

Role of Ultrasound in Management of Breast Cancer

An essay

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

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List of Abbreviations

AC	: Adjuvant chemotherapy
ACR	: American college of radiology
ACS	: American cancer society
ALND	: Axillary lymph node dissection
AP	: Anteroposterior
BCS	: Breast conservation surgery
BI-RADS	: Breast imaging reporting and data system
BRCA1	: Breast cancer type 1
BRCA2	: Breast cancer type
BSE	: Breast self examination
CA	: Carbohydrate antigen
CBE	: Clinical breast examination
CEA	: Carcinoembryonic antigen
CMF	: Cyclophosphamide methotrexate 5-flourouracil
DCIS	: Ductal Carcinoma in Situ
ER	: Estrogen receptors
ESR	: Erythrocyte sedimentation rate
FNA	: Fine needle aspiration
FNAB	: Fine needle aspiration biopsy
FNAC	: Fine needle aspiration cytology
HER-2	: Human Epidermal Growth factor Receptor 2

List of Abbreviations (Cont.)

HIP	:	Health insurance plan
IBIS	:	International breast cancer intervention study
IOUS	:	Intra-operative Ultrasound
IPC	:	Intraductal papillary carcinoma
IPN	:	Intraductal papillary neoplasm
LCIS	:	Lobular carcinoma in situ
LN	:	Lymph node
LS	:	Lymphoscintigraphy
MRI	:	Magnetic resonance imaging
MRM	:	Modified radical mastectomy
NOS	:	Not other wise specified
NSABP	:	National surgery adjuvant breast project
PET	:	Positron emission tomography
PI	:	Pulsatile index
PR	:	Progesterone receptors
RB	:	Retinoblastoma
RBC	:	Red blood cell
RI	:	Resistive index
SLN	:	Sentinel lymph node
SLNB	:	Sentinel lymph node biopsy
TDLU	:	Terminal ductal lobular unit
TNM	:	Tumor / Lymph Node / Metastasis
US	:	Ultrasound

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Introduction

The breast was one of the first organs examined with sonography. Ultrasonography (US) has become an indispensable tool in breast Imaging. Breast US was first introduced in the 1950 s by using radar techniques adapted from the US (**Dempsey et al., 2004**).

Diagnosis of breast cancer has been widely improved since the development of high-resolution ultrasound equipment. In the past, Ultrasound was only considered useful for the diagnosis of cysts. Meanwhile, it improves the differential diagnosis of benign and malignant lesions, local preoperative staging and guided interventional diagnosis (**Madjar et al., 2010**).

US in breast imaging was primary used to distinguish cystic from solid masses. This was clinically important, as a simple breast cyst is a benign finding that does not require further work-up, however, most solid breast lesions remained intermediate and required biopsy, as US was not adequately specific in differentiating benign from malignant solid breast masses. However, recent advances in US technology have allowed improved characterization of solid masses (**Stavros et al., 1995**).

A land mark study demonstrating that solid breast lesions could be confidently characterized as benign or malignant by using high-resolution grayscale US imaging (**Stavros et al., 1995**).

US is both an adjunct and a complement to mammography (**Berg et al., 2012**).

The use of two-dimensional and 3D intra-operative US may decrease the incidence of positive margins and decrease re-excision rates (**Bouton et al., 2011**).

US guided interventional procedures have been increased in volume in recent years as they are faster and more comfortable (**Gareen et al., 2002**).

Once the diagnosis of a simple cyst is made, it can be aspirated with US guidance. Complete aspiration can be confirmed on US, and excision will be required if there is incomplete aspiration. US can be used for guidance for other diagnostic modalities such as FNA can be done for other fluid collections of the breast, such as lymphoceles, abscesses, seromas and hematomas. FNA of solid masses also can be performed with US-guidance (**Missmer et al., 2004**).

US can be used postoperatively in the clinic for insertion of a breast brachytherapy balloon catheter. US allow visualization of the lumpectomy cavity and measurement of the balloon-to-skin distance (**Tammemagi et al., 2005**).

Future directions such as Intravenous US micro bubbles contrast agents have been used to enhance US diagnosis by means of analysis, enhancement patterns, the rate of uptake and washout, and identification of tumor angiogenesis (**Kiessling et al., 2012**).

Aim of the Work

The aim of this work is to highlight the role of ultrasound in management of breast cancer.