ROLE OF MRI IN DIAGNOSIS OF BREAST NEOPLASMS

Essay

Submitted for Partial Fulfilment of Master Degree in Radiodiagnosis

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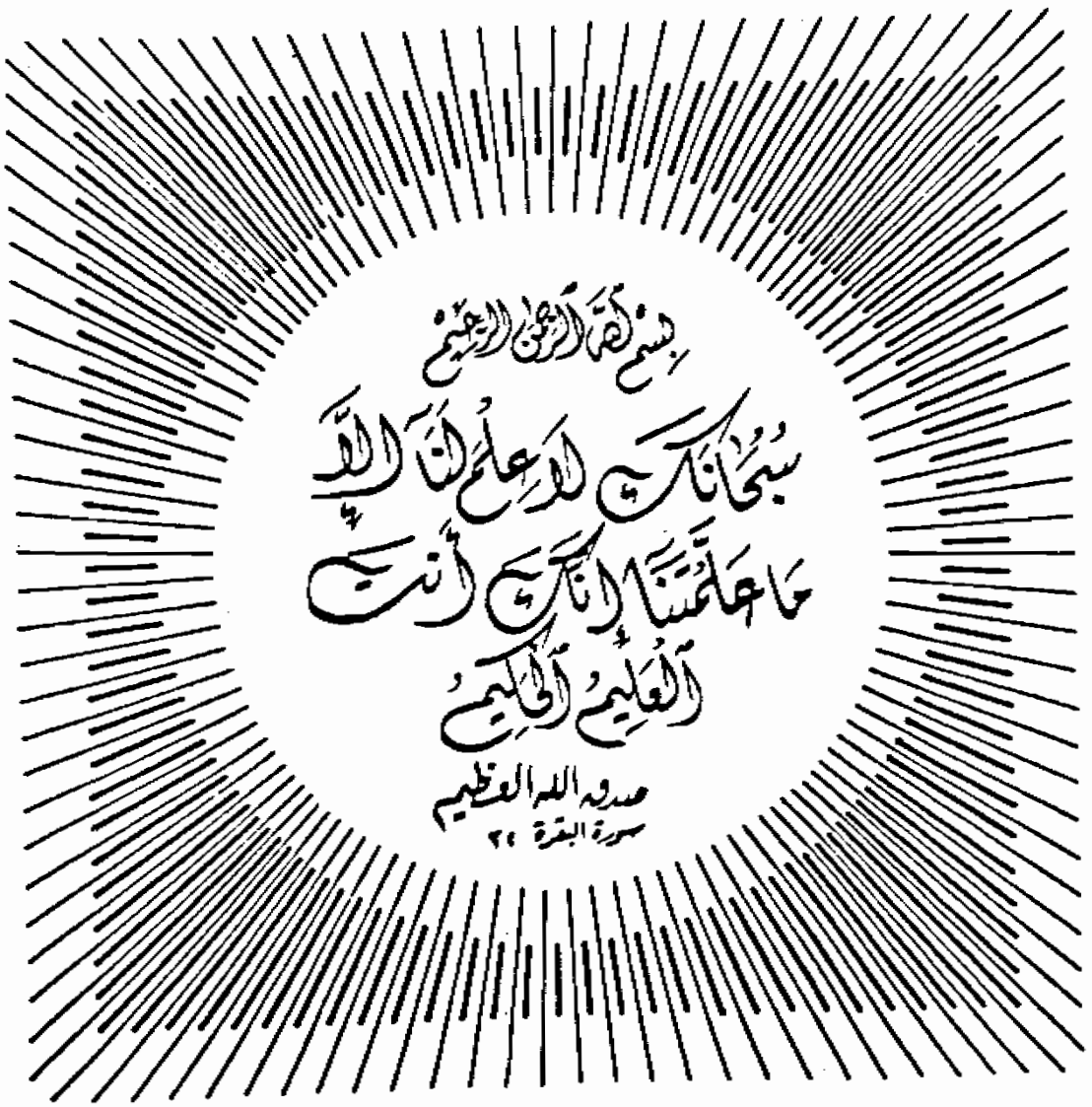
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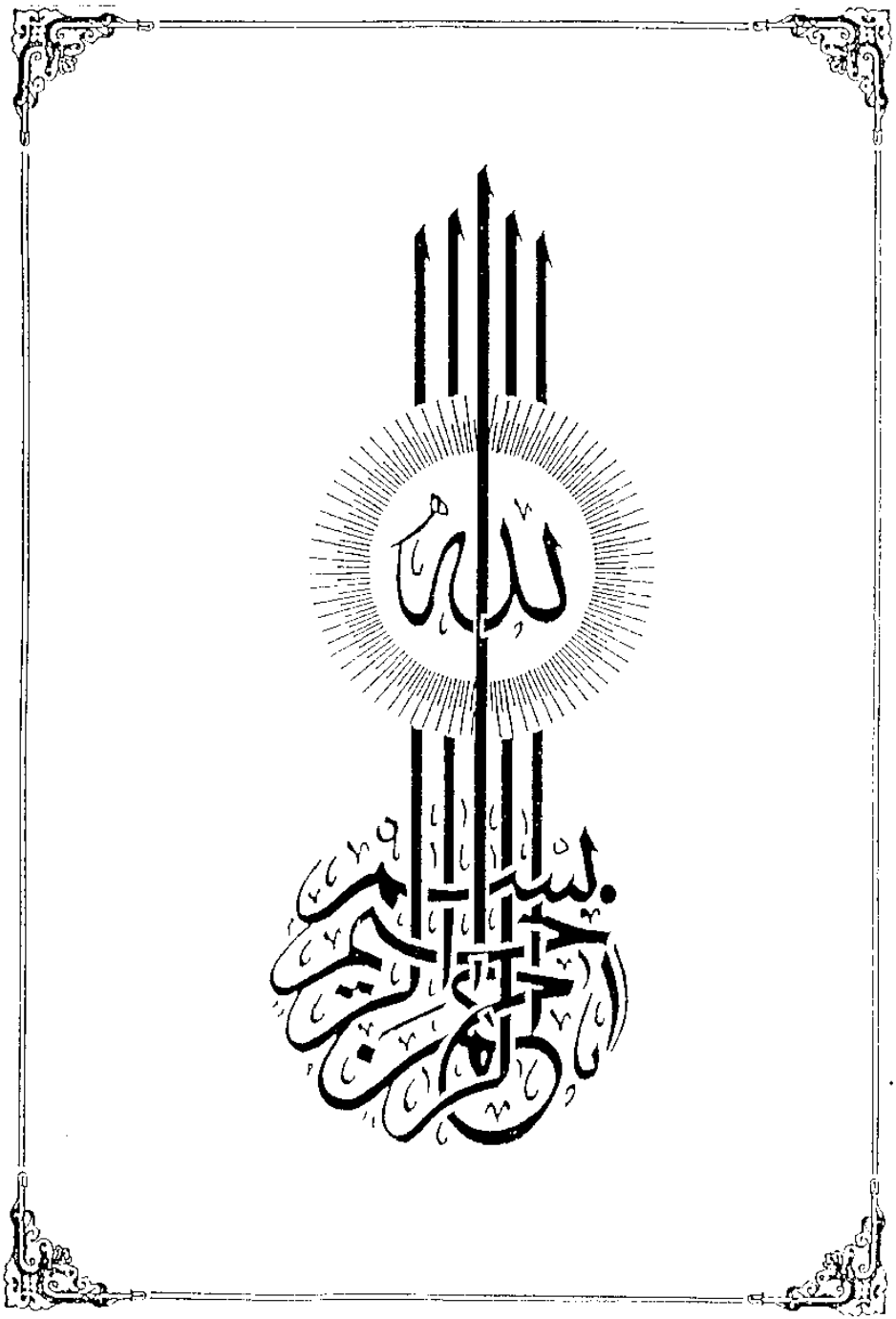

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LIST OF FIGURES AND ILLUSTRATED CASES

LIST OF ABBREVIATIONS

1.	**CSI**	Fat Suppressed chemical shift imaging.
2.	**C-T**	Computed-axial- Tomography.
3.	**FLASH**	Fast low angle shot A gradient echo fast imaging pulse sequence.
4.	**Gd-DTPA**	Gadolinium diethylene triamine penta acetic acid.
5.	**IV**	Intra venous
6.	**MRI**	Magnetic resonance imaging.
7.	**m mol/kg**	Milli mol/kilogram.
8.	**NaCl**	Sodium Chloride.
9.	**SE**	Spin echo.
10.	**S/N ratio**	Signal-to-noise ratio.
11.	**T_1**	Longitudinal relaxation time.
12.	**T_2**	Transverse relaxation time.
13.	**2D**	Two dimensional.
14.	**3D**	Three dimensional.
15.	**US**	Ultra sound.

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Introdution and Aim of Work

INTRODUCTION AND AIM OF WORK

Breast neoplasms are The Commenest neoplasms in females all over The World. That is why early detection and correct management of these neoplasms are essential in order to save so many lives.

Although could be detected clinically, the radiological investigations were, still and will be corner stones in the final Judgement.

Mammography- as a simple, rapid and diagnostic modality- is the most popular radiological investigation and screening method of breast neoplasms, but some cases escape from mammographic diagnosis, so the need for new methods of radiological investigations became a desirable issue. These methods include xerography, thermography, U/S, C-T scan, scintigraphy and lastely but not finally MRI.

This work tries to put a spotlight on the role of this modern modality in diagnosis of breast neoplasms and how MRI can be useful in catching some cases.

Anatomy of the breast

ANATOMY OF THE BREAST

The mammae exist in both sexes. In the male they are rudimentary throughout life; in the female they are undeveloped before puberty, but undergo considerable growth and elaboration at and after puberty. They attain their greatest development during the later months of pregnancy and especially for sometime after parturition. The mamma consists of glandular tissue (the mammary gland proper), which secretes milk, and fibrous and adipose tissue in between the lobes and lobules of the glandular tissue, together with blood vessles, lymph vessles and nerves ***(Williams P.L. et al., 1980).***

The female breast :

In the young adult female, each breast forms a rounded eminence lying within the superficial fascia chiefly anterior to the thorax but spreading variably on to its lateral aspect.

Its shape varies markedly in different individuals and races and in the same individual at different ages. It may be hemispherical, conical and is variably pendulous, becoming either pyriform or thin and flattened. Most of its bulk is adipose tissue.

In the lateral plane its base extends vertically from the second to the sixth rib, and at the level of the fourth costal cartillage it extends transversely from the side of the sternum to near the mid-axillary line. The supero lateral part of the breast is prolonged upwards and laterally twards the axilla, forming the "axillary tail", [Fig. 1] which extends along the lower border of the pectoralis major and may pass through the deep fascia to lie in close relationship to the pectoral group of axillary lymph nodes ***(Williams P.L. et al., 1980).***

The deep aspect of the breast is slightly concave and is related to the pectoralis major, serratus anterior, obliques externus abdominis and the aponeurosis of the later muscle as it forms the anterior wall of the sheath of the rectus abdominis. The breast is, however, separated from these muscles by the deep fascia, and between the breast and the deep fascia there is a zone of loose areolar tissue, "The reteromammary or submammary spaces", which allow the breast some degree of movement on the deep fascia covering the pectoralis major. Advanced mammary carcinoma may by invasion, fix the breast to the pectoralis major.

The mammary papilla or nipple is a cylinderical or conical projection from just below the centre 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 fifteen to twenty lactiferous ducts, which open by minute orifices on its wrinkled tip. It contains numerous non striated muscle fibres: most of these are arranged circularly and their contraction when the papilla is mechanically stimulated (e.g. by suckling) causes erection of the papilla: other fibres are arranged longitudinally and their contraction may retract it. Occasionally the papilla may not evert during its prenatal development and thus remains permanetly retracted, a condition that causes difficulty in suckling ***(Williams P.L. et al., 1980).*** The base of the papilla is encircled by a coloured area of skin called the areola, which is rose-pink in the nulliparous caucasian female. During the second month of pregnancy it becomes larger and darker in colour and as pregnancy advance it becomes dark brown, this colour diminishes in intensity at the end of lactation, but the areola never returns to its original colour. It contains numerous sebaceous areolar glands, which become much enlarged during pregnancy and lactation to form "tubercles" beneath the skin ***(Williams P.L. et al., 1980).***

Structure of the breast :

The mammary gland consists of :

a) Glandular tissue of the tubulo alveolar type.

b) Fibrous tissue, connecting its lobes;

c) adipose tissue in the intervals between the lobes.

The subcutaneous tissue enclose 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 upper part of the breast and constitute the suspensory ligaments (of cooper). These ligaments may become contracted by fibrosis in cancer of the breast, thus causing the skin to become pitted and retracted ***(Williams P.L. et al., 1980).*** The normal gland tissue is of a pale reddish colour, firm in texture, and forms a lobulated mass which is flattened anteroposteriorely and thicker in the centre than at the circumference. It consists of fifteen to twenty lobes, and these are composed of lobules, connected together by loose connective tissue, blood vessles and ducts. The smallest lobules when fully developed, consist of a cluster of rounded alveoli which open into the smallest branches of the lactiferous ducts; these branches unite to form larger ducts which end in the

terminal lactiferous ducts, each of which drains a lobe of the gland. The lactiferous ducts hence also vary from fifteen to twenty in number, they converge twards the areola, beneath which they form variable dilatations, or lactiferous sinuses which may serve as a reservoir for milk. At the base of the papilla they contrat, and pursue a straight course to its summit, ending as separate orifices considerably narrower than the ducts themselves ***(Williams P.L. et al., 1980).***

The male mamma is Rudimentary throughout life and consists of small ducts (without alveoli) together with a little supporting adipose and fibrous tissue.

Sometimes the ducts are largerly represented by solid cellular cords. It may undergo a very slight, temporary enlargement at purberly. ***(Williams P.L. et al., 1980).*** Generally the duct system do not extend beyond the limits of the areola, which is, however, well developed.

The mammary papilla is relatively very small.

Blood supply of the breast : [Fig. 2]

is derived from the perforating branches of the internal thoracic artery, the pectoral branches of the Thoraco-acromial artery and the lateral thoracic artery ***(Smith J.W. et al., 1983).***