SONOMAMMOGRAPHIC EVALUATION OF VARIOUS BREAST PATHOLOGIES AND ITS CLINICOPATHOLOGICAL CORRELATION

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ABSTRACT

BACKGROUND
Radiology plays an important role in detecting breast lesion, which is one of the most leading cause of death in female from 40-44 yrs. Mammography along with sonography plays an important role in early diagnosis, differentiation and detection of breast mass before advancement of the lesion.

MATERIALS AND METHODS
This prospective study was conducted in the Department of Radiodiagnosis, NSCB Medical College and Hospital, Jabalpur, in 2012-2013.The study included patients referred for sonomammographic examination of breast from surgery department. Study to be done on 50 patients.

RESULTS
Results of 50 cases were recorded for observation. The study group consisted of all the patients in the age group ranging from 15 to 70 years of age. The total benign and malignant lesions constituted 62% and 38% of total lesions, respectively. Most of the benign mass observed in cases were in less than 40 years of age, whereas majority of the malignant masses were seen in cases older than 40 years. Maximum number of benign breast lesions were fibroadenoma (40%) followed by fibrocystic disease (14%), breast abscess (4%), duct ectasia (2%) and phylloid tumour (2%). Most of malignant lesions were intraductal carcinoma (34%) and lobular carcinoma in situ (2%).

CONCLUSION
From this study, it was noted that depending upon the sonomammographic appearance of the lesions, the vascularity of the lesions and anatomical locations within breast can be diagnosed easily and accurately.

KEYWORDS
Carcinoma, Fibroadenoma, Colour Doppler.

BACKGROUND
The breast is a symbol of motherhood, nourishment and security, while in other it represents femininity. Breast cancer is probably the most feared cancer in women because of its frequency and its physiological impact.[1]

The Breast Anatomy- Each breast has 15-20 sections called lobes, which are arranged like the petals of daisy. Each lobe has many smaller lobules, which end in dozens of tiny bulbs that can produce milk. The lobes and bulbs are linked by thin lobes called ducts. These ducts lead to the nipple in the center of a dark area of skin called areola. Fat fills the spaces between lobules and ducts. Each breast also contains blood vessels and vessels that carry lymph. Lymph vessels lead to small bean-shaped organ called lymph node. Clusters of which are found under the arm above the collar bone and in the chest as well as many other parts of the body.

Role of Mammography- Mammography is the primary breast imaging technology that has been validated for screening.[2] It has quality of images with optimum film density and contrast, high resolution and low radiation dose.

High resolution is needed to visualise microcalcification and trabeculae as small as 0.1 mm. Mammographic appearances of breast depend upon relative amount of fat and glandular tissue, which are present.[3] Normal structure visible on mammography included nipple, skin, blood vessels, ducts, copper ligament and axillary lymph node.

Role of Ultrasound and Colour Doppler- Breast ultrasound is a noninvasive procedure used to assess the breast. Ultrasound technology allows quick visualisation of breast tissue.[4] By using additional mode of ultrasound technology during an ultrasound procedure, blood flow within the breast can be assessed.[5] An ultrasound transducer capable of assessing blood flow contain Doppler

probe. This study aims to correlate the changes in breast, which has been studied in mammography, ultrasound and colour Doppler with the pathological correlation.

Aims and Objectives
1. Differentiation of cyst from solid masses on ultrasound.
2. Evaluation of a palpable mass not visible in a radiographically dense breast.
3. Identification of microcalcification, which is an indicator of malignancy in mammography.
4. To correlate the sonomammographic finding with histopathological findings.

MATERIALS AND METHODS
This study was done on 50 patients attending the Surgery Department of Medical College, Jabalpur, in 2012-2013 with different complaints of breast; e.g.- pain, lump, abnormal discharge, etc.

Mammography- Siemens 3000 Nova using standard craniocaudal and mediolateral oblique view.

Mammographic Technique- The standard screen-film mammographic examination consists of a Mediolateral Oblique (MLO) view and craniocaudal view.

The MLO is taken with the x-ray beam directed from superomedial to inferolateral, usually at an angle of 30-60°, so that compression is applied perpendicular to the long axis of the pectoralis major muscle. The pectoralis muscle will be parallel to the plane of compression. The breast can be pulled away from the chest and on to film. Conversely, compression for the 90° lateral view 'fights' the direction of the pectoralis muscle so that the breast is less well compressed and incompletely displaced from the rib cage. For the craniocaudal view, the cassette is placed under the breast at the level of the inframammary fold and then elevated as the breast is raised and pulled forward until the skin of the inframammary fold is taut. The breast is then compressed from above. The x-ray beam is directed vertically from above.

Sonography and Colour Doppler- Sononova 500 with high frequency linear transducer (7.5-10 MHz).

Total number lesion 31, lesion detected 28.

Sonographic Technique- Sonography is performed with the patient supine on an examination table with her ipsilateral arm abducted over her head.

For lateral lesion, patients should be placed in contralateral posterior oblique with the aid of a sponge wedge. For medial lesions, the women should be flat in her back. Appropriate compression with the transducer minimises the breast thickness and improves image quality.

The side (Lt. and Rt.) clock face position, distance from the nipple and transducer orientation all are recorded.
We use 5 zone to record the distance from nipple, SA for subareolar location, Ax for axillary segment and 1, 2 or 3 for equal with rings starting at the areolar margin and extending to the edge of the breast (with 1 being the central ring, 2 middle ring and 3 outer ring). We use three zone in our study-
A. For superficial third.
B. For middle third.
C. For deep of the breast.

The transducer orientation used are longitudinal, transverse, radial or antiradial section in our study.

RESULTS
The present study were undertaken in Department of Radiodiagnosis, NSCB Medical College, Jabalpur, to evaluate the role of radiological investigation in evaluation of breast masses. A total number of 50 patients with breast-related complaints were included in this study.

Age	Benign	Malignant	Total	Percentage
<20	3	0	3	6%
20-29	12	0	12	24%
30-39	6	1	7	14%
40-49	8	10	18	36%
50-60+	1	8	9	18%
Total	**31**	**19**	**50**	**100%**
Table 1. Age Wise Distribution				

Age wise distribution of the studied cases shown in this table. Age range from 40-49 yrs. had a highest proportion of cases by 36%, less than 40 yrs. of age group observed with 44% of the studied cases, while 10% cases were above 50 yrs. in age.

Mammographic Feature	Fibroadenoma	Percentage	Fibrocystic Disease	Percentage	Breast Abscess	Other-Duct Ectasia Phylloid
SITE						
UOQ	7	38.8%	3	50%	-	-
UIQ	4	22.2%	1	16.6%	-	-
LOQ	2	11.1%	1	16.6%	-	-
LIQ	5	27.7%	1	16.6%	-	-
Junction of quadrant	-	-	-	-	-	1 (duct ectasia)
All	-	-	-	-	2	1 (phylloid)
SHAPE						
Oval	6	33.3%	1	16.6%	1	-
Round	12	66.6%	4	66.6%	1	1 (duct ectasia)
Lobulated	-	-	-	-	-	1 (phylloid)
Irregular	-	-	1	16.6%	-	-

DENSITY						
High	5	27.7%	4	66.6%	2	2
Intermediate	13	72.2%	2	33.3%	-	-
Mixed	-	-	-	-	-	-
MARGIN						
Circumscribed	17	94.4%	3	50%	-	1 (phylloid)
Microlobulated	1	5.5%	1	16.6%	-	-
Ill-defined	-	-	2	33.3%	2	1 (duct ectasia)
CALCIFICATION	1	5.5%	1		-	-
AXILLARY LN	-	-	-	-	-	-
ARCHITECTURAL DISTORTION	-	-	-	-	-	-
Table 2. Mammographic Features of Benign Lesion						

- 18 out of 20 fibroadenoma were detected on mammography. Two fibroadenomas were not detected as they were obscured by dense breast parenchyma.
- Majority 38.8% of fibroadenomas were located in UOQ of breast followed by LIQ 27.7%, 22.2% in UIQ and 11.1% in LOQ. They were mostly rounded 66.6% in shape followed by oval 33.3%.
- 94.4% of fibroadenomas showed well-circumscribed margin, whereas 5.5% of fibroadenomas showed microlobulated margin.
- Calcification were present, 1 (5.55%) of fibroadenoma, they are coarse type.
- Six fibrocystic disease detected on mammography out of 9 cases. Majority were located in UOQ 50%. Maximum lesion were high density 66.6% followed by intermediate 33.3% density. They all were discrete lesions with well-circumscribed margin 16.6%, followed by ill-defined margins 33.3% and microlobulated margin 16.6%. They varied from round to oval in shape.
- Only 2 breast abscess is detected on mammography. Breast abscess located involving all quadrant on mammography seen as irregular high density lesion with ill-defined margin.
- Only one case of phylloid tumour detected as large lesion with benign feature on mammography and cytology confirm the diagnosis involving all quadrant on mammography, seen lobular shape high density lesion with circumscribed margin.
- Only one case of duct ectasia detected as patchy lesion, which is confirmed on sonography; on mammography, lesion found to be located at the junction of two quadrant as an ill-defined high-density lesion.

Total number lesion 19, lesion detected 18.

	Mammographic Features	Number of Lesion	Percent
SITE	UOQ	7	38.8%
	UIQ	3	16.6%
	LOQ	1	5.55%
	LIQ	2	11.1%
	Junction of two quadrant	3	16.6%
	All quadrant	2	11.1%
MARGIN	Circumscribed	0	0
	Microlobulated	10	55.5%
	Ill defined	2	11.1%
	Speculated	6	33.3%
SHAPE	Oval	0	0
	Round	0	0
	Lobulated	7	38.8%
	Irregular	11	61.1%
DENSITY	High	9	50%
	Intermediate	6	33.3%
	Mixed	3	16.6%
	Low	0	0
CALCIFICATION		14	77.7%
AXILLARY LN		13	72.2%
ARCHITECTURAL DISTORTION		11	61.1%
Table 3. Mammographic Features of Breast Malignancy			

- Above table shows the highest frequency of breast malignancy seen in UOQ 38.8%, followed by UIQ 16.6% and junction of two quadrant 16.6%, LIQ -11.1% and all quadrant also 11.1%, and LOQ 5.55%.
- Majority of breast malignancy shows microlobulation 55.5% margins followed by speculated 33.3% and ill-defined 11.1% margins.
- Majority of breast malignancy were high density 50%, followed by intermediate density 33.3% and mixed

density 16.66%. 61.1% were irregular in shape and 38.8% were lobular in shape. 77.7% cases shows calcification within breast lesions. 72.2% cases shows axillary lymphadenopathy were present as high density lesion with loss of central lucency and breast malignancy shows 61.1% cases of architectural distortion.

Total lesions 31.

Sonographic Feature	Fibroadenoma (n=20)		Fibrocystic Disease (n=7)		Breast Abscess (n=2)		Other Phylloid Duct Ectasia	
SHAPE								
Oval	8 (40%)		2 (28.5%)		-		1	
Round	12 (60%)		5 (71.4%)		-		1	
Lobulation								
Irregular					2			
ECHOTEXTURE								
Hypoechoic	17 (85%)		1 (14.2%)		-		1	
Anechoic			5 (71.4%)				1	
Heterogenous	3 (15%)		1 (14.2%)		2		-	
MARGIN								
Smooth	19 (95%)		5 (71.4%)		-		2	
Lobulated	1 (5%)		2 (28.5%)		-		-	
Ill-defined					2			
RADIAL ZONE								
OR	2 (10%)		1 (14.2%)		-		-	
MR	12 (60%)		5 (71.4%)		-		-	
IR	2 (10%)		1 (14.2%)		-		-	
OR+MR	3 (15%)		-		-		-	
IR+MR	1 (5%)		-		-		-	
All ring					2		1	
Retroareolar							1	
CLOCKWISE	RT	LT	RT	LT				
1-3	3 (15%)	3 (15%)	-	-	-	-	-	1
4-6	3 (15%)	3 (15%)	-	1 (14.2%)	-	-	-	-
7-9	2 (10%)	-	-	1 (14.2%)	-	-	-	-
10-12	4 (20%)	2 (10%)	3 (42.8%)	2 (28.5%)	-	-	-	--
All	-	-	-	-	1	1	1	-
Retroareolar	-	-	-	-				
PWE	9 (45%)		6 (85.7%)		-		-	
CALCIFICATION	3 (15%)		-		-		-	
AXILLARY LN			1 (14.2%)					
Table 4. Sonographic Feature of Benign Lesion								

- This table shows the sonographic features of fibroadenomas; 20 fibroadenomas were detected including those fibroadenomas missed on mammography due to dense breast.
- Most of fibrocystic lesions were round 71.4% in shape, only two were oval (28.5%) in shape. One shows axillary lymphadenopathy.
- Two cases of nonspecific breast abscess were appeared as an irregular heterogenous, anechoic in echotexture and ill-defined margin.
- Single case of duct ectasia showing rounded anechoic lesion, which become elongated and tubular on longitudinal scan. Single cases of phylloid also seen, which is a large breast lesion, hypoechoic lesion, lobular in shape and showing lobular margins and axillary lymphadenopathy.

Sonographic Feature	IDC	ILC	% of IDC	% of ILC
SHAPE				
Oval	5	-	29.4%	-
Round	1	1	5.88%	50%
Irregular	11	1	64.7%	50%
ECHOTEXTURE				
Hypoechoic	6	1	35.29%	50%
Anechoic	-	-	-	-
Heterogeneous	11	1	64.7%	50%
MARGIN				
Smooth	-	-	-	-

Lobulated	6		2		35.2%	100%
Ill-defined	3		-		17.64%	-
Speculated	8		-		47.05%	-
RADIAL ZONE						
OR	1		-		5.88%	-
MR	2		1		11.7%	50%
IR	3		-		17.64%	-
OR+MR	-		-		-	-
IR+MR	4		-		23.52%	-
All	5		-		29.4%	-
Retroareolar	1		1		5.88%	50%
CLOCKWISE POSITION	RT	LT	RT	LT		
1 to 3	-	2	-	-	11.7%	-
4 to 6	3	-	1	-	17.64%	50%
7 to 9	1	1	-	-	11.7%	-
10 to 12	5	1	-	-	35.29%	-
All	1	2	-	-	17.64%	-
Retroareolar	1	-	-	1	5.88%	50%
PWE	0		-		-	-
CALCIFICATION	10		-		58.8%	-
AXILLARY LN	12		1		70.58%	50%
Table 5. Sonographic Feature of Malignant Breast Lesions						

- Above table shows sonographic features of malignant breast lesions, 17 cases of IDC and 2 cases of ILC were found in our study. 64.71% of IDC were irregular in shape followed by 29.4% were oval and 5.88% were round.

| Features of Colour Doppler (n=50)		Number of Cases	Percent
Vascularity		27	54%
Pattern	Central	20	40%
	Peripheral	7	14%
	Both	20	40%
Systolic Peak	Round	7	14%
	Sharp	20	40%
PSV (CM/S)	<15	9	18%
	>15	18	36%
RI	<0.73	9	18%
	>0.73	18	36%
Table 6. Finding of Colour Doppler Feature in Various Breast Pathology			

- Above table shows colour Doppler flow in various breast pathology. Majority of malignant shows vascularity and most of the benign lesions are avascular. 27 (54%) out of 50 cases showed vascularity within the breast masses. Majority of malignant lesions showed moderate-to-marked vascularity.
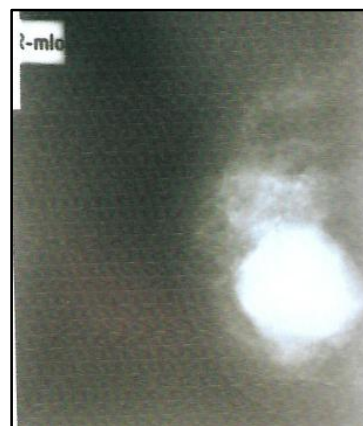
Image 1. Evidence of Well-Defined Mixed Density with Smooth Margin Lesion Seen in Lower Quadrant in MLO View seen Suggestive of Benign Lesion (Fibroadenoma)
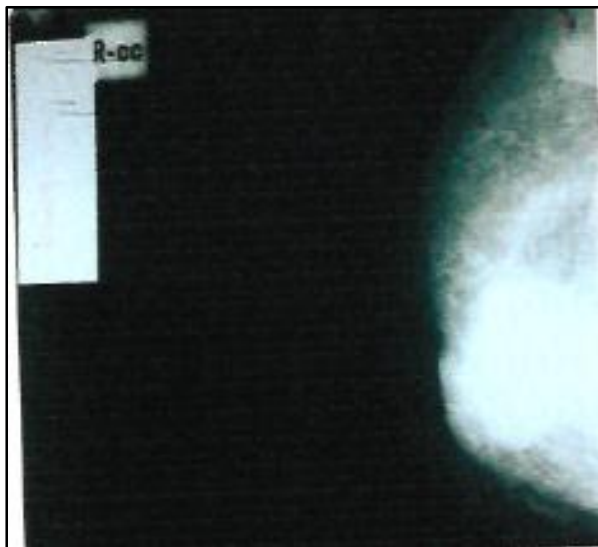

Image 2(a). Evidence of Oval-Shaped Well-Defined Heterogenous Mass Lesion with Smooth Margin Seen Suggestive of Fibroadenoma
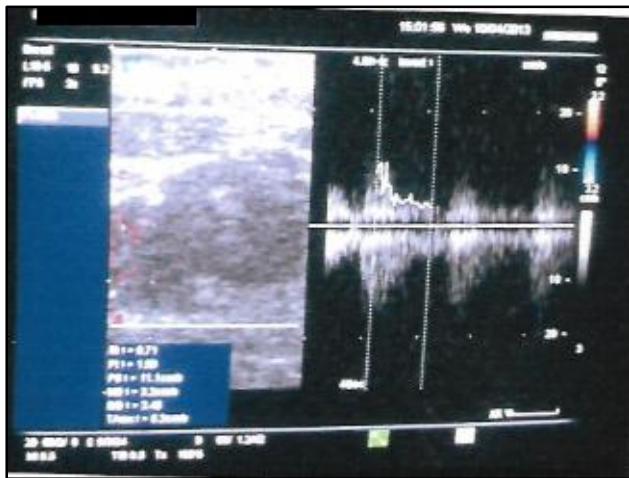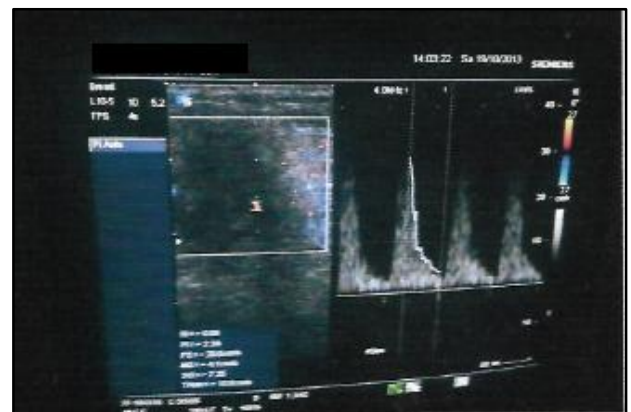
*Image 2(b). Evidence of Mild Vascularity
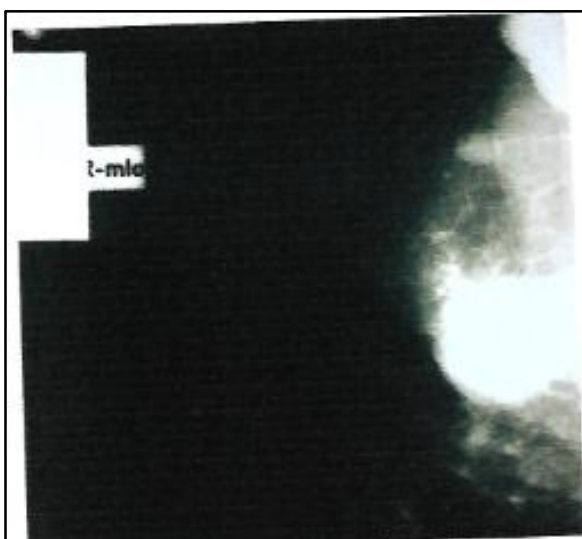Seen with PSV 11.1 cm/sec and RI 0.71*

*Image 3(a). Evidence of Ill-Defined High Density
Lesion with Small Multiple Speculated Margin High
Density Satellite Lesion with Clustered Calcification
seen in CC View Suggestive of Malignant Lesion*

*Image 3(b). Evidence of Ill-Defined High Density
Lesion with Speculated Margin with Multiple Small
High Density with Speculated Margin Satellite
Lesion seen in MLO View with Multiple High Density
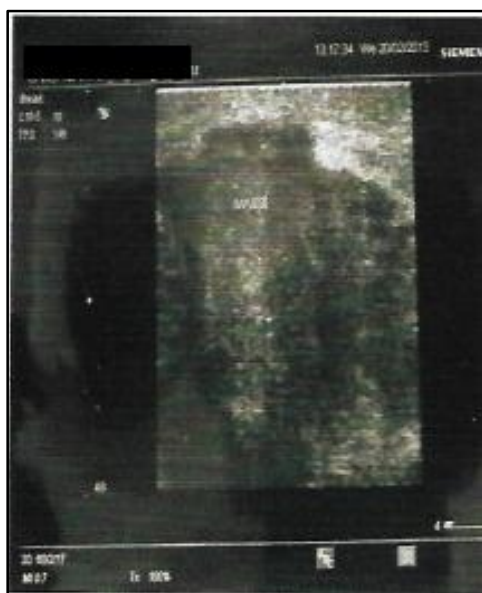Axillary Lymph Node Suggestive of Malignant Lesion*

*Image 4(a). Evidence of Hypoechoic Mass Lesion
with Speculated Margin Seen Suggestive of ILC*

*Image 4(b). On Doppler Lesion showing Marked
Central and Peripheral Vascularity with PSV 21.6
cm/sec and RI 0.83 Suggestive of Malignant Lesion*

*Image 5(a). Evidence of High Density Lesion
with Ill-Defined Lobular Margin with Air Fluid
Level seen in CC View Suggestive of Breast Abscess*

Image 5(b). Evidence of Heterogeneous Mass Lesion with Thick Internal Echoes with Ill-Defined Margin seen Suggestive of Breast Abscess

Image 6(a). Evidence of Irregular Heterogenous Mass Lesion with Infiltrating Margins Suggestive of IDC

Image 6(b). Evidence of Hypoechoic Mass Lesion with Loss of Fatty Hilum seen in Axilla Suggestive of Axillary Lymphadenopathy

Image 7(a). Evidence of Marked Central and Peripheral Vascularity with Sharp Peak with PSV 20.7 cm/sec and RI 0.82 seen Suggestive of Malignant Lesion (IDC)
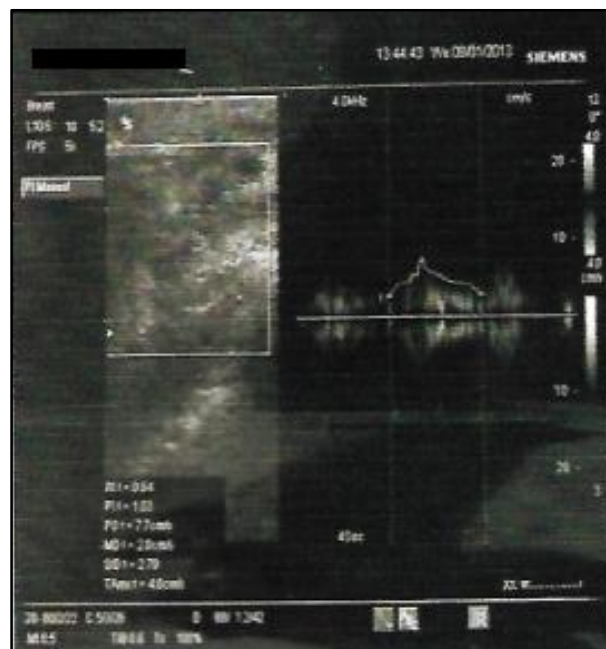
Image 7(b). Evidence of Mild Peripheral Vascularity with Round Peak with PSV 7.7 cm/sec and RI 0.54 seen Suggestive of Benign Lesion (Fibroadenoma)

DISCUSSION

The present study were undertaken in Department of Radiodiagnosis, NSCB Medical College, Jabalpur, to evaluate the role of radiological investigation in evaluation of breast masses. A total number of 50 patients with breast-related complaints were included in this study.

I. Age and Sex Distribution

In our study, the youngest patient was 15 year and oldest patient 70 year old. Most of the benign lesions were seen in <20 to 50 yrs. age group, whereas maximum number of malignant lesions were seen in 40 yrs. to 70 yrs. of age group.

II. Incidence of Benign and Malignant Breast Lesion

In our study, 31 out of 50 breast lesion proved to be benign and 19 breast lesion were malignant on histopathology. The incidence of benign lesion reported in literature varies from 50% to 80% and for malignant lesions from 19 to 50%. Various studies showing the benign:malignant incidence in breast disease-

Author	Year	Number of Cases	Benign	Malignant
Bundenwald Geir et al	1980	334	49.7%	50.3%
Dipieto et al	1985	534	53%	47%
Susan Greenstein et al	1998	230	64%	36%
M.J. Reeves et al	2003	443	77.2%	22.8%
Amit Goel et al	2003	105	60	40%

Benign Lesions
a) Fibroadenoma

Fibroadenoma was one of the most common benign breast lesions in our study. Higher incidence of fibroadenomas was observed in adolescent age group.

Mammography detected 18 out of 20 fibroadenomas presented . Lesions could not be detected in remaining two patient possibly because of the dense breast parenchyma.

Ultrasound was used to detect all fibroadenomas including missed fibroadenoma on mammography due to dense breast parenchymal tissue.

All the lesions were well-defined hypoechoic mass lesions, oval in shape and posterior wall enhancement was seen in 45% of cases. 60% were round and 40% were oval in shape.

Fornage in his study quoted 92% of fibroadenomas to be hypoechoic, whereas 85% of fibroadenomas were hypoechoic in our study.[6] Fornage reported the incidence of posterior acoustic enhancement in fibroadenomas to be around 25%, whereas in our study it was around 45% values.

On colour Doppler evaluation, only 6 cases of fibroadenoma showed minimal-to-moderate amount of vascularity. Holocombe also reported lower vascularity in fibroadenoma compared to malignant lesions. Most of lesion showed peripheral pattern of vascularity and RI <0.73 and PSV <15 cm/sec.

In our study, all the cases of fibroadenoma could be correctly assessed by mammography and sonographic examination. Colour Doppler just reconfirmed sonographically made diagnosis.

b) Fibrocystic Disease

7 patients (14%) with fibrocystic disease were detected in this study. Mammography could detect 5 out of 7 fibrocystic disease. Majority of the lesions observed were well-defined margins, rounded or oval in shape having high or intermediate density.

Ultrasound could detect all the lesions including missed fibrocystic lesions on mammography. Majority of lesions were well-defined anechoic cystic lesion, round or oval in shape with posterior acoustic enhancement. 71.4% were anechoic, 14.2% were hypoechoic and 14.2% were heterogenous. 85.7% were showed posterior wall enhancement.

No additional finding could be detected on Doppler evaluation.

c) Inflammatory Lesions

Two patients (4%) with breast abscess were seen in our study. Both were nonspecific breast abscess.

Mammography could detect breast abscess. In our study, breast abscess appeared as diffuse irregular high density lesion.

Ultrasound could detect all the lesions. Patient with acute breast adhesions revealed ill-defined, heterogenous and irregularly marginated mass. Hilton et al obtained similar finding and Cosgrove et al obtained similar finding.[7]

In our study, inflammatory lesions were common mimicker of malignancy on mammography. Diagnosis of inflammatory pathology could be done by ultrasound clinical assessment with the evidence of resolution after proper therapy.

Malignant Lesion
1. Infiltrating Ductal Carcinoma (IDC)

All 17 cases of IDC were detected on mammography. IDC was most commonly found in upper and outer quadrant (38.8%). Majority of carcinoma were irregular in shape 64.7%, high density 50% lesions with speculated margin (47.05%). Kopans Evans have described similar finding in majority of carcinoma.[8] Calcification were seen in 14 (61.1%) cases in our study and in accordance with Sickles et al and Wolfe reported 58.12% and 55% cases, respectively.[9]

Axillary lymph node associated with loss of lucency, spherical in shape is >1 cm in size was histologically proven to have malignant spread.

On ultrasound, 45.5% of lesion were speculated margins and 35.29% of lesions showed microlobulation and 17.64% were ill-defined margin.

Majority shows heterogenous (64.7%) echotexture to hypoechoic (35.29%) echotexture and having weak posterior wall echoes. Kobayashi AP and Harper et al reported similar finding. In our study, 2 cases of IDC appeared as irregular heterogenous mass with anechoic cystic component and with area of echogenic calcification. On colour Doppler evaluation, most of lesion were showed moderate to marked vascularity obtained in all except lesion with cystic changes showing mild vascularity and low RI values. Most of lesions showed peripheral to central vascularity.

Similar finding were obtained by Shra Raza et al[10] and Sehgal et al. 85% of lesions showed PSV>15 cm/sec, an 80% showed RI> 0.73 in our study. Similar results were obtained by Wei Jee Le et al and Youssefzadeh et al.[11]

2. Invasive Lobular Carcinoma

In our study, two patients had invasive lobular carcinoma. Mammography could not detect lesion because of the increased density of breast.

Ultrasound lesion appeared as hypoechoic to heterogenous in echotexture, irregular in shape with lobulated margins. Butler et al had similar finding. Lesions showed echogenic calcified foci within the mass and one case shows axillary lymphadenopathy with loss of echogenic fatty hilum. On Doppler imaging showed marked vascularity with PSV>15 cm/sec and RI >0.73 was noted.

Summary

The objectives of the present study was to study the role of mammography, sonography and colour Doppler in various conditions of breast pathology. The study was conducted in Department of Radiodiagnosis, NSCB Medical College, Jabalpur.

Results of 50 cases recorded in observation could be comparable to other authors. The study group consisted of all the patients in the age group ranging from 15 to 70 years of age. The total benign and malignant lesions constituted 62% and 38% of total lesions, respectively. Most of the benign masses observed were seen in patients less than 40 years of age, whereas majority of the malignant masses were seen in cases older than 40 years.

Out of the 50 cases ,4 cases which were thought to be benign on sonography turned out to be subsequently malignant on biopsy.The percentage of false negative report was 8%. No other false positive case was reported in our study.

The difference in vascularity was noted. Benign lesions showed mild-to-moderate amount of vascularity in periphery while malignant lesions showed moderate-to-marked vascularity in both peripheral as well as in central region.

Most of the malignant lesions showed PSV >15 cm/sec and RI >0.73.

The FNAC was done under USG guidance. The purpose was to take tissue from the most likely area of pathology. The significance of USG-guided FNAC for its high rate of probability of taking tissue from the site of pathology is remarkable.

The study was only for the early diagnostic procedure and with minimal cost effective method. The correlation with elastography and MRI could not be done as the purpose of study was to provide maximum information with minimum cost to patient. So, study was only sonomammographic evaluation with use of colour Doppler.

Elastography- Ultrasonographic elastography is a method similar to palpation which is one of the main examination method. It evaluates the hardness of breast masses and is currently being used as a new technique to help in the differentiation of malignant and benign breast masses.[12]

Malignant lesions tend to be significantly harder as compared to normal tissue. Combining classical ultrasound with elastography method may reduce the rate of unnecessary biopsies. Although, elastography is not a method that can replace conventional breast ultrasound by increasing its diagnostic power. [13]

Breast MRI- Magnetic resonance imaging of the breast is being performed more frequently to improve primary and recurrent tumour detection, characterisation and patient's response to therapy. Sensitivity approaches (90%) and specificity range of 37%-100%.[14]

MRI of the breast is indicated for the evaluation of the extent of spread of a suspected extensive high-grade carcinoma, evaluation of suspected multifocal or bilateral neoplasm. Monitoring of the response to neoadjuvant chemotherapy, screening of high-risk patient, detection of an occult breast lesion and lymphadenopathy.[15]

FNA Cytology and Core Biopsy- These were originally used to diagnose palpable breast lesion. Both method have a high degree of sensitivity and specificity.

FNA cytology is an excellent method for diagnosing palpable lesions, its sensitivity has been reported to be between 89%-98% and its specificity between 98%-100%. Following the introduction of mammographic screening, FNA cytology and core biopsy are now also used to diagnose impalpable breast lesion. The use of core biopsy has increased especially in the evaluation of lesion that are associated with high inadequacy rate with FNA cytology such as mammographically-detected lesion that are very small or microcalcification.[16]

CONCLUSION

We conclude that mammography, ultrasound and colour Doppler all are useful tool to differentiate between benign and malignant breast masses. Mammography is very useful for detecting microcalcifications and nonpalpable lesions in middle-aged women and also useful for screening purpose. Sonography with colour Doppler is useful for localisation and characterisations of breast lesions.

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