

Mammographic evaluation of palpable breast masses with pathological correlation: a tertiary care centre study in Nepal

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Abstract

Introduction: Breast cancer is one of the major health problem for all countries. . In Nepal , breast cancer is the second most common cancer in female. Early detecting tools like mammography can able to detect location , size, morphology, and nature of breast lesions that can help to reduced mortality and morbidity from breast cancer significantly.

Methods: This prospective study was carried out at the department of Radiology, Surgery and Pathology for a period of one year. A total of 100 patients with clinically palpable breast lump were subjected to mammography and subsequently to FNA or biopsy. The mammograms were reviewed by two senior consultant radiologists and pathology by a senior pathologist.

Results: Out of 100 patients, 65% had mammographic features of benign lesion and 35% had features of malignancy. Pathology revealed 64% of lesion to be benign and 36% of lesion to be malignant. There were four false negative (6.2%) and three false positive (8.6%) cases. The sensitivity and specificity of mammography were 88.9% and 95.53% respectively. The mean age of patient with malignant lesion was 46.3 years (SD=11.5) and 34.7 years (SD=10.6) for benign lesions. Among malignant lesion 37.1% had lobulated, 14.3% had oval, 31.4% round and 17.1% had irregular shape with spiculated margin in 60% and indistinct margins in 34.3%. Among benign 7.7% showed lobulated shape, 41.5% oval and 50.8% round shape. Circumscribed margin was found in 93.9% of benign and 5.7% of malignant lesions.

Punctuate and polymorphic calcification was found in malignant lesions (25.7% and 5.7%). Secondary changes were found in only in the malignant cases. Halo sign was found only in benign cases and most common in fibroadenoma (38.4%).

Conclusions: Mammography is an effective diagnostic tool for benign and malignant characteristic of palpable breast mass.

Keywords: Breast lump, mammography, micro calcification

Introduction

Breast cancer is one of the major health problems for developed as well as developing countries. Breast cancer occurs in approximately 6 percent of the American female and accounts for approximately 30,000 deaths annually in the United States.¹ in Nepal, among cancer cases in females,

frequency of breast cancer is 16.9 percent and it is second most common cancer in females.² Mammography, is capable of revealing the location, size, morphology and in the majority of cases the nature of breast lesions. The absolute mortality rate has been significantly reduced because of efficiency of mammographic screening and its ability to find out carcinoma in situ, small infiltrating cancers at earlier

stage. Thus, complete understanding of breast morphology and mastery of the diagnosis of breast disease and progressive steps towards expanding the use of mammography can help to reduce the breast cancer mortality and morbidity.

Methods

This Prospective study was carried out at the Department of Radiology, Surgery and Pathology. The study included 100 patients with clinically palpable breast lump. An informed and written consent was obtained from the patient for this study. Mammography was performed in craniocaudal and mediolateral projection in the dedicated mammographic unit (Lorad) with automatic exposure timings with 26-30kv. Mammograms interpretation was done by two senior consultant radiologists with consensus reading. Radiologically, the abnormalities were categorized into major and minor groups for the malignant and benign lesions. The characteristics in major groups for malignant lesion included shape, margin and calcification. Lobular and irregular shape, speculated and indistinct margins and punctuate and polymorphic calcifications were the features of malignant lesions. Benign lesions had oval and round shape with circumscribed margins and spherical calcification. The characteristics in minor groups for the malignant lesion included architectural distortion, nipple retraction, skin thickness and benign lesion has perilesional halo. Pathological sample were obtained by image guided fine needle aspiration and true cut biopsy and were reviewed by a senior pathologist. Correlation was made between mammographic and cyto/histologic diagnosis. Statistical Analysis was performed using standard statistical program (spss 10.0).

Results

100 patients with clinically palpable breast mass underwent mammography and subsequent pathological examination. Comparison of mammographic and pathologic diagnosis given in Table 1. Among them, 65% had mammographic features of benign and 35% had features of malignancy. Pathological examination revealed 64% of the lesion to be benign and 36% of the lesion to be malignant. Both mammographic and pathologic diagnosis was concordant in 61(61%) benign and 32(32%) malignant cases. Among 7 discrepant lesions, 4 were mammographically benign and subsequent pathology revealed malignancy. 3 mammographically malignant lesions were benign on

pathological examination. The youngest patient diagnosed as malignancy on mammography was 25 years old, with negative histopathology. The youngest patient with breast cancer both mammographically and pathologically was 32 year old.

Table 1: Comparison of mammographic and pathologic diagnosis

Mammographic diagnosis	FNAC/Histopathological diagnosis		Total
	Benign (%)	Malignant (%)	
Benign	61 (93.8)	4 (6.2)	65
Malignant	3 (8.6)	32 (91.4)	35
Total	64	36	100

Age distribution in benign and malignant lesion of breast masses is presented in Fig. 1.

The mean age of patients with malignant lesion was 46.3 years (SD=11.5) and maximum number of malignant cases were found in the two age groups 40-44 and 50-54. No malignant cases were found below 25 years of age. The mean age of patients with benign lesion was 34.7 years (SD=10.6) and maximum number of benign cases were found in 35-44 years age group.

Characteristics of major mammographic findings in benign

Fig. 1: Age distribution of patients with breast masses

and malignant masses are given in table no 2. Among benign lesions, 50.8% had round, 41.5% had oval, and 7.7% had lobulated shape. Among malignant, 37.1% had lobular, 14.3% had oval, 31.4% had round and 17.1% had irregular shape. (P-value<0.000027)

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Table 2: Mammographic findings of benign and malignant breast lesions

		Benign (65)	Malignant (35)	Total (100)
Shape	Lobular	5 (7.7%)	13 (37.1%)	18 (18%)
	Oval	27 (41.7%)	5 (14.3%)	32 (32%)
	Round	33 (50.8%)	11 (31.4%)	44 (44%)
Margins	Irregular	0 (0%)	6 (17.4%)	6 (6%)
	Spiculated	0 (0%)	21 (60%)	21 (21%)
	Circumscribed	61 (93.9%)	2 (5.7%)	63 (63%)
CalcificationTypes	Indistinct	4 (6.2%)	12 (34.3%)	16 (16%)
	Punctate	0 (0%)	9 (25.7%)	9 (9%)
	Polymorphic	0 (0%)	2 (5.7%)	2 (2%)
	Spherical	2 (3%)	0 (0%)	2 (%)

In malignant lesions, spiculated margins were found in 60%, indistinct margin in 34.3% and well circumscribed margin was 5.7% cases. 93.9% benign lesion had circumscribed, and 6.2% had indistinct margin. (p value < 0.000027)

The most common mammographic finding in malignancy was microcalcification with or without associated mass.³ In our study 25.7% malignant lesions had punctate calcification and 5.7% had polymorphic calcification whereas only 3% benign cases showed Spherical calcification.

Mammographic findings of secondary changes are given in Table 3.

Changes like architectural distortion, nipple retraction and increased skin thickness were found only in malignant cases.

Halo sign was found only in benign cases, most commonly in fibroadenoma (38.4%)

Table 3: Mammographic findings of secondary changes in malignant breast masses

Malignant cases	
1. With secondary changes	No. (%)
(a) Nipple retraction	12 (34.9)
(b) Increased Skin thickness	11 (31.4)
(c) Architectural distortion	4 (11.4)
2. Without secondary changes	8 (22.9)
Total	35 (100)

Pathological findings of benign and malignant breast masses (Table 4).

Among pathologically proven benign lesion 28.1% were fibroadenoma, 33.3% fibrocystic disease, 10.3% galactocele and 7.7% were fibroadenosis. Among malignant lesions, infiltrating ductal carcinoma was seen in 91.7%, Medullary in 5.5% and mucinous carcinoma in 2.8% of cases.

Table 4: Pathological findings of benign and malignant breast masses and halo sign

	Types	No. (%)	Halo sign
Benign (64)	Fibroadenoma	18 (28.1)	15 (38.4)
	Fibrocystic disease	23 (35.9)	13 (33.3)
	Abscess	4 (6.2)	0 (0)
	Simple cyst	9 (14.1)	4 (10.3)
	Galactocele	5 (7.8)	4 (10.3)
	Fibroadenosis	4 (6.2)	3 (7.7)
	Benign phyllodes	1 (1.6)	0 (0)
Malignant (36)	Infiltrating ductal carcinoma	33 (91.7)	0 (0)
	Medullary	2 (5.5)	0 (0)
	Mucinous carcinoma	1 (2.8)	0 (0)

Discussion

In the present study, the sensitivity of mammography was 88.89% and specificity 95.53%. This is close to the findings shown by other authors.

In 1929, Warren¹⁴ was able to show an 85% to 95% diagnostic accuracy of mammography where as Baker¹⁵ found 88%, Mc. Clow¹⁶ 87%, Strax¹⁸ 67% and Lesnick¹⁷ showed only 42% of sensitivity of mammography.

In our study, the mean age of the malignant lesion was 46.3 years and maximum number of malignancy was found in the two age groups 40-44 and 50-54. No malignant lesions were found below 25 years of age. The mean age of the benign lesion was 34.7 years and maximum numbers of benign cases were found in 35-44 years. (p value 0.000001)

Seidman H, et.al. found less than 3% of malignancy in patients below 35 years and less than 1% below 30 years.⁴ In India J.E. Park found mean age of malignancy was 42 years.² Budhathoki TB, et al found 3.7% malignancy in 40-48 years.⁵ The series of Sayami and Nakarmi et al,⁶ showed the mean age of malignancy was 51 years. Our findings are similar to these authors.

In the present study, maximum malignant lesion showed lobulated shape (37.1%) and spiculated margin (60%). Circumscribed margin was found in only two cases (5.7%) of medullary carcinoma. Maximum numbers of benign lesions showed round (50.8%) or oval (41.5%) shape with circumscribed (93.9%) margin. Similar morphology was found in the series of McLelland with typical benign mass round or oval shaped with smooth contours and majority of these lesions were cysts or fibroadenomas.⁷

Meyer J.E. et. al., reported 5% of malignancy with circumscribed mass appearing benign. Medullary, papillary, mucinous and metastatic carcinoma and some ductal carcinoma might show circumscribed mass in mammogram.^{8,9} Hence at times mammography could be misleading in malignant lesions.

We found microcalcifications in 31.4% of malignant lesion and punctuate (25.7%) type was the most common. Microcalcification was not found in the benign lesion.

The study in screening mammography by Ellen, et al showed the most common mammographic finding of malignancy as microcalcification with or without associated masses (38%).³

Powell, et al, found microcalcifications in approximately 40% of all breast cancer, either as an isolated sign or in combination with other abnormal radiographic findings, such as mass, architectural distortion or asymmetry.¹⁰ Millis found microcalcification on mammography at least in 30% of malignancy and 70% in histology.¹¹

In our study, secondary breast changes (nipple retraction 43.3% and skin thickness 31.4% architectural distortion 11.4%) were found only in the malignancy and halo sign was found only in the benign lesions, most commonly in fibroadenoma.

Yorkshire breast cancer group found nipple retraction in 43 (4%) of 1205 patients with operable breast cancer.¹² Tomm E, et al identified partial radiolucent halos in 32 (73%) lesions, 38 (86%) were cysts; 3 (7%) fibroadenomas; 2 (4%) infiltrating ductal carcinomas; and 1 (2%) axillary lymph node metastasis in total 44 masses.¹³

Conclusions

Mammography is an effective diagnostic tool capable of revealing the location, size and morphology of the breast lesions. Certain morphological features are very characteristic for benign and malignant lesion with fallacies in very minority of cases. Hence it has a unique role in the diagnosis of breast lesion with high sensitive and specificity.

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