Contrast Enhanced Mammography In The Diagnosis Of Breast Cancer

Essay

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List of Abbreviations

ACC	: Adenoid cystic carcinoma
ACR	: American College of Radiology
ACS	: American cancer society
AGD	: Avarage glandular dose
AGD	: Average glandular dose
BI-RADS	: Breast Imaging-Reporting and Data System
BMI	: Body mass index
CC	: Cranio-caudal
CEDM	: Contrast Enhanced Digital Mammography
CESM	: Contrast enhanced spectral mammography
DCIS	: Ductal carcinoma in situ
DE-CEM	: Dual energy Contrast Enhanced Mammography
ER	: Estrogen receptor
Gd	: Gadolinium
HRT	: Hormonal repleasement therapy
IDC	: Invasive duct carcinoma
ILC	: Invasive lobular carcinoma
LCIS	: Lobular carcinoma in situ
LN	: Lymph node
MG	: Mammography
MLO	: Medio-lateral oblique
MPS	: Malignancy potential score
MRI	: Magnetic resonance imaging
NCI	: Nathional cancer institute
TNM	: Tumor,Node,Metastasis
UOQ	: Upper outer Quadrant
US	: Ultra sonography

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Introduction

Breast cancer is the most frequently diagnosed cause of death from cancer in women worldwide, the second leading cause of death from cancer in women in developed countries and the leading cause of death from cancer in low- and middle-income countries, where a high proportion of women present with advanced disease, which leads to a poor prognosis ***(Ferlay et al., 2014)***.

Established risk factors for breast cancer include age, family or personal history of breast cancer or of precancerous lesions, reproductive factors, hormonal treatment, alcohol consumption, obesity (for postmenopausal breast cancer only), exposure to ionizing radiation, and genetic predisposition ***(Colditz and Bohlke 2014).***

Screening for breast cancer aims to reduce mortality from this cancer, as well as the morbidity associated with advanced stages of the disease, through early detection in asymptomatic women. The key to achieving the greatest potential effects from this screening is providing early access to effective diagnostic and treatment services. Comprehensive quality assurance is essential to maintaining an appropriate balance between benefits and harms ***(Sankaranarayanan and Swaminathan 2010).***

Number of screening tests have been employed, including clinical and self breast exams, mammography,

genetic screening, ultrasound, and magnetic resonance imaging ***(Kösters and Gøtzsche, 2003).***

Mammography is a common screening method, since it is relatively fast and widely available in developed countries. Mammography is a type of radiography used on the breasts. It is typically used for two purposes: to aid in the diagnosis of a woman who is experiencing symptoms or has been called back for follow-up views (called diagnostic mammography), and for medical screening of apparently healthy women (called screening mammography).

Mammography has some limitations, such as lesions masked by normal fibroglandular tissue, lesions seen on only one view, and subtle architectural distortions. Partly because of these limitations, mammography misses about 20% of invasive breast cancers ***(Dromain et al., 2012).***

Initial mammographic images themselves are not usually enough to determine the existence of adisease with certainty. If a finding or spot seems suspicious, your radiologist may recommend further diagnostic studies.

Contrast agent has been used for many years in both computed tomography and magnetic resonance imaging examinations to explore angiogenesis in breast carcinoma by tracking the uptake and washout of contrast agent in tissues ***(Dromain et al., 2012).***

However, conventional CT results in a high-radiation dose to the breast and chest wall. Breast MRI using gadolinium-based contrast agents is currently considered the most sensitive imaging technique for the detection of breast carcinoma However, breast MRI has a variable specificity and positive predictive value and is more time-consuming and more expensive than mammography ***(Dromain et al., 2012).***

Contrast- enhanced mammography is a new breast imaging technique that has been developed to visualize iodinated contrast agent uptake in the breast. It uses contrast agent to make cancers that are not visible on standard mammograms show up as enhancing areas (***Jochelson et al., 2013***).

It works as breast MRI, which also done with contrast, the cancer takes up more of contrast agent than surrounding tissue causing the cancer to show up as awhite area on the mammogram (***Jochelson et al., 2013***).

Several clinical studies have shown a significantly higher sensitivity for the detection of invasive breast cancers for contrast enhanced mammography than mammography, the ability of CEM to accurately assess the size of the lesion compared to histology and high sensitivity of CEM for the detection of multifocal disease (***Dromain et al., 2011***).

Compared to MRI, CEM has similar sensitivity but better specificity for detection of breast cancer **(*Fallenberg et al., 2014***).

CEM less expensive equipment so it can be performed at less cost.It is also shorter examination, lasting about 5 minutes, versus 30-40 minutes for an MRI (***Mcdonald et al., 2015***).

Aim of the work

To discuss contrast enhanced mammography as new technique that would improve clinical performance of mammography and to highlight its sensitivity and accuracy in the diagnosis of breast cancer.

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Anatomy of the breast

Development of the breast

The epithelial mammary bud appearing at a gestational age of 35 days. by day 37 this become a mammary line extending from the axilla through to the inguinal region **(Fig 1).** ***(Sadler, 2004).***

Usually invagination of the thoracic mammary bud into the mesenchyme occurs by day 49, with involution of the remaining mammary line. Nipple formation begins at 56 day and primitive ducts (mammary sprouts) develop at 84 days with canalization occurring at about the 150th day ***(Williams, 1995).***

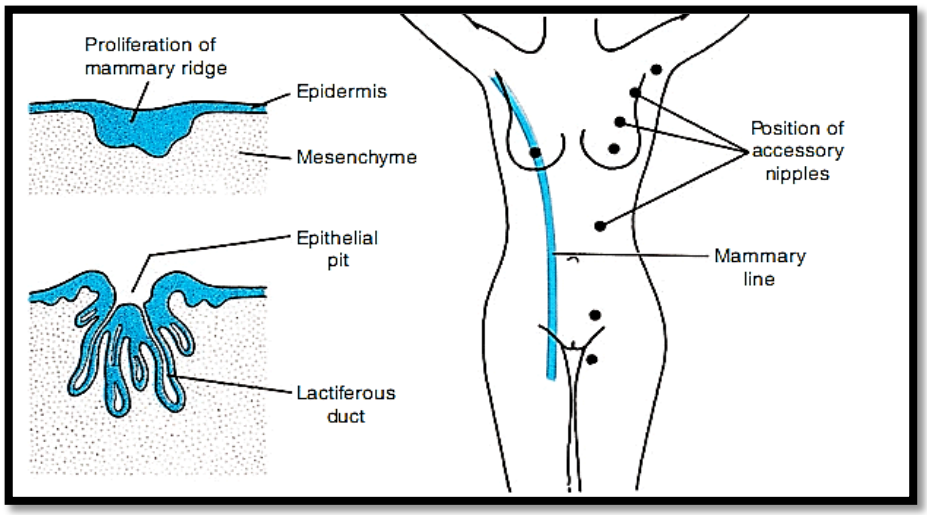

Fig. (1): The position of the mammary line ***(Sadler, 2004)***

Persistence of remnants of the mammary line may give rise to accessory nipples (polythelia). They are found along of the mammary line and are commonly mistaken for