along the lateral border of pectoralis minor muscle.
3. The pectoral branch of acromiothoracic artery: it runs along the medial edge of pectoralis minor muscle.

The additional supplies are: the superior branch of the axillary artery, the lateral perforating branches of the intercostal arteries and branches from the subscapular artery.

Veins of breast:

The mammary glands have a rich anastomosing network of superficial subcutaneous veins, the circus venosus. These veins become markedly dilated during pregnancy,and

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sometimes over an area of neoplasm. The majority of these veins drain into the internal mammary vein. In some individuals they may drain into superficial veins of lower neck.

The deep veins of mammary gland drain along routes roughly corresponding to the arterial blood supply, thus one major route is through internal mammary vein. Another is through axillary vein. A third route is through intercostal veins. This last route has a special significance, since the intercostal veins communicate with the vertebral veins. This explains metastases of mammary cancer to vertebral bodies, or even the sacrum or pelvis.

Nerve Supply:

The secretory tissues are supplied by sympathetic nerves, which reach them via the 2nd to the 6th intercostal nerves. The overlying skin is supplied by the anterior and lateral branches of the 4th, 5th and 6th intercostal nerves.

Lymphatic Drainage:

The breast is drained by two sets of lymphatics:

1. Lymphatics of the skin over the breast.

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2. Lymphatics of the parenchyma of the breast. (Ackerman 1970).

Lymphatics from the skin form a dense network under the areola, which is continuous with the lymphatics of the skin of the surrounding region, forming an un-interrupted network over the entire surface of the chest, neck, and abdomen. It is of great surgical importance to observe that lymphatics of the skin over the breast communicate across the middle line and that a unilateral disease may become bilateral by this route.

The subareolar plexus of Spay is a point of controversy, while (Cutler 1961) considered it to be the 1st station of lymph drainage from the breast, Ackerman and Del Regato (1970) Haagensen (1971) said that it plays no important role in draining the parenchyma of the breast, and is much less dense than generally believed.

The lymphatic plexus of the deep fascia consists of fine lymphatic vessels. They do not act as normal pathways for lymph from breast parenchyma to the regional lymph nodes, but are considered as lymphatic drainage of the pectoral fascia (McGregar 1975). The lymphatics originating within the breast drain by the following pathways, as mentioned by (Christopher 1980).

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A few lymphatics follow the lactiferous ducts and terminate in the subareolar lymphatic network, mainly from the central area. The principal route of lymphatic of the breast is the axillary pathway, coming from all parts of the gland, and pass directly outward in the substance of the breast, receiving tributaries on their way and pass through the axillary tail to axilla. Most of them go to pectoral group, few to the subscapular and intercostal groups. From these they run to the central and apical groups.

The Internal Thoracic Pathway: Following the perforating vessels to the internal mammary lymph nodes. These lymphatics pierce 1st to 4 th intercostal spaces near the sternum to reach the internal mammary glands. It is found that these glands are involved in about half the cases in which axillary lymph nodes are implicated.

The Transpectoral Pathway: penetrates the pectoralis major muscle and ends in the supraclavicular lymph nodes, some may drain into the infraclavicular lymph nodes behind the pectoralis minor muscle.

The Abdominal Pathway: by which lymphatics communicate through the abdominal wall with lymphatics in extra peritoneal tissue and so through the diaphragm to the

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