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بسم الله الرحمن الرحيم

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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3D Tomosynthesis Versus 2D Mammography in Detection of Different Breast Lesions

Thesis

Submitted for partial fulfilment of M.D. Degree in Radiodiagnosis

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بسم الله الرحمن الرحيم

"قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا
إِلاَّ مَا عَلَّمْتَنَا
إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ"

صدق الله العظيم
سورة البقرة الآية (٣٢)

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Contents

List of Abbreviations

Abb.	Full Term
2DDM	Two-dimensional digital mammography
3DDT	Three Dimensional Digital Tomosynthesis
ACR	American College of Radiology
AUC	Area under curve
BIRADS	Breast imaging reporting and data system
CC	Craniocaudal
DBT	Digital Breast Tomosynthesis
DCIC	Ductal carcinoma in situ
DM	Digital mammography
FFDM	Full-field digital mammography
FN	False negative
FP	False positive
IDC	Invasive ductal carcinoma
ILC	Invasive lobular carcinoma
MGD	Mean glandular dose
MLO	Medio lateral-oblique
NPV	Negative predictive value
PPV	Positive predictive value
TN	True negative
TP	True positive

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3D Tomosynthesis versus 2D Mammography in Detection of Different Breast Lesions

Abstract

Background: Breast cancer is considered the most serious lesion among different breast lesions. Mammography is the corner stone for screening for detection of breast cancer. It has been modified to digital mammography then to tomosynthesis. Tomosynthesis is an emerging technique for diagnosis and screening of breast lesions.

Aim: This study aims at interrogating whether addition of digital breast tomosynthesis (DBT) to digital mammography (DM) helps in better characterization of different breast lesions.

Methods: This is a prospective study carried on 38 female patients according to our inclusion criteria. All patients were evaluated by DM alone and then with addition of DBT and were classified according to age, complain, family history, breast density and characterization of lesion. Breast imaging reporting and data System (BIRADS) scoring was assigned for each case which was correlated with the final diagnosis.

Results: DM identifies 32 lesions while DBT with DM identify 37 lesions. Regarding DM findings alone, 17 lesions are characterized as masses, 5 as asymmetry, 2 as architectural distortion, 7 as microcalcification and 1 as macrocalcification. While with addition of DBT to DM helped in better morphological characterization of 27 lesions are characterized as masses, 1 as asymmetry,1 as architectural distortion,7 as microcalcification and 1 as macrocalcification. So, there is statistically significant with addition of DBT to DM in detection of different breast lesions comparing to DM alone. The Sensitivity, specificity, AUC ,positive and negative predictive values were significantly higher with the addition of DBT to DM (100% ,90.5% , 0. 952, 90 % and 100 %, respectively) than that of DM (77.8% ,80.9% , 0.794, 77.8 % and 80.9%, respectively) for all breast lesions.

Conclusions: DBT is an encouraging imaging modality for better detection and characterization of different breast lesions when incorporating its image information with DM. This leads to early detection of breast cancer, performance improvement of radiologists and saving time by reduction of recall rate.

Keywords: Breast lesions, Digital mammography, Digital Tomosynthesis.

Introduction

In the 1970s, Mammography gained widespread acceptance as a breast screening tool for cancer detection. It was shown to reduce mortality rate. From that time, technological advancements have driven the evolution from analog film mammography to full-field digital mammography (FFDM) and digital breast tomosynthesis (DBT) **(Tirada et al., 2019).**

DBT is a 3D reconstruction technique of mammographic images that gives the possibility to reduce the breast tissue superposition **(Ortenzia et al., 2018).**

The projection images obtained are then reconstructed into thin slices of 1 mm thickness each, which minimizes the effect of overlapping tissue and helps in detection of subtle abnormalities **(Yang et al., 2013).**

The mean radiation dose to the breast for the multiple projections of a single tomosynthesis procedure is equivalent to that received during 2D mammography **(Feng and Sechopoulos, 2012).**