



PICTORAL ASSAY OF HIGH FREQUENCY ULTRASOUND OF BREAST LESIONS

Radiodiagnosis

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ABSTRACT

Present study is based upon 100 patients with various breast pathologies (including fibrocystic disease, fibro adenoma, CA breast, phyllodes, lipoma, breast abscess, Galactocoele, breast cysts, benign duct ectasia & gynaecomastia).

95 patients were Females & 05 were Male patients. Main clinical presentation was breast pain, tenderness, lump, nipple discharge, breast development in males, redness & Erythema. All lesions presented with a variety of features on Sonography described in detail in text.

Patients with fibrocystic disease revealed focal or generalized increase in echogenicity, single or clusters of cysts. Fibro adenomas showed a mobile firm homogeneous hypoechoic mass.

CA breast revealed "taller than wider" heterogeneous mass with irregular contour. Duct ectasia showed dilated ducts.

Breast abscess revealed heterogeneous lesions with coarse mobile internal echoes.

Gynaecomastia showed retro areolar hypoechoic masses, few showing subareolar nodule and diffuse enlargement of glandular tissue.

Literature supported our observations in most cases. Mammography, CT, FNAC / Biopsy confirmed the diagnosis in all cases.

KEYWORDS

Breast, Ultrasound, Breast mass, Fibrocystic disease, Abscess, Fibro adenoma.

INTRODUCTION:

Ultrasound is a very useful diagnostic tool for breast imaging. It is the usual initial breast imaging modality in many countries and has become the primary imaging modality for younger women & pregnant or lactating patients. Diagnosis of various breast lesions is established on real time B-mode Ultrasonography with 5–13 MHz linear transducer with color doppler setting. Mammography & MRI may be used as adjuncts to sonography but USG is relatively cheap, readily available tool even at a small medial setup. Breast lumps, abscess, cysts, gynaecomastia etc. are all nicely evaluated by Sonography.

MATERIAL AND METHODS:

The present study was undertaken in the Department of Radio-diagnosis, Heritage Institute of Medical Sciences, Varanasi between the periods of March 2018 to March 2020.

Patients with suspected breast lesions were referred from OPD & IPD of different departments especially Surgery & Obs. & Gynaecology Dept.

- All together 100 cases of breast lesions were investigated.
- Short history was taken & USG done with 7.5 MHz linear probe in Wipro GE logiq E9 machine on B Scan & Color Doppler technique. Sonographic findings were interpreted & correlated together with clinical findings followed by confirmation on histopathology & CT Chest / Abdomen was done in patients with Breast Cancer.
- Finally the data was tabulated, statistically analysed & conclusions were drawn.

Indications:

- Breast lump in women <30 years.
- To evaluate palpable lump with negative or equivocal mammographic findings.
- Breast lump developing during lactation or pregnancy.
- To distinguish between benign and malignant mass.
- To detect lesions within dense breast tissue.
- USG Guided FNAC / Biopsy.
- To evaluate rupture of breast implants.

Observations:

Table 01 Reveals No. of various types of Breast pathologies on USG. Majority were confirmed on FNAC / Biopsy.

S. No.	Breast Lesions	No. of Cases
1	Fibrocystic Disease (FCD)	28
2	Fibro adenoma	25
3	Lipoma	05
4	CA Breast	09
5	Phyllodes	02
6	Breast Abscess	08

7	Galactocoele	02
8	Breast Cyst (Apart from cysts in FCD)	09 (+ 14 Associated with fibrocystic disease)
9	Benign duct ectasia	07
10	Gynaecomastia	05
Total	100	

Table 02 Sex and Age incidence are presented in Table 02

Age	Total No. of Cases	
	Female	Male
0 – 10	X	X
11 – 20	13	02
21 – 30	37	03
31 – 40	23	X
41 – 50	14	X
51 – 60	03	X
61 – 70	05	X
Total	95	05

- **Fibrocystic disease was the commonest breast lesion (28 cases).**

All of the cases showed increase in echogenicity, focal areas of thickened parenchyma in 20 cases, single cysts or cluster of cysts in 14 cases (Fig. 01, 02). All of the cases were confirmed on FNAC & mammography.

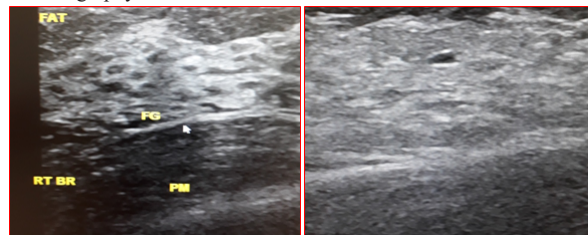


Figure 01

Figure 02

- **Fibro adenoma was the second most common breast lesion.**

They presented with a firm mobile homogeneous hyperechoic oval shaped mass wider than taller with little or no internal vascularity. (Fig 03,04) Majority were solitary (20) multiple in 05 cases and bilateral in 03 cases. Calcification noted in 01 case. Diagnosis was confirmed by histopathology.

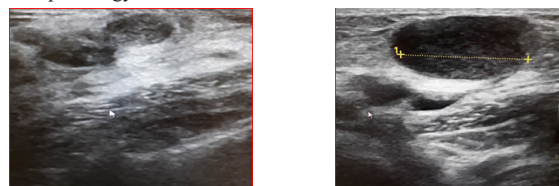


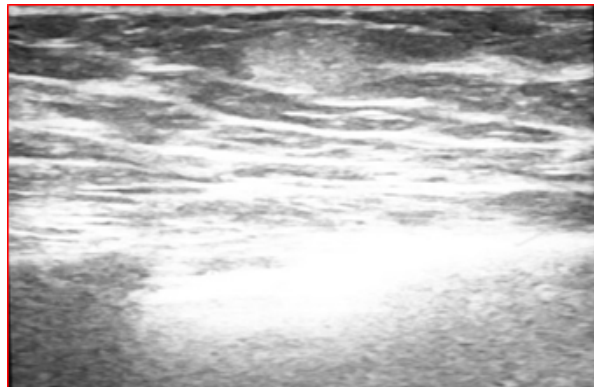
Figure 03

Figure 04

- **05 cases of Lipoma were seen.**

USG showed a subtle hyperechoic mass with a reticular pattern (Fig. 05).

03 cases showed a thin capsule with lamellar appearance in 04 cases.



(Figure 05)

- 09 cases of CA breast were noted. 04 cases were of invasive ductal carcinoma, 01 case of Ductal Carcinoma in Situ (DCIS), 02 cases of invasive lobular carcinoma, 01 case of Paget's disease, 01 case of medullary carcinoma.

One patient showed recurrent breast cancer.

- Invasive ductal carcinoma showed "taller than wider" mass with posterior acoustic shadowing, heterogeneous in nature & ill-defined margins.

(Fig. 06, 07, 08)

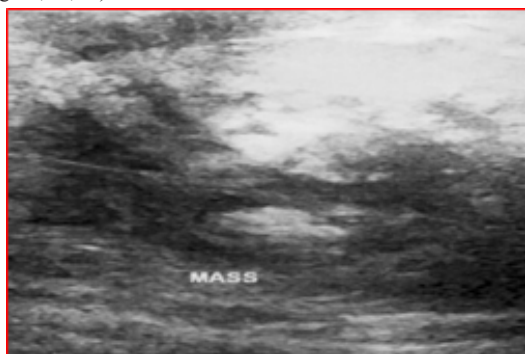


Figure 06

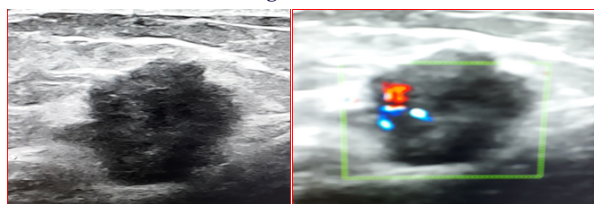


Figure 07

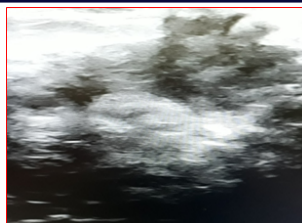
Figure 08

- Ductal Carcinoma in Situ (DCIS) showed an ill-defined hyperechoic lesion with central echogenic areas with dilated ducts (Fig. 09)



Figure 09

- Invasive lobular CA usually showed a large ill-defined mass of variable density. (Fig. 10, 11)



(Figure 10



(Figure 11

- Medullary CA showed a hyperechoic well defined mass with posterior enhancement. (Fig. 12)



Figure 12

Paget's disease presented with nipple excoriation, prominent duct & increased vascularity.

All carcinomas were confirmed on biopsy.

05 masses were associated with axillary lymphnodes. (Fig. 13)

06 masses showed increased vascularity on color imaging.

03 cases showed ductal dilatation.

02 cases presented with liver metastasis.

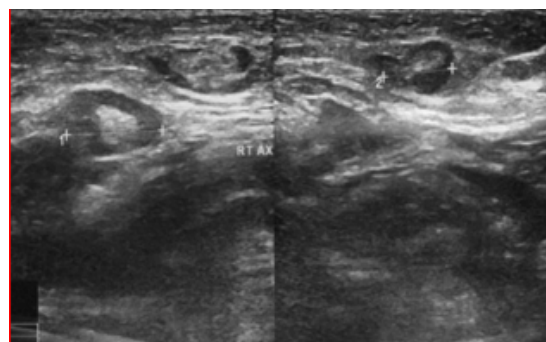


Figure 13

Two patients of Phyllodes were seen. USG showed a large well defined lobulated mass, hypoechoic in nature & mild internal vascularity and multiple linear clefts. (Fig. 14, 15)



(Figure 14



(Figure 15

- 08 cases of breast abscess were noted. USG showed 04 cases of superficial abscess and 04 intra mammary abscesses. Focal or diffuse skin thickening was noted, with heterogeneous lesions with coarse mobile internal echoes with irregular contour in 06 patients (Fig. 16).

Smooth contour with posterior wall enhancement in 02 patients. 02 cases showed associated discharging sinus. One of the abscesses with sinuses proved to be tubercular on cytology in FNAC. (Fig. 17). 05 cases of breast abscess were associated with axillary lymph nodes.

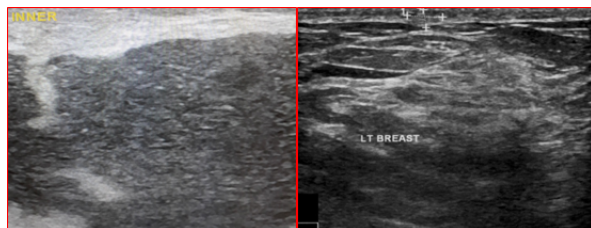


Figure 16

Figure 17

- 02 cases of Galactocele were encountered in lactating females. One was of mixed echogenicity (Cystic & Solid) & one showed a solid echogenic lesion (Fig. 18). Both showed no vascularity on color doppler imaging.

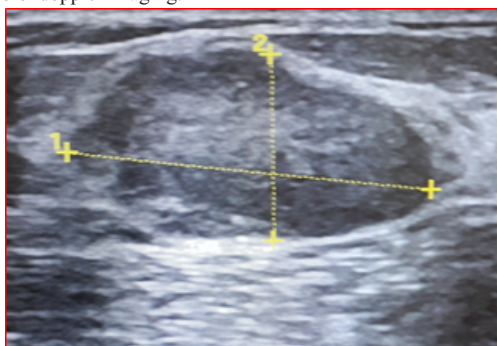


Figure 18

- 09 solitary cases of simple breast cysts were seen (14 associated with fibrocystic disease). 08 were simple breast cysts and were well defined cystic areas with thin walls & posterior enhancement.

01 was complicated breast cyst containing intracystic debris. (Fig. 19)



Figure 19

- 07 cases of benign duct ectasia seen. USG showed distended tubular anechoic structures > 02 mm diameter tapering peripherally with smooth margins. 05 Females were premenopausal & 02 postmenopausal. 02 cases showed mild debris within ducts (S/o inflammatory debris). 05 cases showed dilated ducts in retro areolar region (Fig. 20) and 02 showed ductal dilatation posterior to nipple (Fig. 21).

All cases proved benign on histopathology.

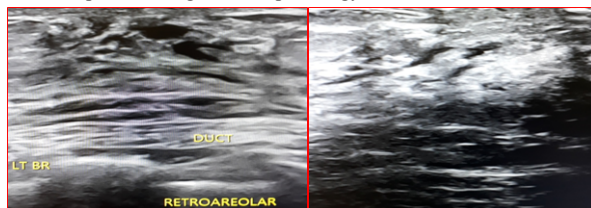


Figure 20

Figure 21

- 05 cases of gynaecomastia were seen. Three cases were bilateral,

02 were unilateral, 02 cases of focal gynaecomastia appearing as a retro areolar hypoechoic mass.

- 02 cases of early nodular gynaecomastia were seen appearing as a subareolar fan shaped hyperechoic nodule (Fig 22) & 01 patient of diffuse glandular gynaecomastia having both nodular & dendritic features surrounded by hyperechoic fibrous breast tissues. (Fig. 23)

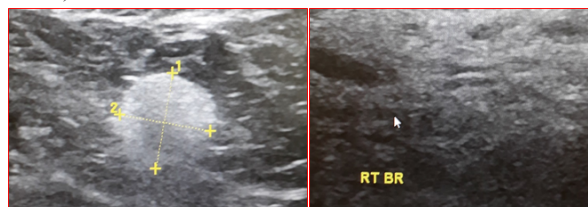


Figure 22

Figure 23

Fibrocystic disease (FCD):

Fibrocystic disease of the breast is a benign alteration in the terminal ductal lobular unit of breast with or without associated fibrosis.

Usually present at ages between 20–40 years with peak at menopause. FCD presents with breast pain especially during ovulation, tender nodular swelling usually multifocal & bilateral.

USG shows prominent fibro glandular tissue, increased density of breasts, thickening of parenchyma with increased echogenicity, discrete single or cluster of small cysts or solid areas. (Fig. 24, 25).

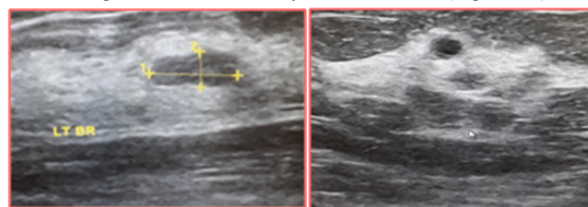


Figure 24

Figure 25

Fibro adenoma:

Fibro adenoma is an estrogen induced tumor that forms in adolescence. Fibro adenomas present as a firm solid oval shaped freely moveable mass.

Fibro adenomas are usually under 5 cm. multiple in 10-20%, bilateral in 4% of lesions.

USG findings show a well circumscribed homogeneous solid lesion, usually hypoechoic & wider than tall (Fig. 26, 27).

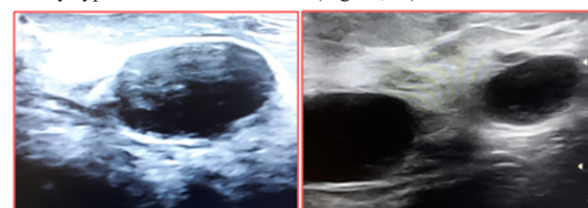


Figure 26

Figure 27

Breast Lipoma:

- Lipoma is a benign breast lesion & classified as a BIRAD II lesion.
- Usually asymptomatic & coincidentally discovered on routine USG or mammography. Patients may present with a painless palpable breast lump soft & mobile in nature.

USG reveals a rounded compressible lesion, iso to hypo to slightly hyperechoic to surrounding fat (Fig 28). Multiple thin echogenic septations may be seen running parallel to skin surface. (Fig. 29).

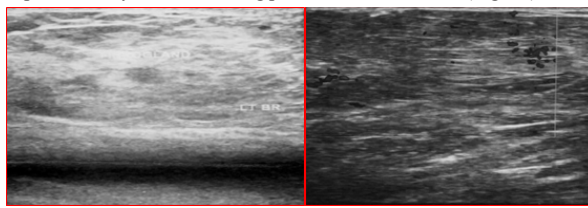


Figure 28

Figure 29

Phyllodes Tumor:

Phyllodes tumor also known as Cystosarcoma Phyllodes. It is a rare fibro epithelial tumor of the breast and is a large, fast growing mass that forms the peri ductal stroma of the breast. It is common at ages between 40- 60 years.

On ultrasound it presents as a homogeneous, solid appearing mass containing single or multiple cystic spaces & posterior acoustic enhancement (Fig. 30). Vascularity noted in the solid component.

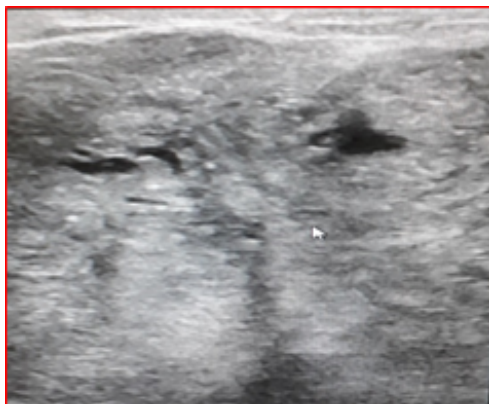


Figure 30

Breast abscess:

Abscesses may be acute or chronic and present as a painful breast mass, tenderness on touch, erythema & high grade fever. USG shows a heterogeneous hypoechoic mass with irregular margins, coarse internal echoes with posterior enhancement (Fig. 31).

Acute abscesses may occur during breast feeding. In India, chronic abscess may be due to tuberculosis and may present with discharging sinus.



Figure 31

Breast Cancer:

Breast cancer is the second most common cancer in India after CA cervix and the fifth most common cause of cancer deaths today.

Risks:**Factors increasing risk of breast cancer:**

1. Strong family history of breast cancer.
2. Mutation (or a first degree relative) with a mutation in the BRCA I or BRCA II gene.
3. Personal history of invasive breast cancer or ductal carcinoma in situ.
4. Radiation treatment to chest area during childhood or young adulthood.

Characteristic of benign lesions:

1. Smooth & well circumscribed.
2. Hyperechoic to iso to mildly hypoechoic.
3. Thin echogenic capsule.
- Ellipsoid, wider than taller.
- Three or fewer lobulations.

Characteristic of malignant lesions:

1. Ill-defined borders.
2. Usually hypoechoic nodular mass.

3. Taller than broader.
4. Spiculated margins, posterior acoustic shadowing & micro calcifications with branching pattern.
5. Irregularly branching with neo vascularity on color doppler.

Ductal Carcinoma in Situ (DCIS):

Ductal Carcinoma in situ is a noninvasive cancer with proliferation of tumor cells within terminal ductal lobular unit.

USG findings show a small mass or an ill-defined hypoechoic lesion with echogenic foci within due to micro calcifications. (Fig. 32).



Figure 32

Invasive Lobular Carcinoma:

This is the second most common breast malignancy, usually in elderly women. It is often multicentric & bilateral (10-15%). Sonography shows a heterogeneous hypoechoic mass with ill-defined margins & posterior acoustic shadowing or an ill defined heterogeneous infiltrating area (Fig. 33, 34).



Figure 33



Figure 34

Paget's Disease:

Paget's disease also called Paget disease of the nipple is characterized by infiltration of nipple epidermis by adenocarcinoma cells. USG shows heterogeneous hypoechoic area in breast parenchyma, presence of a mass & skin thickening in nipple areolar complex.

Invasive Ductal Carcinoma:

Common Sonographic appearance of invasive ductal carcinoma show hypoechoic irregular masses with heterogeneous echotexture & spiculated margins.

Few masses have complex solid cystic appearance (Fig. 36). Micro calcifications may be seen within mass (Fig 35).

Color doppler study shows internal hyper vascularity. (Fig. 37).



Figure 35

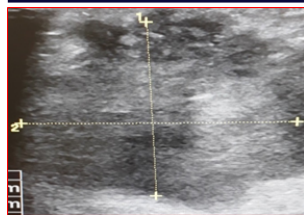


Figure 36

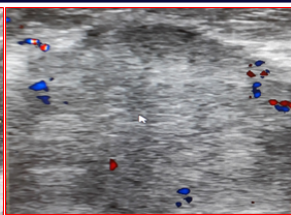


Figure 37

Medullary Carcinoma:

These are uncommon, benign appearing lesions. On USG they appear homogeneous, hypoechoic & well circumscribed masses.

Breast Cysts: Breast cysts are the commonest cause of breast lumps in women between 35 & 50 years of age.

Simple cysts are totally anechoic with a thin echogenic capsule, posterior enhancement & thin edge shadowing (Fig. 38).

Complex cysts have intracystic echoes, septae or thick walls. Cysts may be solitary or multiple.



Figure 38

Duct ectasia:

Mammary duct ectasia is the abnormal widening of one or more breast ducts > 2 mm in dimension. It can be due to benign or malignant processes.

Ultrasound shows distended branching or tubular structures filled with fluid or old cellular debris presenting as echogenic areas. (Fig. 39).



Figure 39

Galactocele:

Galactocele typically occur in young lactating females, usually on cessation of lactation.

Patients present with a painless breast lump occurring over weeks.

USG appearances are variable. Cystic in 50%, mixed (cystic + solid) in 37% and solid in 13%.

Gynaecomastia:

Gynaecomastia refers to a benign excess of male breast tissue. There is enlargement of male breast due to benign ductal & stromal proliferation. Early nodular gynecomastia on USG shows a subareolar fan shaped, hypoechoic nodule surrounded by normal fatty tissue.

Diffuse glandular gynecomastia shows both nodular & dendritic features.

Chronic dendritic gynecomastia shows a subareolar hypoechoic lesion, "finger like" projections insinuating into the surrounding echogenic fibrous breast tissue. (Fig. 40)

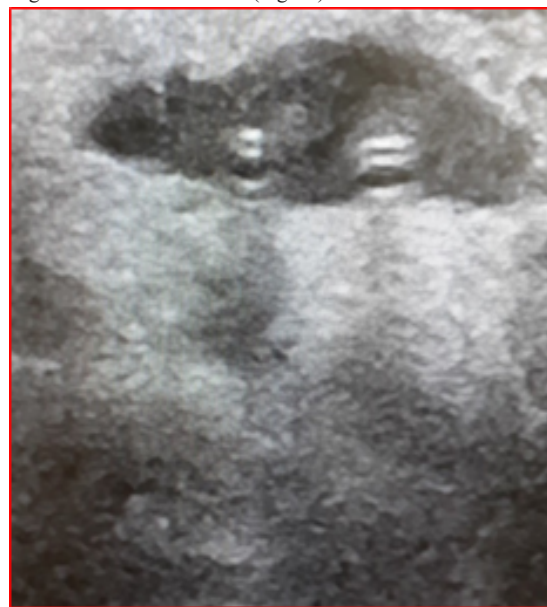


Figure 40

Summary and Conclusion:

This study is based upon 100 patients with different breast pathologies majority were fibrocystic disease (28 cases). Rest 72 cases included fibro adenoma (25 cases), Lipoma (05 cases), CA breast (09 cases), phyllodes (02 cases), breast abscess (08 cases), Galactocele (02 cases), Breast cysts (09 Cases), Benign duct ectasia (07 cases) & Gynaecomastia (05 cases).

Ultrasound made presumptive diagnosis in all the cases which were proved on histopathology, mammography and CT.

Iso, hypo, hyperechoic echotexture, sharp or ill-defined contour, internal vascularity, internal echoes, mobility of lesion were found on USG examination.

Therefore it is concluded that high resolution ultrasound with color doppler imaging is very good in assessment of these pathologies. However precise histopathological diagnosis is established on or after FNAC/ Biopsy & post-surgical histopathology.

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