THE ROLE OF MRI IN THE DIAGNOSIS OF BREAST CANCER

Essay

Submitted in Partial Fulfillment for The Master Degree in

Radiodiagnosis

By

Abeer Abd El Naby Abd Allah

M.B., B.Ch.

Supervisor By

Prof. Dr. Mohamed Samy El Beblawy

Prof. of Radiodiagnosis Dept.

Faculty of Medicne, Ain Shams University

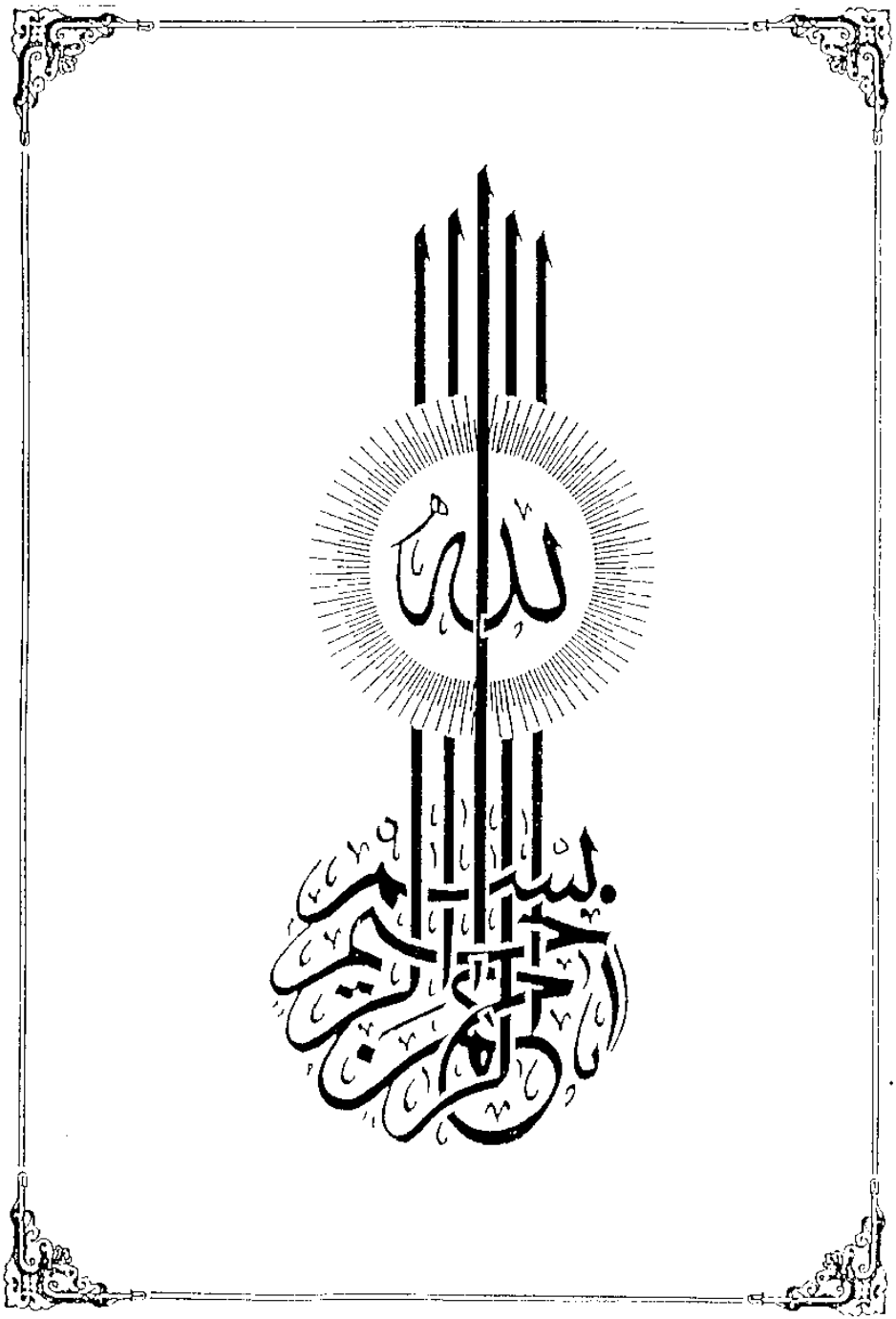
Dr. Hasan Galal Mourad

Lecturer of Radiodiagnosis

Faculty of Medicne, Ain Shams University

Faculty of Medicne,
Ain Shams University
1998

Dedication



ACKNOWLEDGMENT

Firstly I thank the merciful God who gave me the power to finish this work.

Faithfully, I would like to express my deepest gratitude to ***Professor Dr. Mohamed Samy El Beblawy***, Professor of Radiodiagnosis Department, Faculty of Medcine, Ain Shams University, for his generous support and advice and to him I remain deeply indebted in accomplishing this work.

Sincerly, I wish to express my dreatest gratitude to assistant ***Dr. Hasan Galal Mourad***, Lecturer of Radiodiagnosis Department, Faculty of Medcine, Ain Shams University, for his outstanding cooperation and continuous guidance in this work.

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Introduction
&
Aim of The Work

INTRODUCTION AND AIM OF THE WORK

Progress in early detection and diagnosis of breast cancer has already been achieved by conventional imaging modalities including mammography. However, some problems so far remain unresolved e.g. early detection of malignancy within dense breast and diagnostic specificity especially small and malignant masses is not always an easy task by mean of conventional mammography, so a large number of unwanted biopsies can not be reduced *(Weinreb and Newstead, 1994)*.

Furthermore true evaluation of the size and extent of breast malignancy, i.e., the number of malignant foci within the breast tissue is not accurate by film-screen mammography. As a result a pretreatment planning, i.e., to advise either aggressive mastectomy or more conservative lumpectomy can't be achieved. For these reasons investigation of further methods is necessary *(Boetes and his colleagues, 1995)*.

The aim of this work is to try to define the appropriate role of MR in breast cancer diagnosis.

Anatomy of The Breast

ANATOMY OF THE FEMALE BREAST

The breasts (mammae) are secondary reproductive glands of ectodermal Modified Sweat gland origin.

Each breast lies on the superior midsurface of the chest wall. In women the breasts are the organ of lactation *(Lamarque, 1984)*.

Emberyological Anatomy:

The breast is a modified apocine sweat gland and begins to develop as early as the fourth week as a downgrowth from a thickened mammary ridge (milk line) (Fig. 1) of ectoderm along a line from the axilla to the inguinal region. Supernumerary nipples or even glands proper may form at lower levels on this line *(McMinn, 1994)*.

Structural Anatomy:

Gross anatomy:

The adult female breast usually forms an almost hemisphere protrusion on each side at the level of the second rib inferiorly to the sixth or seventh rib. the gland is usually situated between the lateral ster.nal border and the anterior axillary fold.

The superior surface of the breast emerges gradually from the chest wall, whereas the lateral and inferior borders are quite well defined. The major portion of the breast lying atop the

pectoralis major muscle, projects ventrally; smaller portion extends laterally and inferiorly to lie atop the serratus anterior and external oblique muscles and as far caudal as the rectus abdominis muscle.

A triangular tongue-shaped tail of breast tissue (the axillary tail of spence) extends superiorly and laterally towards the axilla perforates the deep axillary fascia, and enters

The axilla, where it terminate in clase opposition to the axillary lymph vessels and nodes and the axillary blood vessels and nerves *(Dixon et al., 1993)*.

The areola is a circular pigmented zone 2-6 cm in diameter at the tip of the breast. Its color varies from pale pink to deep brown depending on age, parity, and skin pigmentation (Fig. 2).

Microscopic anatomy:

The skin of the areola contains multiple small elevated nodules beneath which lie the sebaceous glands (glands of Montogomery) the glands are responsible for lubrication of the nipple and help preventing nipple and areolar cracks and fissures.

During the third trimester of pregnancy, the sebaccous glands hypertrophy markedly.

A circular smooth muscle band surrounds the base of the nipple longitudinal smooth muscle fibres branch out from the

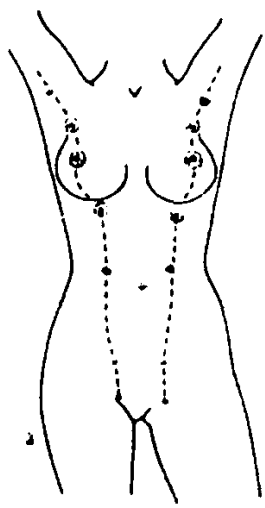


Fig. (1): The milk line or ridge.

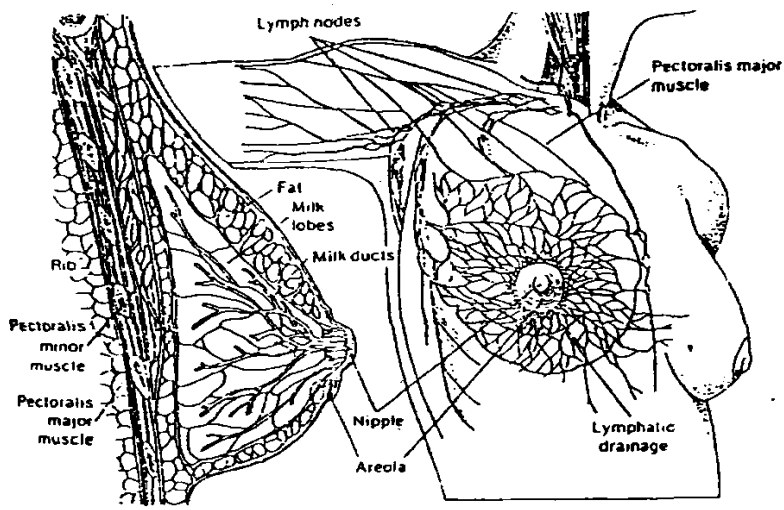
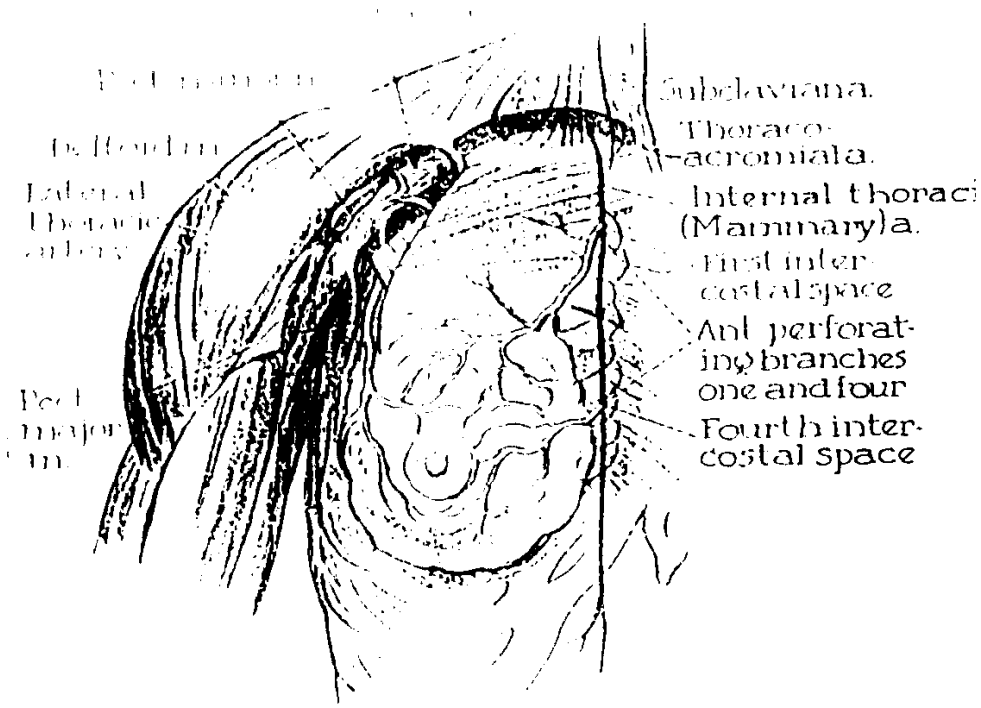


Fig. (2): Anatomy of the female breast.



Mal

Fig. (3): The arterial supply of the breast is derived from the anterior perforating branches of the internal mammary artery and the lateral thoracic artery.

PATHOLOGY OF MALIGNANT LESIONS OF THE BREAST

Breast carcinoma is a major cause of death for women in their forties in Europe and North America.

Malignant neoplasms of the breast are primarily of epithelial origin. Only a small number of malignancies are sarcomas and metastases.

Most of the epithelial breast malignancies arise from the terminal duct lobular unit (TDLU) and its surroundings whereas only few conditions, notably papillary duct carcinoma arise from the major ducts *(Wellings et al., 1975)*. Epithelial breast malignancies have been traditionally classified into ductal and lobular carcinomas. The names given to these two categories implicate that they arise from the ducts and the lobules respectively. However, they actually represent histological types rather than indicate a certain cell-of-origin. Furthermore, histological features of both types exist in nearly 50% of cases *(Ramzy, 1990)*. Each of the two broad histological categories, the ductal and the lobular carcinomas is further divided into in-situ type and infiltrative type based on the absence or presence of infiltration of the basement membrane of the involved ducts or lobules by the malignant cells. The incidence of the various histological types of malignant breast neoplasms is given in the following table.