EARLY DIAGNOSIS OF CARCINOMA OF THE BREAST

ESSAY

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of M.S. Degree in General Surgery

BY

Ahmed Abd El-Khalek Ahmed Saleh

Supervised By

Professor Dr. Kamel Mohamed Said

Professor of general surgery

Ain Shams university

Faculty of medicine

Ain Shams university.

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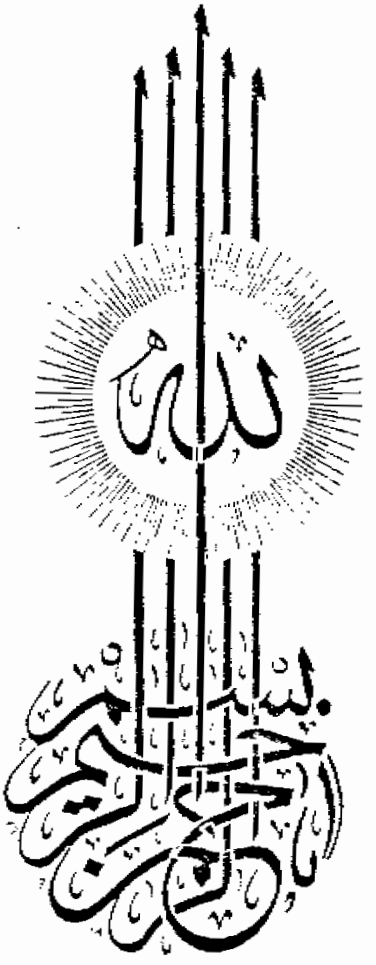

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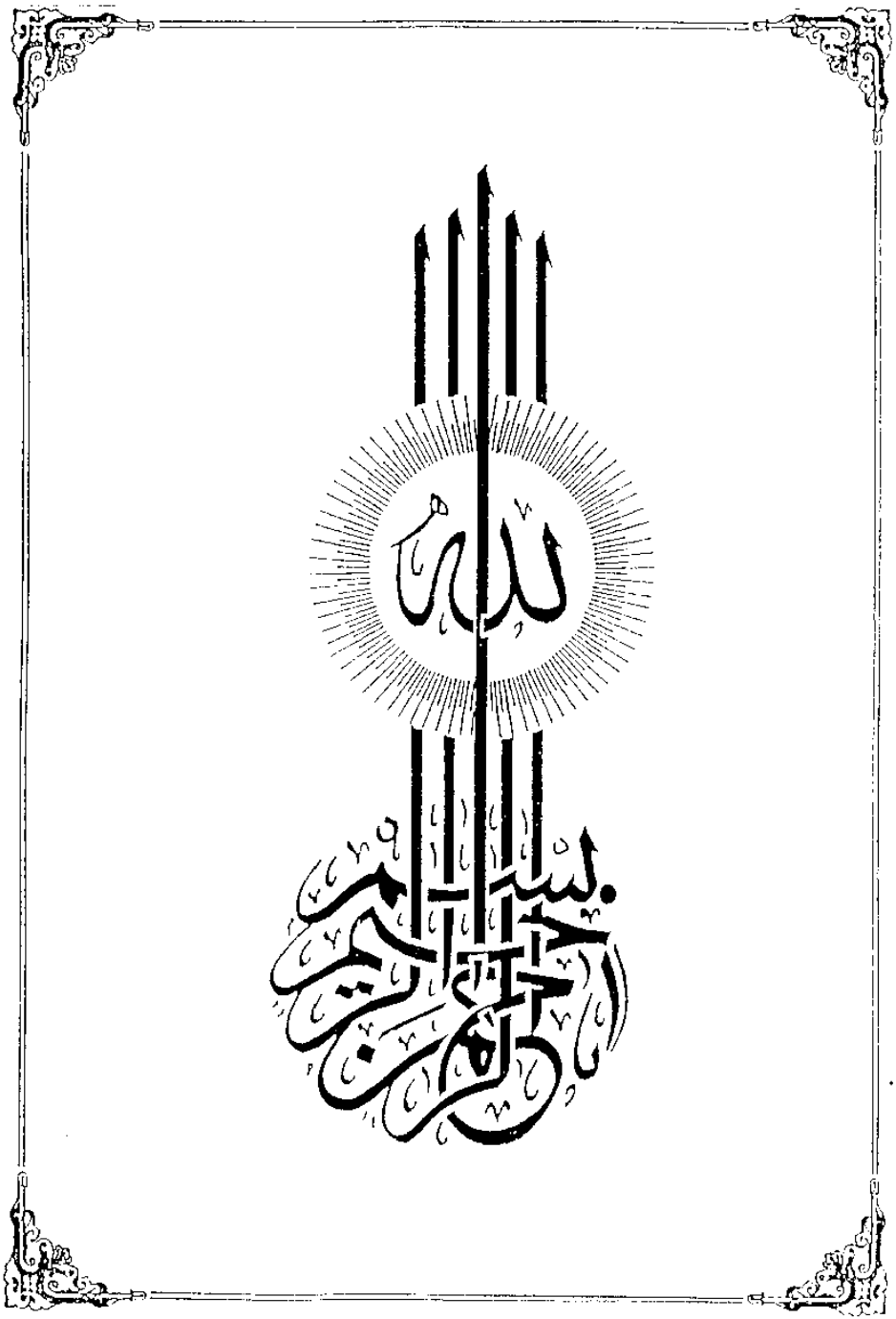

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Shape :

The mammary gland is a modified sweat gland so it has no fibrous capsule or sheath, it lacks special blood vessels and nerves, and it has generalized drainage of its lymph (Woodburne,1973) .

The glands are hemispherical in shape with base resting on the chest wall and lying mainly on the pectoralis major , but also extends inferolaterally on the serratus anterior and inferomedially on the aponeurosis of the external oblique muscle, and separated from all these muscles by the deep fascia (Gray,1977; Du Plessis,1984).

The gland extends from the second to sixth rib inclusively and from the side of the sternum to the midaxillary line (Du Plessis,1984), and extends in depth through the major and minor pectorals to the intercostal muscles (McVay,1984).

The gland rests on a condensation of superficial fascia , the upward continuation of Scarpa's fascia.

Between this fascia and the deep fascia over pectoralis major is a submammary space (Last,1984).

The full extent of the breast is apparent in cases of milk engorgement where it extends from the clavicle above to the eighth rib below and from the midline medially to the edge of latissimus dorsi posteriorly.

The central region of the anterior surface of the breast

is surrounded by the areola.

The lower border is more rounded than the upper and a skin crease, the submammary groove,form the lower limit (Lamarque, I984).

AXILLARY TAIL :

This is a prolongation from the upper outer part of the gland which passes to the axilla through an opening in the axillary fascia known as the foramen of Langer, so becoming deep to the deep fascia and in direct contact with the main lymph glands of the breast.

The axillary tail may be palpable in the normal females , can be the site of tumours, and can be mistaken for lymph nodes, mass, or a lipoma (Du Plessis,I984; Rains &Ritchie, I986).

STRUCTURE AND EVOLUTION :

The female breast consists of : glandular tissue, fibrous tissue and adipose tissue . The glandular tissue is contained within about 20 ill defined lobes (Hutson,I984). Each lobe is composed of combined secretory and excretory systems (Lamarque, I984) in the form of compound tubulo-alveolar glands (Junqueira,I983). Each lobe opens at the nipple by a

segmental localization of breast pathology in the case of nipple discharge (Azzopardi,I979).

Each lobe consists of a variable number of lobules and associated extralobular ducts.

The lobules are made of a variable number of acini or ductules arising from a branched intralobular duct(Hutson,I985)

The ductule opens into the subsegmental duct which opens into the segmental duct which forms a dilatation, the lactiferous sinus, before opening at the nipple(Azzopardi,I979)

Each lobe is separated from the others by dense connective tissue and much adipose tissue.

The interlobar connective tissue penetrates each lobe dividing it into lobules. This connective tissue also surrounds and supports each secretory unit (Junqueira, . I983), but adipose tissue is not evident within the lobular unit (Hutson, I985).

The lobular stroma is more loosely textured , more cellular and more abundant than the periductal stroma (Azzopardi, I979).

The ducts are invested by elastic tissue while the lobules are devoid of it (Azzopardi, I979).

In the whole ductal-lobular epithelial system of the breast

there are 2 cell types arranged in 2 layers, the outer cell is smaller and wedged between the bases of two adjacent inner-type cells. The inner cell is larger and taller , rests on the basement membrane, but extends to the luminal space. The outer cell type is regarded as a myoepithelial cell. Appreciation of the 2-cell-type structure is extremely important in distinguishing between benign tumours and malignant tumours (Azzopardi, I979).

The lactiferous ducts are lined by squamous stratified epithelium near their external openings.

The shape and histologic structure of the breast varies according to sex, age and physiologic status :

BEFORE PUBERTY :

The gland is small with small nipple , but the areola is fully formed and the breast tissue does not extend beyond the margins of the areola (Last, I984).

The prepubertal is not a totally quiescent period for the mammary gland. It undergoes a slow and steady development with growth and ramification into secodary and tertiary lactiferous ducts with terminal spherical expansions (Lamarque, I984).

AT PUBERTY :

At about II years of age the primitive breast tissue,nipple and areola begin to show changes which typically progress over the course of 4 years to adult maturity (Furnival,I986).

There is increase in breast size and the nipple becomes prominent (Junqueira, I983).

There are changes in both glandular and connective tissue components of the breast, but the principal changes occur in the stroma with the development of adipose tissue amongst the fibrous connective tissue which supports the epithelial element (Furnival, I986).

Dense fibrous tissue around the breast lobules is responsible for the characteristic toughness of young adult breast (Furnival, I986).

The epithelial growth which occurs during adolescent development is limited to ductal proliferation.Lobulo-alveolar development does not occur at this time (Furnival, I986).

CYCLICAL CHANGES :

There is increase in volume of I5-30 % during the luteal phase.

The decline in volume which begins just before menstruation continues through the follicular phase of the next cycle (Furnival, I986).

The increase in volume is due to increased lipid accumulation and greater hydration of connective tissue in the luteal phase (Junqueira, I983).

There is proliferation of the ducts and the secretory parts at about the time of ovulation (Junqueira, I983).

An important implication of these cyclical changes is that the ductal epithelium is continually renewed.

The menstrual cycle shows substantial variation throughout reproductive life and there is some evidence that epithelial cell turnover decline in later reproductive years. This appears to coincides with a rising incidence of breast cancer which escalates after the menopause when such cyclical changes disappear (Furnival, I986).

CHANGES THAT OCCUR WITH AGE :

During the third to sixth decades the level of fibrous connective tissue within the average lobe declined, while the level of fat increased. During the seventh decade these trends tended to reverse (Azzopardi,I979; Hutson, I985).

Between the second and fifth decades the total epithelial cells (in the acinar and intralobular ducts) increased . This is reversed during the sixth decade (Hutson, I985). Also with increasing age the mean volume of the average breast lobule gradually declined (Hutson, I985). These changes causes the breast to become loose in texture and detection of lump within it becomes easier. Also the interpretation of mammography becomes easier because of adipose metaplasia of the stroma (Azzopardi,I979;Gerin & omar,1984)

INVOLUTION OF THE BREAST :

These are the changes which occur in the aged breast. These changes begin well before menopause (Hutson, I985). Azzopardi,(I979) stated that it involeves the lobules,ducts and the stroma :

LOBULES :

The basement membrane of the acini becomes thickened and the double layered epithelium shrinks and becomes flattened while the luminal space narrows and becomes almost obliterated and epithelial secretion ceases. The connective tissue of the lobule gradually becomes converted into dense hyaline collagen.

STROMA :

Fibrous connective tisuue partly and largely disappears and is replaced by adipose tissue. This leads to either a small atrophic and flabby breast or at the other extreme to a voluminous and pendulous breast.

The stromal involution is not uniform in time throughout the breast or even in adjacent parts. This can give rise to marked differences in consistency in different areas resulting in a slightly granular consistency on palpation.

LIGAMENTS OF COOPER :

The body of the gland is surrounded by a connective tissue capsule from which septa extend through the anterior fatty layer to the dermis.These are Duret's crests whose general orientation is perpendicular to the skin (Lamarque,I984).

These ligaments account for dimpling of the skin in lesions of the breast accompanied by fibrosis (Rains& Ritchie,I986), because these strands of connective tissue fail to lenghthen with enlargement of the gland.

THE NIPPLE :

The central region of the anterior surface of the breast is occupied by the nipple which forms a cylindrical and conical protrusion (Lamarque, I984).

In the young breast the nipple usually lies opposite the fourth intercostal space, but after lactation the breast becomes pendant (McVay,I984).

The nipple is an erectile structure because of the action of the circular fibres at its base and the longitudinal fibres attached to the lactiferous ducts (McVay,I984).

Near the apex of the nipple lie the orifices of the lactiferous ducts (Rains & Ritchie , I986).

THE AREOLA :

It is a circular cutaneous zone about 5cm. in diameter (McVay, I984).

It surrounds the nipple and shows some measure of pigmentation (Lamarque, I984).

The areolar epithelium contains numerous glands of 3 types

I- numerous sebaceous glands are present superficially close to the surface (Azzopardi,I979), forming rounded elevations called glands of Montgomery(McVay,I984). These glands enlarge stikingly during pregnancy (Rains &

Ritchie,1986).

2- sweat glands .

3- Accessory mammary glands .

The subcutaneous tissue contains involuntary muscle arranged in concentric rings as well as radially(Rains & Ritchie ,1986).

The colour of the nipple and areola varies with the complexion of the person, but in young subjects usually is rose pink. During pregnancy the colour becomes browner.

The pigmentation never entirely disappears,and increases slightly with each succeeding gestation (McVay , 1984).

DURING PREGNANCY :

The earliest changes of pregnancy are an increase in breast size (Furnival, 1986) as a result of proliferation and ramification of the lactiferous ducts with a consequent active production of secretory tubules and alveoli .

The relative amounts of connective tissue stroma and adipose tissue decrease considerably (Junqueira,1983).

The veins become larger (Evans & Gravelle,1973).