

**“A PROSPECTIVE STUDY OF MODIFIED TRIPLE
ASSESSMENT IN BREAST LUMPS”**

Dissertation submitted to

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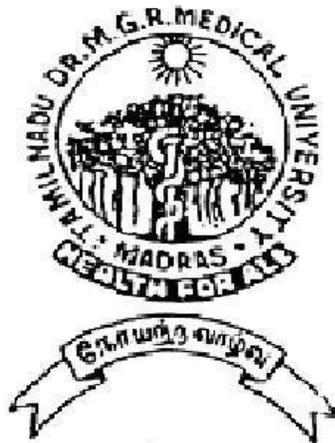
CHENNAI

TAMIL NADU

*With partial fulfillment of the regulations for the award of the
degree of*

BRANCH - I M.S (GENERAL SURGERY)

APRIL 2019



Government Kilpauk Medical College

Chennai

April -2019

DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation thesis “**A PROSPECTIVE STUDY OF MODIFIED TRIPLE ASSESSMENT IN BREAST LUMPS**” is a bonafide and genuine research work carried out by me in the Department of General Surgery, Government Kilpauk Medical and Hospital, Chennai-10 under the guidance of our Chief **Prof. Dr.B.SANTHI M.S.**, Government Royapettah Hospital, Kilpauk Medical College, Chennai.

This dissertation is submitted to **THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI** in partial fulfillment of the University regulations for the award of M.S degree (General Surgery) Branch I, examination to be held in APRIL 2019.

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BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled “**A PROSPECTIVE STUDY OF MODIFIED TRIPLE ASSESSMENT IN BREAST LUMPS**” submitted by **DR .R.NARESH KUMAR** ,to the Tamil Nadu Dr. M.G.R. Medical University Chennai in partial fulfillment of the requirement for the award of **M.S Degree Branch – I (General Surgery)** is a bonafide research work were carried out by her under direct supervision & guidance.

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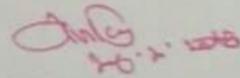
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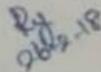
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PLAGIARISM CERTIFICATE

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INTRODUCTION

“BREAST LUMP” is one of the common complaints in women coming to the surgical outpatient department. Even though most of the lumps were benign, all cases need to be evaluated properly to rule out malignancy.

In India, Breast carcinoma is the 2nd most common malignancy in women. Incidence increasing every year which ranges approximately 19-33%. Incidence of cancer breast shows “AGE SHIFT” over the past twenty years in India that is incidence increased from 7 to 15% in the age group of 30-40 years.

Advanced breast cancer stage is associated with high morbidity and mortality. Hence early stage disease should be promptly differentiated from benign disease for proper management at the earliest with proper assessment.

Breast lump assessment should be an ordered one. So, sequential evaluation named “TRIPLE TEST” was formalized. This was introduced with an aim to avoid expensive potentially morbid negative biopsy and also to let the clinician to proceed directly for definitive management without

further investigations. Triple test proved to be a gold standard diagnostic modality in lump breast.

Components of triple test:

1. Clinical examination
2. Imaging
3. FNAC

Clinical assessment should be the initial investigation but it is not very certain to make a clear cut diagnosis. Hence to proceed with next diagnostic test, the Imaging study- Mammogram. In 1950, Robert Egan at the Texas University introduced Mammogram. In 1966 Philip Strax introduced mammogram as a screening procedure.

Mammogram is a low energy X-ray [30kvp] with high m Amp used for breast imaging. Like other x-ray it emits ionizing radiation but of low energy levels. It has high false negative rate that is missed cancer rate of 10% especially in dense breast cases.

In women of reproductive age group breast is dense owing to increased glandular component, where sensitivity of mammogram is very less and hence Ultra sound of breast came into vogue which replaced

mammogram in conventional triple test. Then “MODIFIED TRIPLE TEST” was put into practice with USG replacing Mammogram as an imaging modality in less than 40 years of age group. In recent year’s ultrasound imaging with advanced technology proved to be an effective adjuvant to diagnosis.

Fine needle aspiration cytology:

With invent of FNAC entire outlook in the evaluation and management of breast lump changed, it serves as an effective tool in confirming the diagnosis. FNAC being safe, minimally invasive, painless and technically each procedure that can be carried out for assessing all the patient with palpable breast lumps. In early 1994, Kaufman et al found the sensitivity and specificity of FNAC was 94% and 97% respectively. FNAC still accepted to be effective and safe diagnostic procedure for breast lumps.

This study was done to know the efficacy of individual component and also the overall efficacy of modified triple test in accurately diagnosing a breast lump in a woman with more than 30 years of age.

LITERATURE REVIEW

Review of literature is one of the basic foundation for all Research work. It was in late 1970's in UK the Triple assessment for Breast Lump was first started eventually. Only after this, the morbid procedure of open biopsy that was done in all cases of palpable breast lump was stopped.

In 1987 Hermansen C.*et.al* studied 650 breast tumors patients and applied '*Triple test*' which was a triad of clinical examination, mammography and FNAC in the assessment of palpable breast tumors. He concluded that the diagnostic accuracy of the triple test is comparable to that of final histological examination report studied.

Hardy JR. *et. al.* assessed 143 patients with palpable breast mass with clinical examination, mammography, ultrasound, magnetic resonance imaging (MRI) and FNAC and concluded that the combination of cytology

Lawrence N Bassett *et.al.* assessed the usefulness of mammography and ultrasound in women less than 35 years of age (total of 1016 women) over a period of 8 years of study. This study showed that mammography was not very useful in women less than 35 years of age . On the other hand ultrasound was useful in avoiding unnecessary breast lump biopsies and for

this reason, USG proves to be a reliable investigation in women less than 35 years. But it was not good in detecting non-palpable breast lumps and could therefore miss non-palpable early breast malignancies unfortunately.

In the year 1996, Vetto JJ *et. al.* studied 55 women below the recommended age of screening mammography with '*Modified Triple Test*'(C/E, USG; FNAC/CNB). The study showed a high specificity and negative predictive value of 100% for malignancy. They concluded that use of MTT for diagnosing a palpable breast mass in younger women has high diagnostic accuracy.

A study by R. D Jayakar *et. al.* (2013) evaluated the efficacy of ultrasound instead of mammography in the conventional 'triple test ' for evaluation of young women with palpable breast lumps. They concluded that Breast masses diagnosed as malignant can proceed to definitive therapy.

Hatada T *et. al.* studied 114 lesions retrospectively and compared the results obtained by standard FNAC with that of ultrasound guided FNAC with surgical findings and were found have an accuracy of 65% and 86% respectively. They concluded that USG-guided FNAC is highly useful in the preoperative diagnosis especially in patients with tumor less than 2cm.

Heiken TT *et. al.* done a prospective analysis on 660 breast lesions with ultrasound breast and put forward that suspicious lesions determined by USG had a 75% chance of being malignant; however 5% of benign lesions(fibroadenoma) turned out to be malignancies.

Jill S Montrey study is to assess the potential utility of ultrasound as screening tool for breast cancer in young women of less 35 years of age especially with indeterminate mammography, persistent symptoms and high risk history. This study proved that USG is a good screening modality with high sensitivity.

Martelli *et.al*, (1990) found that FNAC had a sensitivity and specificity of 68% and 97% respectively.

(NICE) National institute for Health and clinical excellence guidelines also recommends Triple Test for assessing the women with breast lump.

Agriga *et. al.* (2002) study results were FNAC had a sensitivity of 99%, positive predictive value of 99% and specificity of 99%

Jin Young Kwak *et. al.* in 2006, studied the application of Ultrasonogram , based on (BIRADS) Breast Imaging Reporting and Data

System in women with palpable breast lump and studied on results of MTT and compared the diagnostic accuracy of USG against palpation guided FNAC, found that USG reports were similar to that of FNAC especially in not missing the malignancy.

Heining *et. al.* study also showed that Ultrasound characterization of breast lesion with BIRADS criteria found to be highly accurate.

Literature review showed that both the “Triple Test” and “Modified Triple Test” were the well accepted method used to diagnose breast lump.

DISCUSSION

ASSESSMENT OF PALPABLE BREAST LUMPS

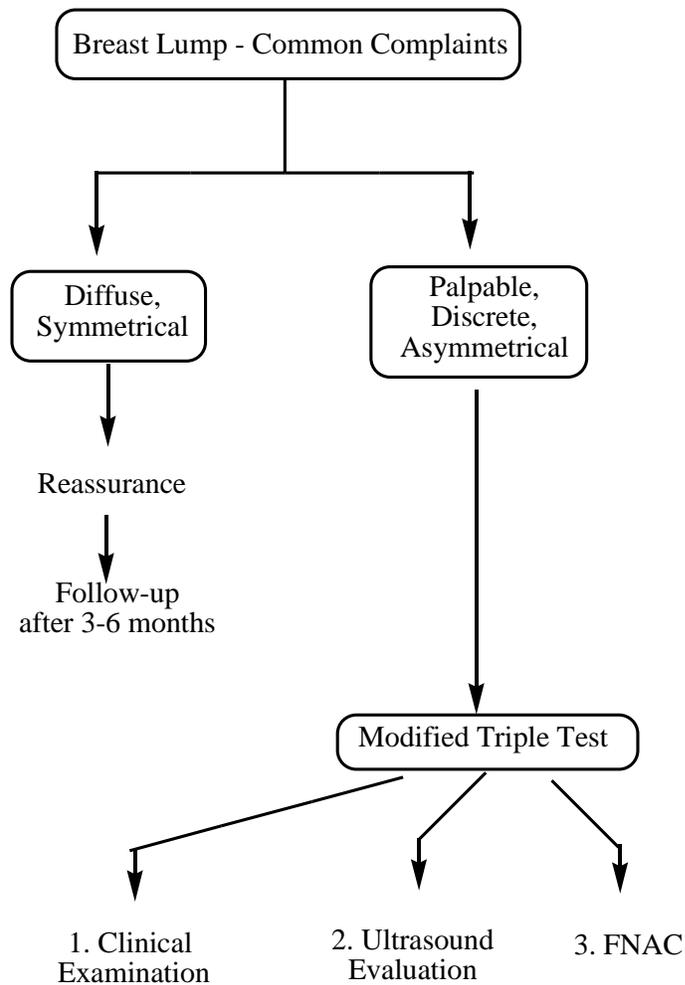
In modern era, with increased public and professional awareness with associated increase in incidence of breast malignancy in women less than 40 years of age, large numbers of female were referred with Breast lumps to higher center for assessment. Women motivated for self breast examination, also attend surgical OPD with breast lump. We believe BREAST AS SYMBOL OF WOMANHOOD and so breast disease will cause extreme anxiety to the patient. Though Benign disease are most common, it is the duty of a surgeon to properly assess the breast lump and to alleviate the anxiety if malignancy ruled out or to reassure with necessary management if malignancy confirmed.

Breast lump needs to be properly assessed before proceeding with definitive management. A dominant breast mass is defined as a solid or cystic lump that persists throughout the menstrual cycle.

Assessment of a breast mass begins with a thorough history and clinical examination. The breast is normally nodular and hence there is a

difficulty in appreciating small nodules amidst the normal breast tissue.

Clinical examination alone is less promising in differentiating the benign breast lump from early breast malignancy, necessitating the need for good diagnostic modality where imaging of the breast tissue was tried.



Schematic Diagram of Diagnostic approach of Breast Lump

The first recorded case of breast imaging was done by SALOMON, a German pathologist who in 1913 reported the use of X-ray to visualize

breast structure in mastectomy specimen. He demonstrated the irregular mass density and micro calcification which are still in use as the most important indicator to identify possible breast malignancy. In 1950, Robert Egan at the University of Texas introduced mammogram. In 1966 Philip Strax demonstrated it as screening tool. Even today mammography proves to be a good diagnostic tool in detecting the occult, non-palpable lesion. In Copenhagen (capital of Denmark), mammography service screening was introduced on the basis of trial results in the year 1991. Breast carcinoma mortality was greatly reduced after introduction of mammogram screening.

Limitation of mammogram:

- ❖ Risk of exposure to Ionizing Radiation, only low energy of 30 kvp but still can't be used in pregnant women and lactating mothers.
- ❖ Less sensitive in women less than 40 years of age (dense breast tissue)
- ❖ Not routinely available
- ❖ High rate of false negative

Ultrasound role was established in the assessment of breast lump because of limitations of Mammogram. Ultrasound sound waves with no risk of Radiation exposure can be safely used to image breast, high frequency probes are used. Sound waves from the probe passes through the

body, the transducers collect the sound waves that bounce back and the computer then uses these waves to create an image. The diagnostic role of ultrasonogram was first documented in 1950s; but it was only with the development of “grey scaling” by Korsakoff and associates, ultrasound was widely accepted as an imaging tool, in characterizing the breast lesion.

In the year 1998 Department of Health and Human Services provided funds through the office on women’s Health to support research work on ultrasound. American College of Radiology further supported the research work, thus leading to characterization of the breast lesion with USG. In early 2003 it resulted in the publication of the first BIRADS. Recently, the technical advancement in ultrasonography has expanded its potential utility in the evaluation of breast lesions.

The best reliable diagnostic tool to confirm the nature of a breast lesion is tissue diagnosis. FNAC proved to be the best one with minimum invasiveness. It was in 1912, Ward used fine needle aspiration (FNAC) cytology to examine lymph nodes for lymphoma. In New York, Martin and Ellis in 1926, attempted the procedure on patients with breast lumps. Surgeons should draw the specimen from representative areas with proper technique. Only an experienced pathologist with great skill can accurately interpret cytology.

CLINICAL EXAMINATION

Clinical Assessment begins with proper history taking then with examination of breast. A palpable breast mass may be identified when it becomes sufficiently large to be differentiated from surrounding breast tissue – usually detected by the patient or the physician. Breast is a modified sweat gland, composed of acini which make up lobules, aggregates of which forms the lobes, under hormonal influence there is a constant cyclical changes. Breast is a combination of glandular tissue, fibrous and fat tissue which normally gives some sort of nodular feel on palpation, hence careful palpation must be carried out to correctly identify the breast lump.

❖ HISTORY

- Age
- Resident
- Social status

❖ SPECIFIC COMPLAINTS:

- Breast lump
- Mastalgia
- Discharge from Nipple

- Nipple retraction

- Loss of weight

- Loss of appetite

❖ MENSTRUAL HISTORY:

- Relation of lump to menstrual cycle in concern with increase in size, presence of pain during periods goes in favour of fibroadenosis.

- Age of menarche

- Pattern of cycle

❖ OBSTETRIC HISTORY:

- Infertility treatment if any

- Age at first child birth

- Number of children

❖ LACTATIONAL HISTORY

❖ PAST HISTORY:

- Radiation exposure

- Similar illness

- Previous Biopsy

- History of Hormone Replacement Therapy

❖ FAMILY HISTORY

❖ History of Breast cancer in first degree relative

❖ History of ovarian cancer in the family

PHYSICAL EXAMINATION

- Informed consent must be obtained.
- Adequate privacy maintained so that the patient can be relaxed.
- Patient must be stripped to the waist to expose completely both the breast
- Examination room should be well lighted so that subtle skin changes can be well evident.

Examination can be performed in various positions as discussed below

a. Sitting position:

level of nipple

lump

palpation of axilla

b. Semi-recumbent position

c. Recumbent position:

breast flattens out so lump can be better can be palpated

against the chest wall

d. Bending forward position

Inspection:

a. Arms by the side of the body

- b. Arms raised straight above the head- reveals the lower surface of the breast and axilla can also be examined
- c. With hands on her hips pressing and relaxing
- d. With bending forwards

Examination Of Both Breasts:

- a. Position
- b. Size , shape and Symmetry
- c. Obvious mass seen

Skin over the breast:

Colour and texture, engorged Veins, dimple / retraction or puckering, Peau d'orange, nodules, puckering, ulceration and fungation.

Nipple:

- a. Presence: both are present , symmetrical, retracted or destroyed
- b. Position
- c. Number
- d. Size and shape
- e. Surface

f. Discharge

Areola:

- a. colour
- b. size
- c. surface and texture

Arm and thorax:

- a. Multiple nodules
- b. Brawny oedema

Axilla and supraclavicular fossa:

Enlarged lymph nodes

Palpation:



Fig. 1 Method of Breast Palpation

a. Position:

Initially in sitting, semi-recumbent and later on in recumbent position

b. Method:

Palmar surface of the fingers with flat hands

All four quadrants palpated systematically

First superficial then deep palpation

Palpate behind the nipple and also feel the axillary tail

Examine normal breast first.

Texture of normal breast

Texture varies, may be soft and smooth, whereas in some it is firm and lobulated with nodularity

Examination of lump:

- a. local temperature and tenderness
- b. situation
- c. number

- d. size and shape
- e. surface
- f. margin
- g. consistency
- h. fixity to breast tissue, skin , underlying muscles chestwall
- i. palpation of nipple

Examination of lymph nodes:

1. Palpation of axillary group of lymph nodes

Five groups:

- a. Pectoral
- b. Brachial
- c. Subscapular
- d. Central
- e. Apical

2. Palpation of cervical lymph nodes

Supraclavicular nodes

Examination of Other System

- a. Lungs
- b. Liver

- c. Skeletal system
- d. Per vaginal
- e. Per rectal

Above mentioned are the possible sites of Metastasis which need to be thoroughly examined

On examination:

a. BENIGN:

Soft to firm in Consistency, have discrete borders and well defined margins, freely mobile

b. SUSPICIOUS:

(dilemma between benign and malignant)

Variably consistency not freely mobile

c. MALIGNANT:

Hard, immobile lump with fixity to skin or underlying

Structures, irregular borders with skin dimpling.

With good physical examination diagnosis of most of the benign and malignant lesion can be made.

Although in some cases, Clinical finding of benign disease may sometime confuse with or overlap the finding of early breast malignancy. Next step in evaluation of breast lump, imaging- ultrasound came into role. Imaging study also localizes ipsilateral multifocal or multicentric lesion and screen the contralateral breast. A negative interpretation imaging study, should never over rule a strongly suspicious finding on physical examination or vice versa. Rosner et al reported that physical examination can only identify 58% of breast lump correctly. Boyd et al study shows physical examination alone is not adequate, subsequent need for biopsy is mandatory for proper diagnosis.

At the end of clinical examination, those who are found have benign lesions are labeled with score of 1. Score 2 for suspicious lesion and score 3 for malignancies.

ULTRASOUND OF BREAST:



Fig 2. USG Machine with High Frequency Probe

Recent technological advancement improved the potential utility and expanded the diagnostic role.

- ❖ Linear probe with high frequency range between 7-12MHz provides high resolution.
- ❖ Harmonic imaging leads to improved resolution and reduced reverberation and near field artifacts.
- ❖ Extended or panoramic view provides a better image.
- ❖ 3D image seems to be more promising.

- ❖ Real time compound scanning results in increased tissue contrast resolution.
- ❖ Colour Doppler provides additional information about vascularity. Blood flow demonstrated by movement of RBC's, which in turn produces frequency shift.

In olden days, an Ultrasound was generally used to differentiate solid from cystic lesions. But now a day's ultrasound characterizes the lesion precisely as benign or malignant with better definition about internal echotexture margin, shape, dimension etc. Ultrasound reporting is highly operator dependent. Radiologist should be skilled with good experience in characterizing the lesion. Ultrasound breast was done before needle biopsy to avoid possible artifacts following biopsy procedure:

Reports were categorized by the radiologist according to the standard Breast Imaging Reporting and Data System (BIRADS).

- The BIRADS1-3 as is benign
- BIRADS-4 is indeterminate
- BIRADS-5 highly suspicious
- BIRADS-6 frankly malignant

Graf *et. al.* study found that BIRADS 1-3 lesions can be safely managed with short term follow up at 6 month to 2 years interval. Finally, score 1 is for benign. Score 2 suspicious and score 3 for malignant lesion.

TECHNIQUE:

❖ Position:

Supine / oblique position with arms above the head, pillow placed under the back to elevate the side of the breast to be examined, this flattens the breast evenly over the chest wall to facilitate examination.

❖ Utmost privacy maintained to make the patient relax.

❖ Both breast and axilla exposed.

❖ Evaluate whether clinically abnormal area(Region Of Interest) corresponding to the finding on ultrasound Lesion should be dealt in detail in concern to shape , size, margin, architextural pattern, entire periphery of the lesion examined in all planes in transverse, sagittal, radial or antiradial planes.

❖ Probe compressed over the breast tissue so as to spread the breast tissue apart which helps to avoid artificial artifacts. Systematic evaluation of breast tissue to be carried out, examining the entire

breast tissue from periphery to centre covering the Nipple, areolar region.

Retroareolar region can be cautiously evaluated by angling the transducer in multiple planes to avoid shadow artifact caused by the nipple.

Golden rules in ultrasound imaging:

1. Never make an interpretation on a single image, always superimpose the multiple ultrasonic images mentally to formulate a 3 dimensional picture of the tissues and ensure that the displayed feature is consistent with the 3D image.
2. Always rule out the artifacts, don't interpret the image as it was displayed and vice-versa is also true.

Indications for Breast Ultrasound:

Standardized indications for the Breast Ultrasound are furnished as below:

1. To confirm the existence of the pathological lesion and its location
2. To differentiate cystic and solid lesion and better characterisation of lesion

3. Evaluation of a suspicious mammographic abnormality
4. As a imaging modality in pregnant or lactating patient
5. For pathological examination of suspicious lesions- USG guided FNA/CNB can be carried out
6. Pre operative localization of lesions with needle placements, documentation of lesion removal by USG of biopsy specimen.
7. Following augmentation mammoplasty USG can be used to detect extra capsular rupture /contour abnormalities of the prosthesis
8. Follow up of probably benign lesions that have not been biopsied or excised e.g fibrocystic disease or fibroadenoma
9. Screening for breast carcinoma especially in young women less than 40 years of age.

NORMAL BREAST PARENCHYMA PATTERN

In the young non lactating women, the parenchyma is primarily composed of fibro glandular tissue with little or no subcutaneous fat with increasing age and parity more and more fat gets deposited both subcutaneous and retromammary layers. For better reporting knowledge about normal variations in breast architecture is essential. On ultrasound, breast is seen as multilayer structure, skin and fibro-glandular plate being relatively echogenic, while subcutaneous and retromammary fat layers are poorly echogenic.

Skin:

Skin is a echogenic layer with a hypoechoic central line and normal skin thickness is around 3mm. focal layer of skin thickening is difficult to recognize and hence always better to know with normal area.

Nipple and areola:

Nipple being imaged by compression with transducer so as to overcome shadowing artifact produced by air trapping of protruded or inverted nipple. Lactiferous ducts can be visualized, any lesions like duct papilloma, duct dilatation, debris etc can be imaged.

Subcutaneous tissue:

Subcutaneous tissue is a hypoechoic layer between skin and breast parenchyma. Cooper's ligaments are seen as curvilinear lines between breast tissues and superficial fascial layers. Focal increased architecture suggestive of inflammatory lesions, edema fat necrosis malignancy or old scar. Pathological lesions specific to this plane are sebaceous cyst, epidermoid inclusion cyst, rarely smooth muscle and fibrous tissue tumor.

Breast parenchyma:

In young patient breast tissue is denser. Parenchyma has lobular, ductal and fibroglandular tissue of varying proportions in relation to age parity. Fibroglandular component are echogenic and ductal component imaged as tubular structure with sinuses close to areola.

Retromammary area:

This is the area between fascia pectoralis breast parenchyma imaged as hypoechoic fat plane.

Lymph nodes:

Internal mammary and axillary nodes maybe enlarged. Lymph nodes imaged as round or oval nodules with eccentric hypoechoic hilum and

surrounding rim of tissue with less echogenicity. Benign nodes are well circumscribed, diffuse enlargement and maintain normal morphology whereas malignant nodes appear as lobulated hypoechoic nodules with distorted morphology.

Blood vessels:

Colour Doppler is highly useful in characterizing the vascularity

CHARACTERISATION OF LESIONS

1. The lesion is labeled on a clock wise manner
2. Architectural pattern should be mentioned
3. The greatest diameter (width) and height (AP diameter) are measured using this obtain a height/width ratio.

Diagnostic accuracy of USG Breast

USG can detect solid lesions of size as small as 1cm and can pick up cystic lesions of 3-5mm

Breast Lump:

1. Cystic
2. Solid

Breast Cyst:

Fluid accumulates due to obstruction of extralobular terminal ducts either due to fibrosis or intraductal epithelial proliferation. The Breast cysts are broadly classified as a) Simple and b) Complex

Diagnostic criteria of simple cyst:

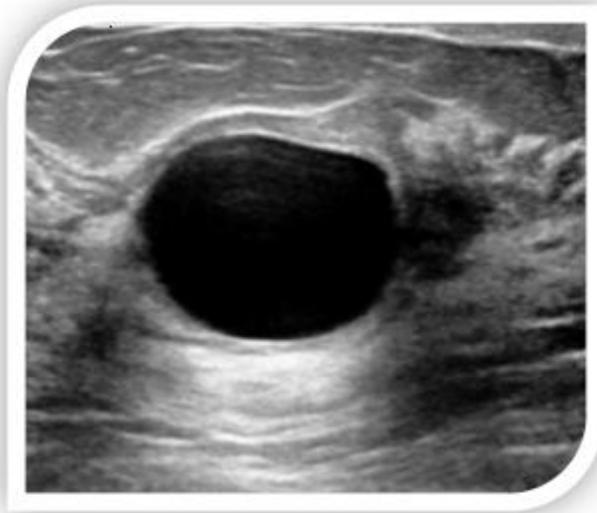


Fig 3. Simple Breast Cyst

- ❖ Anechoic round or oval shape
- ❖ Well circumscribed and defined borders
- ❖ Posterior acoustic enhancement
- ❖ No alteration of surrounding parenchyma

If all this criteria are met USG diagnostic accuracy is nearly 100%.

Complex Breast Cyst:

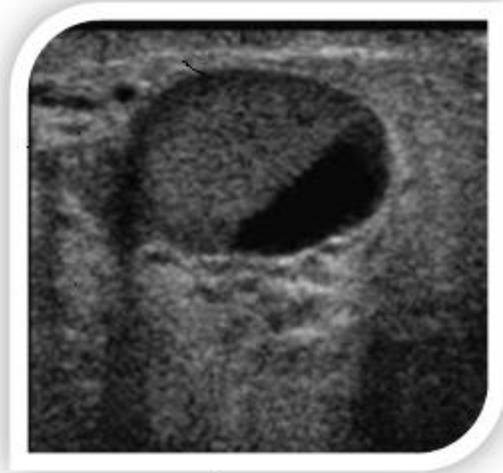


Fig 4. Complex Breast Cyst

Cyst may have internal echoes in conditions like presence of cholesterol or calcium, haemorrhage, debris due to infection. The first step in USG is to differentiate the breast mass as solid or cystic. Presence of internal echoes in cystic lesions makes differentiation difficult.

Internal echoes or debris are seen, caused by floating cholesterol, crystals, pus, blood or milk of calcium crystals. This type has both anechoic (cystic) and echogenic (solid) component. Various causes being has demonstrated.

Abscess hematoma, fat necrosis are classified under complex cystic lesions. Fibrocystic disease is the commonest benign cystic lesions.

Intraductal or intracystic papilloma without atypia.

Atypical lesions:

- Intracystic papilloma with atypia
- Atypical lobular or ductal hyperplasia

Malignant cystic lesions includes:

- Ductal carcinoma in situ
- Infiltrating ductal or lobular carcinoma

According to Berg et. al. only 12% of complicated cysts with malignancy rate of 0.42%. Simple cystic lesions in young women can be safely followed USG alone with follow up interval 6months. Complex cystic lesion need to be evaluated with USG guided FNAC and managed according to the HPE report.

Chronic abscess of the breast:

- Irregular outline
- Anechoic lesions or low level internal echoes
- Posterior enhancement

Fibrocystic disease:

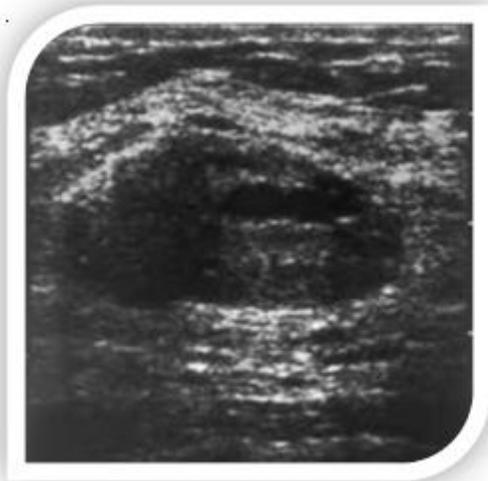


Fig 5. Fibrocystic Disease

Variable appearance depends upon extent of morphological changes, focal areas of thickening with or without increased echogenicity.

Duct ectasia:

Single tubular structure filled with fluid or sometimes may show multiple structures as well

Fibroadenoma:

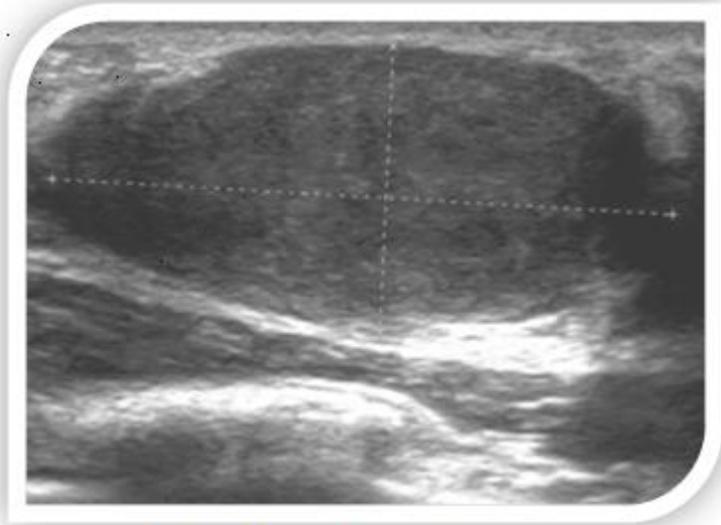


Fig 6. Fibroadenoma

- ❖ Oestrogen induced tumor occurs in adolescent is most common benign tumor.
- ❖ Well defined capsulated lesion
- ❖ Hypoechoic , homogenous
- ❖ Transverse diameter more than anteroposterior diameter.
- ❖ In degenerating fibroadenoma coarse calcification produces shadowing effect.
- ❖ Rarely mass may appear complex hypoechoic or isoechoic. similar finding seen in medullary, mucinous or papillary carcinoma

Cytosarcoma phyllodes:

Mass may involve the whole of the breast, inhomogenous structure, variable cystic areas

Lipoma:

- ❖ Tumors on compression with transducer deform the mass.
- ❖ Thin capsule with reticular pattern
- ❖ A fat globule produces internal echoes



Fig 7. Lipoma

Traumatic Fat Necrosis:

Hyperechoic nodule with central area of translucency

SOLID MASSES

1995 stavros put forward USG criteria to characterize solid breast lesion

Ultra Sound Images Interpretation:

❖ Benign lesion score-1;

- Smooth well circumscribed
- Round to oval or ellipsoidal shape
- Homogenous Hyper or hypoechogenic lesion
- Thin echogenic pseudo capsule
- Anteroposterior diameter more than or equal to 1
- Gentle tri or bilobulation
- No disruption of surrounding architecture
- Low vasculature

❖ SUSPICIOUS score 2:

- Isoechoic or mildly hypoechoic lump

❖ MALIGNANT Score 3:

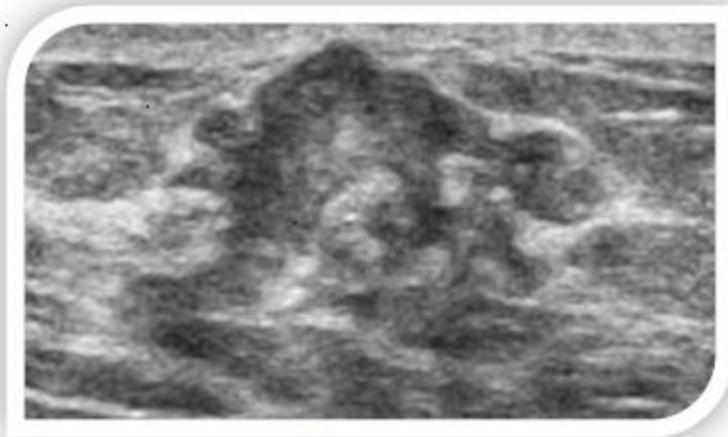


Fig 8. Ductal Carcinoma

- Poorly defined irregular lump
- Mixed or markedly hypoechoogenicity
- Altered echogenicity
- Nodular lesion with spiculation
- Multilobulated ,more than 3 lobulations
- Height/width ratio more than 1
- Angular margin
- Punctuate or microcalcification
- Distorsion of surrounding breast architecture
- Posterior acoustic shadowing
- Vessels are tortuous and irregular
- Lesions are non compressable

- Diffuse edema changes resulting in poor differentiation of fat
parenchyma interface and loss of normal orientation of tissue
phase
- Duct extension
- Branching pattern or microlobulation
- Asymmetry and architectural distortion

BENEFITS OF ULTRASOUND BREAST

1. No risk of radiation and its inherent consequences
2. Safely used in pregnancy and lactating mothers
3. Better characterization of the lesion -as size, shape, margin,
4. echogenicity and relation to surrounding tissues as against a less specific mammographic report of a 'density'
5. USG guided biopsies are more accurate than stereotactic biopsies as the needle can be visualized in real time throughout the entire procedure. One can be very sure that the biopsy was taken from the representative area
6. Technically easy, less time consuming and more accurate when compared to Mammography. Hence USG is the modality of choice for guidance
7. A post surgical change produces confusing findings and is non-informative on mammography, where USG can be used with certainty.
8. Palpable lumps following extracapsular rupture of prosthesis may be impossible to image by mammography in such cases USG are highly helpful

9. Long term follow-up of benign nodules can be done without any risk of radiation exposure
10. Widely available, less expensive
11. Additional access to axilla to access the lymph node status

Limitations of Breast Ultrasound:

- ❖ USG breast not sensitive in detecting non palpable breast malignancy with high false negative rate of 23%.
- ❖ Not good in picking up of solid lesions less than 1cm.
- ❖ Postoperative breast changes interpretations is not good with ultrasound imaging, hence it cannot be routinely used for followup

MRI BREAST

- ❖ MRI Breast is not routinely indicated except in special conditions like high risk group with lifetime risk of 15-20% chance of developing breast cancer.
- ❖ To follow up those underwent breast conservative surgery and to differentiate the scar tissue from recurrence

Limitations of MRI Breast:

- Highly expensive
- More false positive rates

FINE NEEDLE ASPIRATION CYTOLOGY

- ❖ In olden days, open biopsy was done in all cases of breast lump for definitive diagnosis. It was with invent of FNAC the morbidity related with open biopsy was avoided.
- ❖ In the year 1966 Bamforth defined cytology of the obtained specimen
- ❖ Accurate cytological reporting can be done only by Skillful and experienced pathologist.

Materials Required:

- a. Fine needle of size 22/23G
- b. Syringe-10/20ml
- c. Antiseptic solution-spirit
- d. Cotton
- e. 76x26mm sized glass slides
- f. Fixatives – absolute alcohol

Procedure (OPD procedure):



Fig 9 (a). FNAC Technique



Fig 9 b) Slide Preparation

- Usually no anesthesia required
- Skin over the breast lump cleaned with spirit cotton swab
- Lump is stabilized between index and middle finger of non dominant hand
- Needle is inserted into the breast lump
- Piston of the needle was retracted to create a negative suction.

Needle moved forth and back inside the mass with maximum of six aspirations with rapid excursion

Maintaining the negative suction, needle withdrawn from the mass
Material expelled into the labeled clean glass slide, smeared and fixed by
air drying.

Prepared slides delivered to the pathology department with request
form containing patient particulars and clinical diagnosis.

If aspirant found to be fluid in case of breast cyst can also smeared and
remaining content expressed in universal container and sent for cytological
examination.

Adequate FNAC:

Adequacy depends on multiple factors:

1. Nature of lesions
2. Operator experience
3. Patient's cooperation

National cancer institute NCI definition of adequacy was one that
leads to resolution of problem presented by the lesion in a particular breast

Fixatives:

1. 95% ethyl alcohol
2. 95% ethyl alcohol with 3% glacial acetic acid. this ratio aids nucleoprotein fixing property

Staining Of Prepared Slides:

1. Hematoxylin and Eosin stain
2. Papanicolaou stain- this method is highly helpful in studying the nuclear morphology in demonstration of clear translucent cytoplasm.
3. Modified Giemsa staining

FNAC results were reported using 5 tier system:

- C₁ – inadequate
- C₂ – Benign
- C₃- suspicious probably benign
- C₄- suspicious of malignancy
- C₅- malignant

Where C₁ lesion repeat FNAC/CNB

C₂/C₃- followup necessary

C₄ and C₅ lesion – requires excision

Advantages of FNAC:

1. OPD procedure
2. Minimally invasive
3. Fast and easy approach
4. Less painful with very minimal complications
5. Inexpensive
6. Does not require anaesthesia
7. Remote chance of tumor seedling

Limitations:

1. Difficult differentiation of benign and malignant lesions occurs when the specimen is inadequate. As for an example, in conditions likely atypical hyperplasia, *in situ* lesions or low grade malignancy.
2. Inadequate specimen

NORMAL BREAST

1. Composed of epithelial and stromal component.
2. Epithelial cells- columnar , cuboidal cells forming the inner most layer and myoepithilium forming the outer most layer on the basement membrane
3. Basement membrane- surrounds the ducts, ductules,acini. Contains type IV collagen and laminin
4. Stroma-can be interlobular or intralobular stroma which may appear myxoid and no elastic fibres
5. Ducts pseudostratified along the main lactiferous and stratified as the approach the nipple

BENIGN FNAC

It is accounts for 24-75% of cases.

Fibrocystic Disease:

- ❖ Present as spectrum of histological features, cystic changes represent a common finding may rarely present with calcification.
- ❖ Feature of apocrine cells lining cyst cavity with eosinic cytoplasm, round nuclei and prominent nucleoli suggestive of non proliferative type of fibrocystic change.
- ❖ Significant epithelial proliferative component sheets and type clusters of cells are usually prominent. Presence of atypia in these cellular clusters needs further evaluation. Cytological features of intraductal papilloma rarely mimics proliferative fibrocystic changes but clinically have nipple discharge and palpable subareolar mass.
- ❖ Ducts pseudostratified along the main lactiferous and stratified as the approach the nipple.

Fibroadenoma:

- ❖ Most common benign solid tumor
- ❖ Nodular and encapsulated

- ❖ Epithelial proliferation appears in single terminal duct surrounded by stroma
- ❖ Two main types- intracanalicular and pericanalicular
- ❖ Intracanalicular- stromal proliferation predominates and compresses the duct which are reduced to slits
- ❖ Pericanalicular- fibrous stroma proliferates around ductal spaces so that they remain oval or round on cross section

General pathological features of malignancy:

- ❖ Altered nuclear cytoplasmic ratio
- ❖ Hyperchromasia and aberrant chromatin pattern
- ❖ Nuclear atypia
- ❖ Prominent nucleoli
- ❖ Abnormal mitotic figures
- ❖ Degenerative or necrotic cells

Ductal Invasive Carcinoma:

- ❖ Malignant epithelial tumor
- ❖ Resulted from proliferation of ductal epithelium of breast

- ❖ Atypical tumor cells form ribbons ,tubules, nests which penetrates the basement membrane
- ❖ Tumor cells induce desmoplastic reaction in stroma.

Lobular Carcinoma:

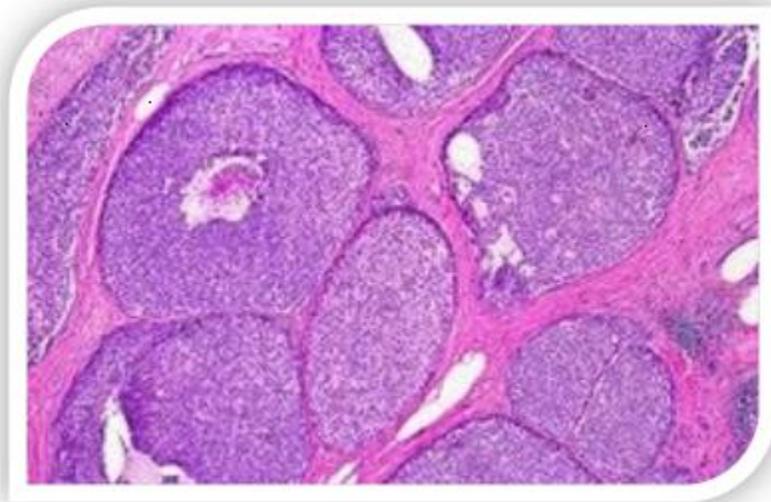


Fig 10. Lobular Carcinoma

- ❖ Cells grow in single file or targetoid pattern of non cohesive cells encircling ducts
- ❖ Tumor cells are usually small, uniform round with minimal pleomorphism
- ❖ Variable dense fibrous stroma, lymphoid infiltrate
- ❖ No necrosis seen

Core needle biopsy:

- ❖ Usually under local anaesthesia
- ❖ Freehand core needle biopsy:
- ❖ no imaging technique required
- ❖ Done in superficially situated lump felt through the skin

Image guided biopsy:

- ❖ Young women with dense breast
- ❖ For deep seated lesion

Advantages of CNB:

- Adequate tissue available for examination
- Better cytological reporting
- Extensive information
- Receptor status and genetic analysis

Disadvantages of CNB:

- Risk of cancer seedling high when compared to FNAC

After FNAC results score 1 for benign lesions, score 2 for suspicious
and score 3 for malignant disease

AIM OF THE STUDY

To study the diagnostic accuracy of modified triple test.

Components of Modified Triple Test

- Clinical examination
- Imaging study- ultrasound
- Tissue diagnosis- FNAC/CNB

Scope of this study:

1. To assess the individual component diagnostic accuracy of MTT
2. To assess overall diagnostic accuracy of MTT
3. To explore the results against HPE report of Incisional/

Excisional biopsy

MATERIALS AND METHODOLOGY

Patients attending Department of General Surgery OPD with a palpable breast lump was subjected to the study

Place of study:

Department of General Surgery, Government Royapettah Hospital, Kilpauk medical college, Chennai-14.

Inclusion criteria:

- ❖ Female patients with palpable breast lump
- ❖ Age group of more than 15 years

Exclusion criteria:

- ❖ Male patients
- ❖ Female patients with clinically evident advanced stage breast disease

As per inclusion and exclusion criteria study people were selected. Total numbers of 50 patients were included in the study.

Duration of Study:

March 2018 to August 2018

- ❖ Prospective cross sectional study was undertaken
- ❖ With necessary study materials as already discussed, all 50 patients were subjected to MTT.

METHODOLOGY:

- ❖ Initially, the complete clinical examination (performed) after getting informed consent
- ❖ Ultrasound Imaging of both breast and axilla, imaging study done before any invasive procedure to avoid possible architectural distortion
- ❖ Finally, the tissue diagnosis with FNAC/CNB based on 5 tier system of FNAC reports.

All patients at the end of MTT categorized as Benign, Suspicious and Malignant with each component of MTT. Those who are diagnosed as clear cut benign tumor(score<4) on three tests were subjected to incisional biopsy and for others with suspicious or malignant lesion(score 5 and 6) were to proceed with excisional biopsy. Finally, all the individual component and combined results of Modified Triple Test, explored against the HPE report of incisional / excisional biopsy.

CALCULATION OF SAMPLE SIZE

$$\text{Sample size } n = 4pq/d^2$$

Where:

P = Proportion of sensitivity of clinical examination obtained from previous study results 80%

$$q = 100 - P$$

d - Absolute precision

95% confidence interval and 5% alpha error

80% power

$$n = 4 \times 80 \times 20 / 10 \times 10$$

$$n = 64$$

Calculated sample size is 64

Based on feasibility, patient satisfying the inclusion and exclusion criteria during the study, sample size of 50 was arrived.

DATA ANALYSIS

In this section, the data analysis encompassed the detailed information of patients attending surgical OPD with the breast lump, above 15 years of age. The total of 50 patients were selected as per the criteria as discussed earlier. Each patient in concern with various data and their study results with respect to Modified Triple Test were analyses in detailed.

Age distribution:

In this study population, based on the age group, the 15 years patients as youngest and 64 years is being the oldest. Most commonly affected agegroup being 30-39 years.

| S. No. | Age Range | Total No. of Patients |
|--------|----------------|-----------------------|
| 1 | 15 to 30 years | 02 |
| 2 | 30to 39 years | 19 |
| 3 | 40 to 49 years | 14 |
| 4 | 50 to 59 Years | 13 |
| 5 | 60 and above | 02 |

Table 1. Comparison of Age Distribution of Patients and Breast Lump

The **Table 1** shows that breast lump is most common among the group between 30 and 39 years old patient. In literature, it was documented that the breast cancer incidence shown age shifts over past two decades in India. i.e., incidence increased from 7 to 16% between the age group of 30 and 40 years.

Parity:

| Parity | No. of Patients (% age) | | |
|--------------|-------------------------|-----------|----------|
| | Benign | Malignant | Total |
| Nulli parous | 4 (44.44) | 5 (55.55) | 9 (100) |
| Multiparous | 35 (85.37) | 6(14.63) | 41 (100) |
| Total | 39 (78) | 11 (22) | 50 (100) |

Table 2. Comparison between Parity and %age of Benign and Malignant Breast Disease.

The parity study is shown in **Table 2**. Parity study compared the occurrence of benign and malignancy disease among nulliparous and multiparous women results were reported as % age and total numbers of

patients. From this table, among 10 nulliparous women 6 were found to be breast carcinoma. The calculated P - value for parity study is 0.017 and it is shown that malignancy is common among nulliparous.

Menstrual age:

The menstrual status of women was studied under the categorist of premenopausal, perimenopausal and postmenopausal and their results were shown in **Table 3**. The Table 3 exemplified benign tumor is most common in the entire three categorists. However, the comparison of menstrual status of women shows that premenopausal women prevailing benign tumor is common, whereas in the case of perimenopausal and postmenopausal women being malignant tumor is common one. For the menstrual status, the calculated p-value is 0.044 is significant.

| Menstrual Status | Total No. of patients (%age) | | |
|------------------|------------------------------|-----------|----------|
| | Benign | Malignant | Total |
| Premenopausal | 24 (85.71) | 4 (14.28) | 28 (100) |
| Perimenopausal | 10 (7.43) | 4 (28.57) | 14 (100) |
| Postmenopausal | 4 (50) | 4 (50) | 8 (100) |

Table 3. Comparison between Menstrual Status with Benign and Malignant Breast Disease

In the study population, the breast tumor is common at left side account for about overall 54% age. The bilateral tumors are least common shown in **Table 4.**

| Tumor sites | % age of patients |
|-------------|-------------------|
| Right Side | 44 |
| Left Side | 54 |
| Bilateral | 02 |

Table 4. Location of Tumor and percentage

Location of tumor:

During the population study, the location of most prevailing tumor was also examined. Based on the results, most of the patient's tumor were observed at U/O and least patient at L/I. This fact is due to estrogen receptors more prevailing at U/O quadrant which is reported as 63 %. In this comparison, L/O quadrant plays a median role between L/I and U/O quadrants is given in **Table 5.**

| Quadrant | %age of Patients |
|--------------------|------------------|
| Upper Outer (U/O) | 63 |
| Upper Inner (U/ I) | 15 |
| Lower Outer (L/O) | 09 |
| Lower Inner (L/I) | 04 |
| Central (C) | 09 |

Table 5. Distribution of Breast Tumor with Quadrant % age

Histopathological Report:

Fibroadenoma is the most common benign tumor. In our study also similar results were obtained. Next common benign tumor among the study group is fibrocystic disease of breast. One of our study patient have ductal carcinoma *in situ* of the malignant cases, ductal carcinoma is the commonest which is comparable to the previous study results mentioned in literature.

| Cytology | No. of Patients |
|------------------------------|-----------------|
| Fibro adenoma | 25 |
| Fibro cystic disease | 10 |
| Cystosarcoma phylloides | 02 |
| Proliferative without atypia | 02 |
| Ductal carcinoma in situ | 01 |
| Ductal carcinoma | 06 |
| Lobular Carcinoma | 03 |
| Mucoid Carcinoma | 01 |

Table 6. Final Biopsy Specimen Results

Results of clinical examination:

| Clinical Examination | Biopsy Report | | Total |
|----------------------|---------------|--------|-------|
| | Malignant | Benign | |
| Malignant (+) | 08(a) | 01(c) | 09 |
| Benign (-) | 01 (b) | 37 (d) | 38 |

Table7. Comparison of Clinical Input against final Biopsy Reports

From the data given in Table 7 the following results were calculated and listed as shown below:

- Sensitivity: 88.89%
- Specificity: 97.37%
- PPV: 88.89%
- NPV: 97.37%

It was inferred from the study that clinical examination has a sensitivity of 87.5% which means that around 12.5% of the breast carcinoma cases are missed clinically. In spite of this, clinical examination is a reliable method to assess the breast lump as it has high specificity and negative predictive value.

| Ultrasound | Biopsy Report | | Total |
|---------------|---------------|--------|-------|
| | Malignant | Benign | |
| Malignant (+) | 08(a) | -(b) | 08 |
| Benign (-) | - (c) | 39 (d) | 39 |

Table 8. Comparison between Ultrasound Results against Final Biopsy Report

Results of ultrasound breast:

- Sensitivity: 100%
- Specificity: 99.7%
- PPV: 98.9%
- NPV: 100%

Results of ultrasound breast are highly operator dependent. The results of the study show that the radiologists are experienced and skilled enough. Ultrasound breast has high sensitivity and negative predictive value of 100%.

| FNAC | Biopsy Report | | Total |
|---------------|---------------|--------|-------|
| | Malignant | Benign | |
| Malignant (+) | 10(a) | -(c) | 10 |
| Benign (-) | 01 (b) | 38 (d) | 39 |

Table 9. Comparison between FNAC Result and Final Biopsy Report

Results of FNAC:

- Sensitivity: 90%
- Specificity: 100%
- PPV: 100%
- NPV: 97.42%

Analysis of the above results shows that though FNAC has a sensitivity of 90%, it has a positive predictive value of 100%. So those who are diagnosed to be positive for malignancy can be taken up for definitive surgical management without any further investigations for confirmation of diagnosis.

| Modified Triple Test | Biopsy Report | | Total |
|----------------------|---------------|--------|-------|
| | Malignant | Benign | |
| Malignant (+) | 11(a) | 01(c) | 12 |
| Benign (-) | - (b) | 37 (d) | 37 |

Table 10. Comparison between combined results of MTT against final Biopsy Report

Results of Modified Triple Test:

- Sensitivity: 100%
- Specificity: 97.37%
- PPV: 91.67%
- NPV: 100%

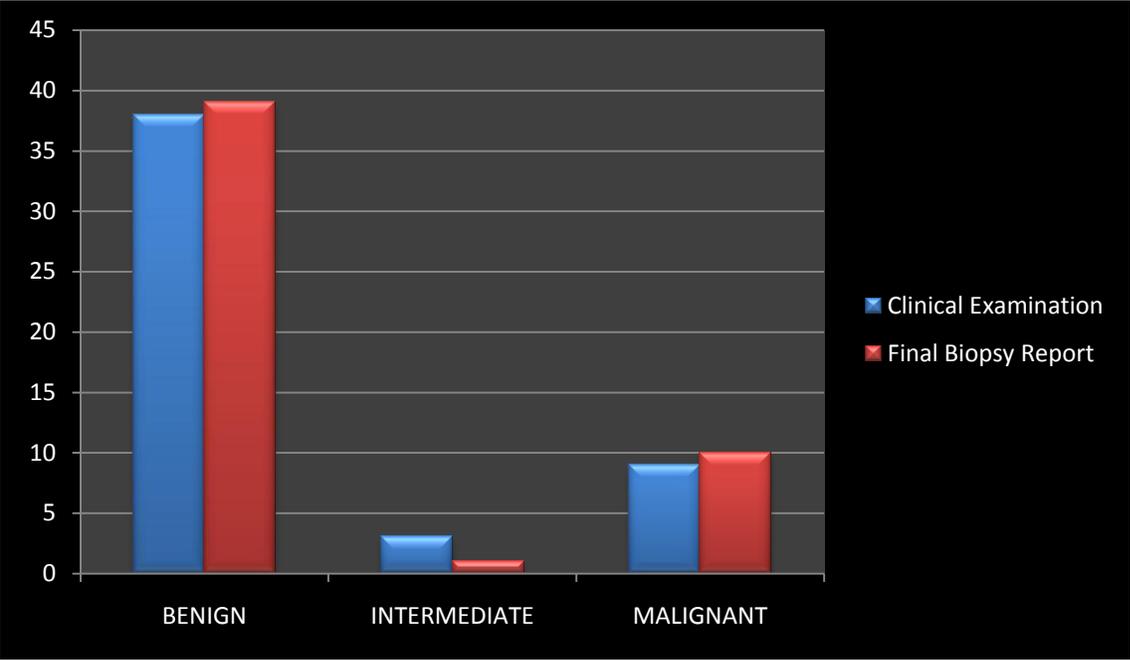
The study shows that the combined results of Modified Triple Test are comparable to the histopathological diagnosis of the biopsy specimen. Hence the modified triple test can be used as a reliable and fairly accurate means of diagnosis of breast carcinoma.

| | C/E | USG | FNAC | MTT |
|-------------|-------|------|-------|-------|
| Sensitivity | 88.89 | 100 | 90 | 100 |
| Specificity | 97.37 | 99.7 | 100 | 97.37 |
| PPV | 88.89 | 98.9 | 100 | 91.67 |
| NPV | 97.37 | 100 | 97.44 | 100 |

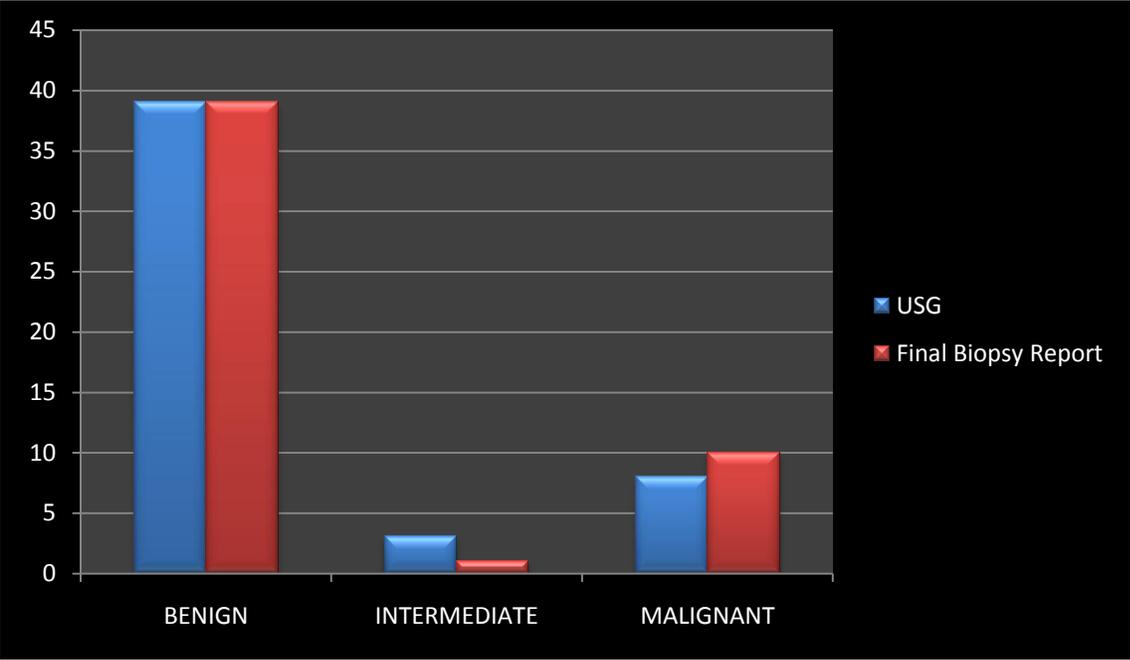
Table 11. Individual component and Combined Results of Modified Triple Test

After analyzing the results of all the individual and combined components of modified triple test we can infer the following:

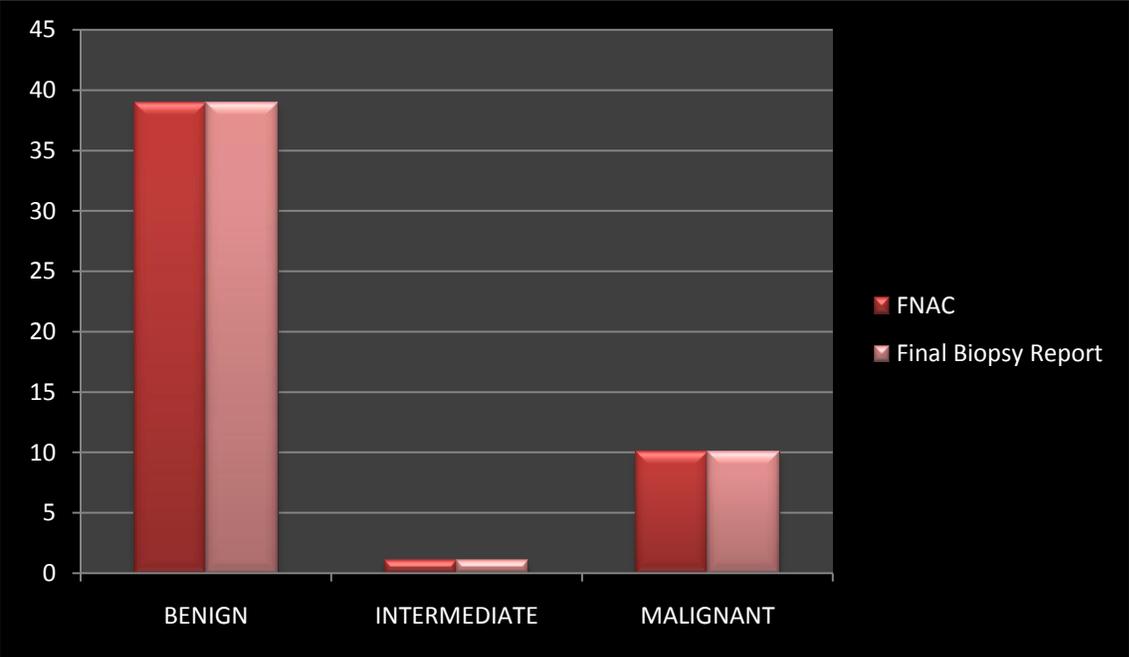
- ❖ Clinical examination alone has a sensitivity of 89%, but when combined with USG and FNAC the overall sensitivity rises to 100%
- ❖ Ultrasound examination has a high sensitivity of 100% and hence is a reliable method that can be used for screening of breast lump
- ❖ Among the three components fine needle aspiration cytology is highly accurate with a specificity and positive predictive value of 100 %.



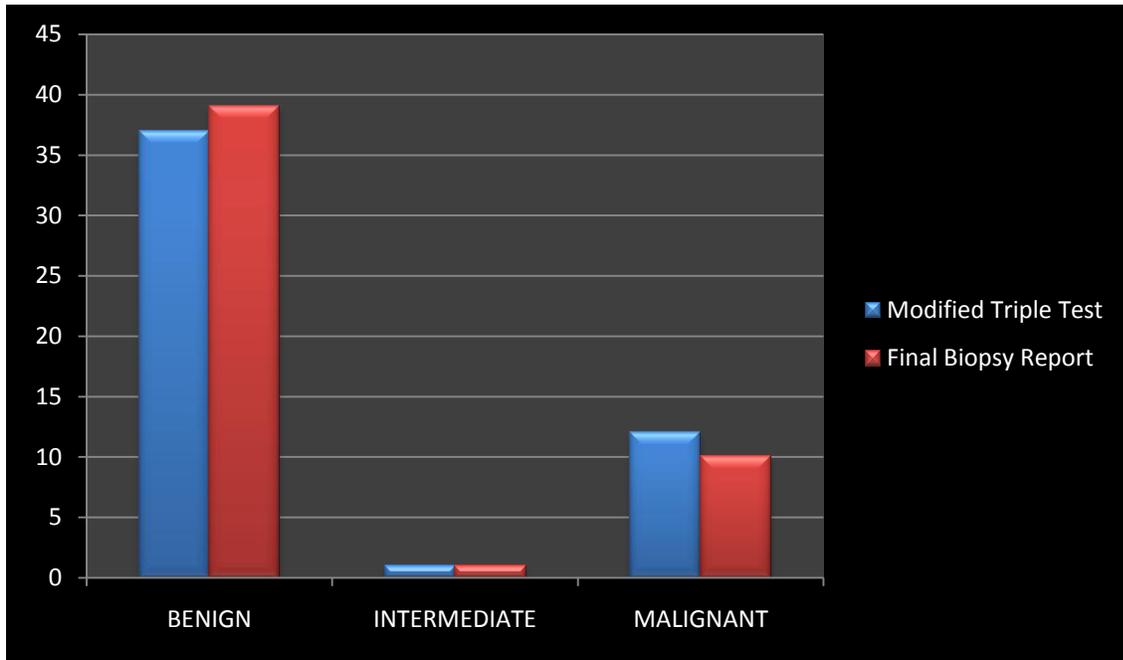
Bar diagram showing the comparison of clinical examination results against final biopsy report



Study results of USG against final biopsy report represented in bar diagram

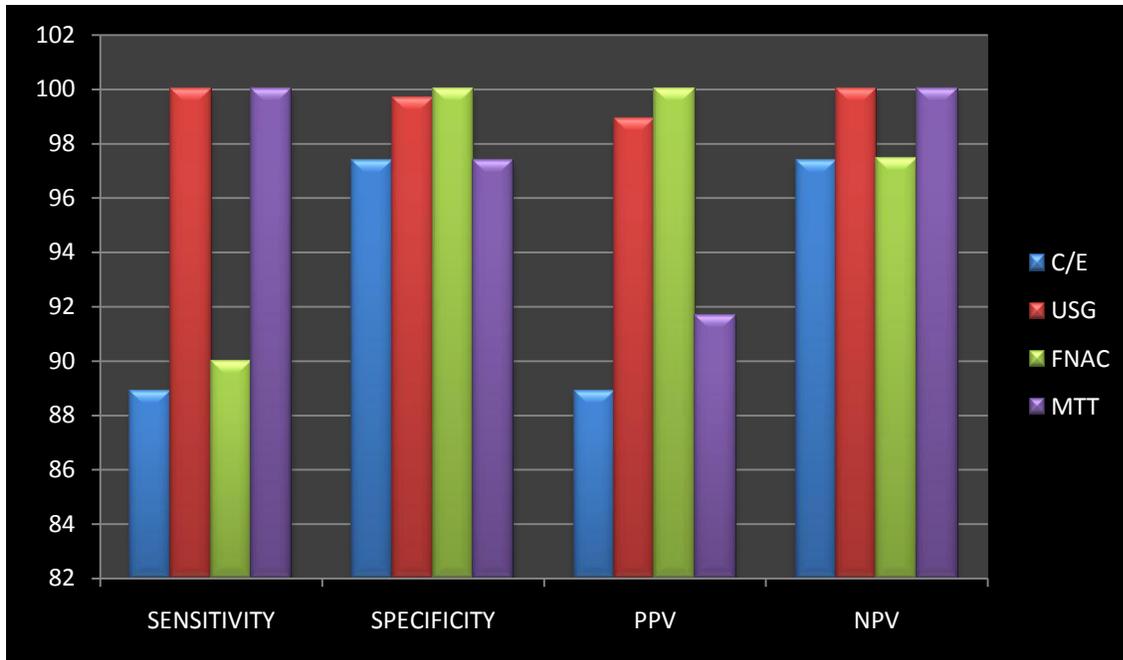


Bar diagram comparing the study results of FNAC against biopsy report



Combined result of MTT against biopsy report is represented in the bar diagram

In the above mentioned bar diagram intermediate interpretation corresponds to the suspicious lesion in modified triple test parameters. intermediates in final biopsy report is ductal carcinoma *in situ*.



Bar diagram represents the individual component and combined results of Modified Triple test

CONCLUSION

In recent years in India, westernization and increased sedentary life style resulted in increased incidence of breast cancer. With present knowledge and public awareness about cancer breast, the cancer phobia is increased in among the female.

Our study includes assessment of individual and combined diagnostic accuracy of Modified Triple Test in women of more than 30 years of age with palpable breast lump.

Study goes on with initial assessment with clinical examination, then imaging with Ultrasound and finally cytological interpretation of FNAC slides.

Clinician, Radiologist and pathologist had fine collaboration during the study. Diagnostic accuracy of MTT indirectly indicates the experience and skill of the clinician, radiologist and pathologist.

On data analysis the study results showed that clinical examination is least sensitive in diagnosing the malignancy, hence breast lump requires further investigations which on combination with other two component the sensitivity increased to 100%. Advanced technology Ultrasonogram good

in characterization of breast lump which had high sensitivity and NPV of 100%. FNAC had a high specificity and positive predictive value of 100% which was highly comparable to previous study results.

On summation of all the three components of Modified Triple test, results were almost identical to final histopathological report of incisional and excisional biopsy specimen.

On concluding the study results Modified Triple Test had a sensitivity, specificity, positive predictive value and negative predictive value of 100%, 97.37%, 91.67% and 100% respectively. With the available study results, we infer that benign cases can be safely followed up without further procedure (open biopsy) that avoiding the surgical morbidity and scar and also those found to be malignant on MTT can directly proceed to definitive surgical management.

MASTER CHART

| S. No. | Name | Age | I.P. No. | Menstrual History | PARITY | Clinical Examination | USG | FNAC | MTT | Final HPE |
|--------|---------------|-----|----------|-------------------|--------|----------------------|-----|------|-----|-----------|
| 1 | MUTHAMAL | 40 | 57148 | P | M | - | - | - | - | - |
| 2 | LAKSMI | 37 | 57254 | P | N | + | + | + | + | + |
| 3 | FEROSE MARY | 64 | 57642 | MEN | M | + | + | + | + | + |
| 4 | MANICKAMAL | 39 | 57728 | P | M | - | - | - | - | - |
| 5 | KALANI | 33 | 57883 | P | M | - | - | - | - | - |
| 6 | POORNIMAL | 42 | 58066 | P | N | - | - | - | - | - |
| 7 | POONGODII | 35 | 58278 | P | M | - | - | - | - | - |
| 8 | JAYALAKSHMI | 44 | 58558 | P | M | - | - | - | - | - |
| 9 | REMYA | 36 | 58627 | P | M | - | - | - | - | - |
| 10 | MALATHI | 47 | 58996 | PM | M | + | + | + | + | + |
| 11 | RANIMARY | 29 | 59156 | P | M | + | + | + | + | + |
| 12 | FATIMA | 35 | 59338 | P | M | - | - | - | - | - |
| 13 | KAVITA | 44 | 59626 | P | M | - | - | - | - | - |
| 14 | MAHALAKSMI | 62 | 59708 | MEN | N | + | ± | + | + | + |
| 15 | LATHA PANDY | 34 | 59776 | P | M | - | - | - | - | - |
| 16 | PARVATHY | 47 | 60095 | P | M | - | - | - | - | - |
| 17 | UMAA | 50 | 62145 | PM | M | + | ± | + | + | + |
| 18 | DILSHATHI | 49 | 64329 | P | M | ± | - | - | - | - |
| 19 | SELVY | 38 | 65857 | P | M | - | - | - | - | - |
| 20 | PALANIAMAL | 41 | 65997 | P | N | ± | ± | - | + | +(DCIS) |
| 21 | RADIKA | 45 | 66129 | P | M | - | - | - | - | - |
| 22 | VIMALAMA | 51 | 66546 | PM | N | - | - | ± | ± | - |
| 23 | NILOFERIN | 32 | 66997 | P | M | - | - | - | - | - |
| 24 | SEETHALAKSHMI | 45 | 67057 | PM | M | ± | + | + | + | + |
| 25 | POOVAYE | 51 | 67248 | PM | M | - | - | - | - | - |

Contd.,

| S. No. | Name | Age | I.P. No. | Menstrual History | PARITY | Clinical Examination | USG | FNAC | MTT | Final HPE |
|--------|----------------|-----|----------|-------------------|--------|----------------------|-----|------|-----|-----------|
| 26 | SANTHAA | 48 | 67347 | PM | N | - | - | - | - | - |
| 27 | SANGETHA | 35 | 67489 | P | M | - | - | - | - | - |
| 28 | KASTURI | 56 | 67667 | MEN | M | - | - | - | - | - |
| 29 | MURUGAMA | 49 | 67729 | PM | M | - | - | - | - | - |
| 30 | PARVENA | 34 | 68039 | P | M | - | - | - | - | - |
| 31 | AADHILAKSMI | 44 | 68187 | P | N | + | + | + | + | + |
| 32 | NIRMALADEVI | 30 | 68229 | P | M | - | - | - | - | - |
| 33 | MENAKAL | 35 | 68416 | P | M | - | - | - | - | - |
| 34 | SARADHAL | 54 | 69728 | PM | N | - | + | + | + | + |
| 35 | PONI | 53 | 70358 | PM | M | - | - | - | - | - |
| 36 | NARGES | 37 | 73139 | P | M | - | - | - | - | - |
| 37 | RENUKAMBAL | 55 | 73876 | PM | M | - | - | - | - | - |
| 38 | RESHMALI | 54 | 74238 | PM | M | - | - | - | - | - |
| 39 | SENTAMIL SELVI | 30 | 74550 | P | M | - | - | - | - | - |
| 40 | PALAVI | 57 | 74926 | MEN | M | - | - | - | - | - |
| 41 | USHAA | 36 | 75228 | P | M | - | - | - | - | - |
| 42 | CHITRAA | 52 | 75430 | PM | N | - | - | - | - | - |
| 43 | DEVIKAL | 56 | 75760 | MEN | M | + | + | + | + | + |
| 44 | VANAMAYIL | 28 | 75996 | P | M | - | - | - | - | - |
| 45 | KAVIYAL | 32 | 76338 | P | M | - | - | - | - | - |
| 46 | VALLIYAMAL | 59 | 76530 | MEN | M | + | - | - | + | - |
| 47 | CHRISTI | 50 | 76896 | PM | M | - | - | - | - | - |
| 48 | ANITA | 39 | 77018 | P | M | - | - | - | - | - |
| 49 | FARZANA BEEVI | 45 | 77250 | PM | M | - | - | - | - | - |
| 50 | BAANU | 33 | 77346 | P | M | - | - | - | - | - |

ABBREVIATIONS

C/E – Clinical Examination

USG - Ultrasonogram

FNAC- Fine Needle Aspiration Cytology

CNB- Core Needle Biopsy

MTT- Modified Triple Test

PPV- Positive Predictive Value

NPV- Negative Predictive Value

HPE- Histo Pathological Examination

% age - Percentage

+ Positive for malignancy

- Negative for malignancy

Suspicious /in conclusive

mAmp - mili Ampire

kvp- Kilo voltage peak

N – Nulliparous

M- Multiparous

P - Premenopausal

PM - PeriMenopausal

MEN - Post menopausal

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சுயஒப்புதல்படிவம்

ஆய்வுசெய்யப்படும்தலைப்பு 'A PROSPECTIVE STUDY OF MODIFIED TRIPLE ASSESSMENT IN BREAST LUMPS' ,
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பங்குபெறுபவரின் எண் :

மேலே குறிப்பிட்டுள்ள மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது .
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