



Role of digital breast tomosynthesis and contrast enhanced mammography in characterization of breast masses

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المقدمة

ان الماموجرام هو أشعة الثدي السينية التي تمكنا الكشف عن الكتل الثدييه قبل ان يشعر بها المريض او ان تسبب اي اعراض .و يبقي الماموجرام الفحص الأكثر شيوعاً للكشف عن وجود سرطان الثدي ، و هو يساعد علي الحد من الوفيات بنسبة ٢٠% .

لاستخدام الماموجرام ،فمن الممكن ان يعطينا الفحص نتائج سلبية بالرغم من وجود كتل في الثدي ، و لقد اثبت ان ٢٠% من أورام الثدي لا تشخص عند وقت المسح الدوري لافات الثدي .

واحدة من العقبات التي تقبانا في تشخيص المرض ، هو ان الكتل الثدييه لها نفس الكثافة مثل الانسجه المحيطة بها ، و لهذا ففي كثير من الأحيان من الصعب رؤية الورم في الاشعه التقليديه . مما أتاح لنا الفرصة لاكتشاف تقنيات جديدة ، مثل التصوير المقطعي باستخدام الاشعة السينية و استخدام الصبغة غير المتأينة مع الماموجرام الرقمي و هذا يساعدنا علي تحسين اكتشاف الكتل الثدييه .

ان التصوير المقطعي باستخدام الاشعة السينية هو طريقة جديدة و مثيره لتحسين الكشف عن الكتل الثدييه .يتم الحصول علي صورهِ للثدي من عدة زوايه مختلفة لتكوين شرائح منفصلة بسماكة ١ مل ، ويتم بعد ذلك استبعاد الأنسجة المتداخلة للحصول علي صورة ثلاثية الأبعاد واضحة للورم.

ان حقن الصبغة وريديا مع الماموجرام الرقمي يمكننا من تصوير الثدي عن طريق أخذ سلسلة من الصور التي تظهر تدفق الصبغة لتعزيز رؤية الأوعية الدموية بالورم للمريض، و رسم خريطه لها .وقد اثبتت الابحاث ان استخدام الصبغة غير المتأينة مع الماموجرام الرقمي قد أظهرت ٨٠% من الأورام التي تم التأكد انها خبيثة النوع، و انه يوجد علاقة وثيقة بين تدفق الصبغة و نوع الورم .

ان حقن الصبغة وريديا مع الماموجرام الرقمي يمكننا من تصوير الثدي عن طريق أخذ سلسلة من الصور التي تظهر تدفق الصبغة لتعزيز رؤية الأوعية الدموية بالورم للمريض.

الهدف من الدراسة

تهدف هذه الدراسة الي توضيح دور التصوير المقطعي باستخدام الاشعة السينية و الأشعة الرقمية للثدي بالصبغة في تصنيف الكتل الثدييه .



دور التصوير المقطعي باستخدام الأشعة السينية للثدي و الأشعة الرقمية للثدي بالصبغة في تصنيف الكتل الثدييه

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في الأشعة التشخيصية

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LIST OF ABBREVIATIONS

ALH: Atypical lobular hyperplasia

ACR: American college of radiology

AJCC:The American Joint Committee of Cancer

BB: Breast Biopsy

BI-RADS : Breast Imaging and Reporting Data Systems

BPBD: Benign proliferative breast disease

BRCA : Breast cancer

BSE: Breast self examination

CC : Cranio caudal

CCDs: Charge coupled devices

CE: contrast enhancement

CEDM: contrast enhanced digital mammography

CR: Computed Radiography

DBT: Digital breast tomosynthesis

DCIS : Ductal carcinoma in situ

DE: Dual energy

DECM: Dual energy contrast mammography

DM: Digital mammography

ERT: estrogen replacement therapy.

ETD: Extra lobular terminal ductule

FDA: Food and drug Administration

FIG: Figure

FNA: Fine needle aspiration

FFD: Full field digital mammography

HER2: Human epidermal growth factor receptor 2

IBT: Inflammatory breast cancer

IDC : Invasive ductal carcinoma

ILC : Invasive (infiltrating) lobular carcinoma

ITD: Intralobular terminal ductule

LCIS : Lobular carcinoma in situ

LT: Left

MIP: Maximum intensity Projection

MLO: Medio lateral oblique

MR: Magnetic resonance

MRI: Magnetic resonance Imaging

NOS: Invasive ducal carcinoma, not otherwise specific

RT: Right

SA: Sclerosing adenosis.

TDLU: terminal duct-lobular unit

TNM : Tumor, Nodes, metastasis

TS: Temporal subtraction

US: Ultrasound

WHO: world Health Organization.

2D: 2 dimensions

3D: 3 dimensions

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INTRODUCTION

A mammogram is a breast X-ray that can detect breast masses before they are large enough to feel or cause symptoms (*Hubbard et al., 2011*), it is the most commonly screening method used for breast masses detection, it helped to reduce mortality of breast cancer patient by 20 percent(*Welsh et al., 2014*).

The limitations of mammography are well known. False – negative results occur when mammograms appear normal even though breast mass is present. Overall, screening mammograms miss up to 20 percent of breast cancers that are present at the time of screening (**National cancer institute, 2010**).

The main problem is that breast masses have the same density as surrounding tissue, and can be obscured by overlapping tissue. With the mass potentially obscured by overlapping tissue in two-dimensional (2-D) conventional mammography, a 3-D procedure, such as tomosynthesis,

may help solve this problem. Also, there is hope that the use of intravascular contrast material with digital mammography will take advantage of the mass vascularity to characterize its type. (*Alakhras et al.,2013*).

Digital Breast Tomosynthesis is a relatively new and exciting modality for characterization . Multiple low dose X-ray images are acquired in an arc and reconstructed to form 3D image thus minimizing the impact of overlying breast tissue and improving the lesion conspicuity. The process is similar to a film tomogram and Computed tomography, then post processing allows reconstruction of any slice needed. The radiation dose is the same as a conventional digital dose. The separate slices are 1mm thick resulting in a high resolution. Overlapping shadows and structures are eliminated. The image is displayed as static slices or a cine loop and a regular 2-D image is obtained at the same time. (*Rafferty et al., 2013*).

Contrast-enhanced mammography is used to obtain more functional information from the neovascularity found in malignant tumors. It involves injecting the contrast agent intravenously while the patient is imaged with a sequence

of digital mammograms that show the flow of the contrast agent over time. (*Dormain et al.,2012*).

The use of contrast medium takes advantage of mapping abnormal blood flow. Early evaluation of the feasibility of the use of contrast medium with digital mammography revealed 80% of pathological proven breast carcinomas were enhanced with excellent correlation between the size of enhancement and the histologic type of tumor. (*Balleyguier et al.,2009*).