SONOMAMMOGRAPHY IN BENIGN BREAST DISEASES

ESSAY

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RADIO-DIAGNOSIS

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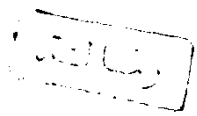

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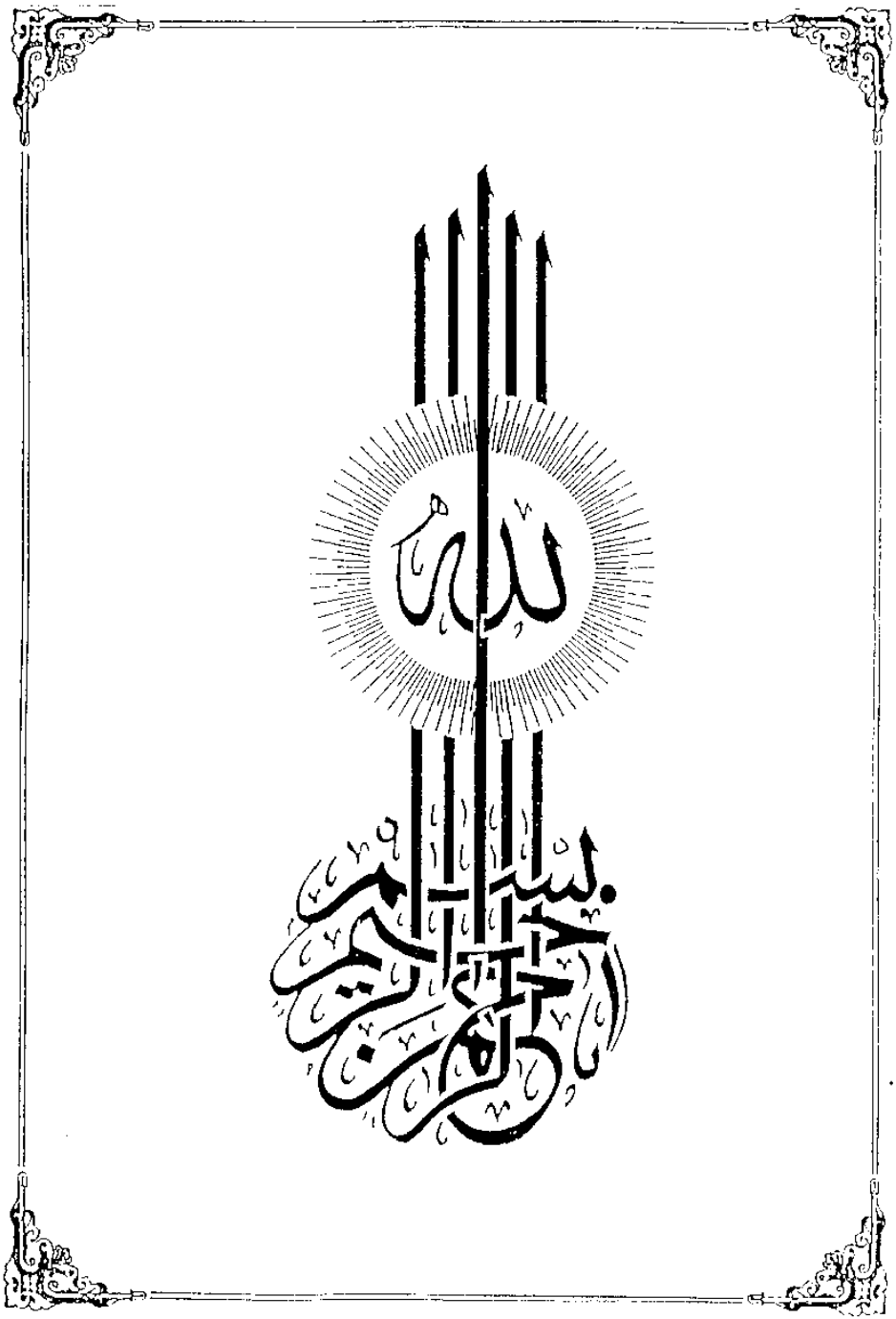

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The breast is a complex organ with a complicated physiology. Too often, the physical examination alone is insufficient to establish a proper diagnosis of breast problems.

The benign breast diseases are common diseases, patients presented with pain, lump or discharge from the nipple.

Ultrasonography is an imaging modality. It depends on the transmitted and reflected properties of an extremely high sound beams which are imaged and recorded after passage through the body.

Sonomammography is rapidly becoming established method for evaluation of benign breast diseases dependent on the fact that it is non invasive, simple method, with high accuracy.

The aim of this work is to find out the capability of this method to detect and provide informations about type, nature and extent of these diseases and to assess whether increased information is obtained using that method.

RADIOLOGICAL ANATOMY OF BREAST

EMBRYOLOGY

The breast is a modified skin sweat gland that develops into a complex functional structure in the female, but remains as a rudimentary organ in the male. It arises from an epidermal thickening on the ventral surface of the body at approximately the sixth week of fetal development. Bilateral ridges (the milk line) develop between the upper and lower limb buds ie. between axilla and groin. These ridges totally atrophy except for several persistent thickenings, which later give rise to the nipples.

During the second trimester of fetal life, cords of cells grow downward from the basal layer of the epidermis and later give rise to the primary mammary ducts. At first the cords eventually develop lumina so that, at the time of birth, rudimentary branching ducts are present, which fan out in a small area about the region of the nipple and the areola. Development of the breast is by no means complete at the time of birth. Progressive growth and branching of the mammary ducts occur at a very slow pace during prepubertal life. Mammary development ceases at about this stage in the male. In the female, before the onset of menstruation, the growth rate increases with branching ducts and proliferation of the interductal stroma. During adolescence, stromal growth is responsible for most of the increases in the mass of the breast, but at the same time the terminal small ducts give rise to many small, blind, saccular outpouchings-rudimentary gland buds (*Robbins et al., 1984).

The enlargement of the breasts at puberty is due to an accumulation of fat in these modified sweat glands. These changes at puberty are due to the action of estrogen, so that they do not occur in the male (Boyd, 1970).

ANATOMY

The breasts (mammae) exist in both sexes. In the male, they are rudimentary throughout life; in the female they are underdeveloped before puberty, but undergo considerable growth at and after puberty. They attain their greatest development during the later months of pregnancy and especially for some time after parturition, during lactation.

The mamma consists of glandular tissue (mammary gland proper which secretes milk) and fibrous and adipose tissue in between the lobes and lobules of glandular, together with blood vessels, lymph vessels and nerves (*Warwick and Williams, 1989).

The female breast: (Fig. 1)

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, except during lactation; and hence its shape and consistency are primarily dependent upon this. In the lateral plane, its base extends vertically from second to sixth rib, and at the level of the fourth costal cartilage it extends transversely from side of the sternum to near the mid-axillary line. The superolateral part of the breast is prolonged upwards and laterally towards the axilla, forming the

"axillary tail", which extends along the lower border of the pectoralis major and may pass through the deep fascia to lie in close relationship to pectoral group of axillary lymph nodes.

The deep aspect of the breast is slightly concave and is related to pectoralis major, serratus anterior, obliquus externus abdominis and the aponeurosis of latter muscle as it forms the anterior wall of sheath of the rectus abdominis. The breast is, however, separated from these muscles by deep fascia. Between the breast and deep fascia, there is a zone of loose areolar tissue, "the retromammary or submammary space", which allows the breast some degree of movement on the deep fascia covering pectoralis major (*Warwick and Williams, 1989).

The mammary papilla or nipple is cylindrical 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. Lactiferous ducts, about fifteen to twenty in number, 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 permanently retracted, a condition that causes difficulty in suckling (Fig. 2).