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Original Research Article

Correlation between histopathological results and BIRADS classification inbreast masses

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Abstract:

Background: Breast cancer incidence in India is increasing and has now become the most common cancer among women. Preoperative pathology diagnosis and mammography (using breast imaging reporting and data system (BI-RADS) scoring system) constitute an essential part of the workup of breast lesions. The present study was aimed to compare the diagnostic accuracy of BI-RADS score with histopathological finding in diagnosis of benign and malignant lesions of breast.

Methods: This is a cross-sectional study with study duration of 1.5 year (January 2021- June 2022) The present study was conducted on 100 randomly selected newly diagnosed cases of breast masses.

Results: Considering histopathological examination as gold standard, the sensitivity and specificity of BI-RADS score is 93.9% and 82.8% respectively. The positive predictive value, negative predictive value and diagnostic accuracy of BI-RADS score is 91.04% and 87.8 % respectively.

Conclusions: The inference derived from the present study is that BIRADS is a very useful tool specially owing to the fact that it is noninvasive, which leads to lesser trauma and faster report however the tissue diagnosis using H&E and other stains remains the gold standard and should always be restored to before undertaking surgery.

Keywords: Breast imaging reporting and data system, Breast lump, Histopathology, Triple assessment

Introduction: Breast cancer is the commonest cancer worldwide in women accounting for 25% of cancer in women.[1] Every breast lump is not malignant and every benign lump do not progress to cancer; nevertheless, the precision of the final diagnosis can be greatly increased by using triple assessment; radiological imaging (mammography, ultrasonography) and pathological diagnosis along with clinical examination.[2]They can be used both for diagnostic and screening purposes.

Imaging screening has contributed to substantial reduction in breast cancer mortality, resulting in

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an increased prevalence of benign biopsies statistically. Mammography in all women above the age of 40 years with breast lump becomes mandatory to rule out malignancy[3]. Benign breast biopsies can be distressing, and therefore the correct interpretation of mammography and ultrasound (US) results for breast lesions is very important. BI-RADS classifies breast lesions from categories 2 to5 depending on imaging characteristics as a final assessment, and category 4 is further subdivided into 4a, 4b, and 4c. In general, lesions of category 4 or category 5 are recommended for tissue biopsy.[4] It has six categories, 1-denotes negative study, 2-denotes benign lesion, 3-denotes probably benign lesion, 4-denotes suspicious abnormality, 5-denotes lesion is highly suspicious of malignancy, and 6-denotes previously biopsy proven malignancy.[5]

Numerous centers throughout the world are promoting screening programmes and Breast self-examination to detect the disease as early as possible. Due to an increase in awareness and screening programmes, the number of women presenting to the hospital with a breast lump has increased substantially.

Aim of this study is to evaluate the Correlation between histopathological results and BIRADS classification in breast masses of patients attending the tertiary care center at Indore.

Material and methods: A cross-sectional study was conducted in Index medical college, Indore for evaluating histopathological results and BIRADS classification in breast masses. Data were collected from January 2021 to June 2022. A sample of 100 patients was collected during the studyperiod. The study Setting of the present study was conducted on randomly selected newly diagnosed breast lump cases.

Inclusion criteria:

1. Female patients above 35 years with complaint of a breast lump.

Exclusion criteria:

1. Patients less than 35 years.
2. Pregnant and lactating females.
3. Patients with recurrent lumps.
4. Male patients

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5. Previous history of surgery on the breast

A predesigned semi-structured questionnaire was prepared based on the review of literature on breast lumps including epidemiological data, duration of symptom, menstrual and obstetric history, and history specific to breast lumps. Women underwent mammography, the report of which was evaluated using BI-RADS score. After relevant investigations, trucut biopsy was taken from the lumps and the sample was sent for histopathological examination.

Statistical analysis:

The categorical variables were assessed using Pearson chi-square. The quantitative variables were assessed using t -test. The test was considered significant only if the p-value comes out to be less than 0.05. The concordance between BI-RADS score and histopathology test was assessed using sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy considering histopathology test as Gold standard.

Result:

The mean age of the study participants is 57.7±8.3 years. The mean age of benign cases was 50.1±9.4 years and malignant cases was 58.2±8.9 years. It was observed that among benign cases, 10 (15.2%) cases were between 36-45 years, 16 (24.2%) cases were between 46-55 years, 28 (42.4%) cases were between 56-65 years, 9 (13.6%) cases were between 66-75 years, 3 (4.5%) cases were above 75 years while among malignant cases, 5 (14.7%) cases were between 36-45years, 7 (20.6%) cases were between 46-55 years, 11 (32.4%) cases were between 56-65 years, 7 (20.6%) cases were between 66-75 years and 4 (11.8%) cases were above 75 years.

On histopathological examination, it was observed that 65 (65.0%) cases were having benign lump while 35 (35.0%) cases were having malignant lump as shown in Figure 1. On basis of BIRADS score distribution of cases were 67(67%) were benign and 33(33%) were malignant as shown in Figure 2

It was observed that 11 (11.0%) cases had BIRADS score 1, 33(33.0%) cases had BI-RADS score 2, 23(23.0%) cases had BI-RADS score 3, 14(14.0%) cases had BI-RADS score 4, 10(10.0%) cases had BI-RADS score 5 and 9 (9.0%) cases had BI-RADS score 6

On comparing with findings on histopathological diagnosis, findings of BI-RADS 1 and 2 matched HPE and confirmed benign condition in all cases. Cases with BI-RADS 3 and 4 showed variation with 6 cases having score of BI-RADS score 3 (probably benign) shown to be malignant on histopathology and 3 cases having BI-RADS score 4 (suspicious) shown to be benign. The remaining cases were malignant in both examinations as seen in table 1

Considering BI-RADS score 1, 2 and 3 to be benign and score of 4, 5 and 6 to be malignant, it was seen that 61 cases were benign on both HPE and BI-RADS score, 4 case was benign on HPE and

malignant on BI-RADS score, while 6 cases were malignant on HPE and benign on BI-RADS score and 29 cases were malignant on both HPE and BI-RADS score as shown in table 2

Considering HPE as gold standard, the sensitivity and specificity of BI-RADS score is 93.9% and 82.8% respectively. The positive predictive value and negative predictive value of BI-RADS scoreis 91.04 %, 87.8 % respectively as seen in table 3.

Table 1 : Distribution of findings on BIRADS mammogram and histopathology.

BI-RADS Score	N (%)	HPE positive	HPE negative
BI-RADS score 1	12	0	12
BI-RADS score 2	32	0	32
BI-RADS score 3	24	6	18
BI-RADS score 4	13	10	3
BI-RADS score 5	10	10	0
BI-RADS score 6	9	9	0
Total	100	35	65

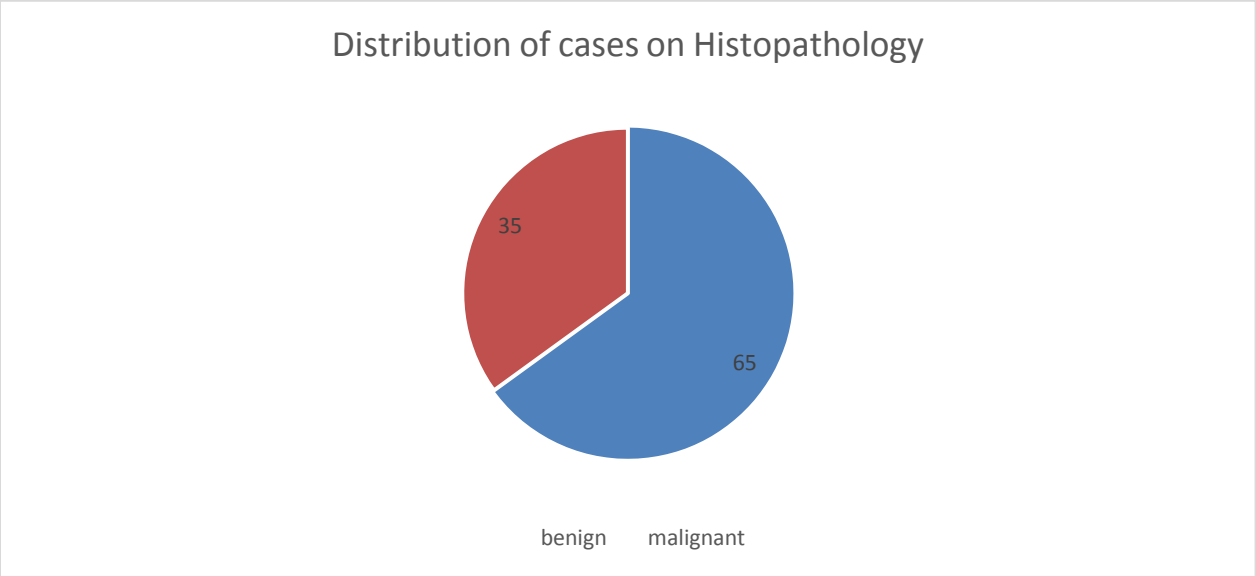

Table 2: Correlation between HPE diagnosis and BI-RADS score.

BIRADS diagnosis	HPE diagnosis		Total
	Benign	Malignant	
Benign	61	6	67
Malignant	4	29	33
Total	65	35	100

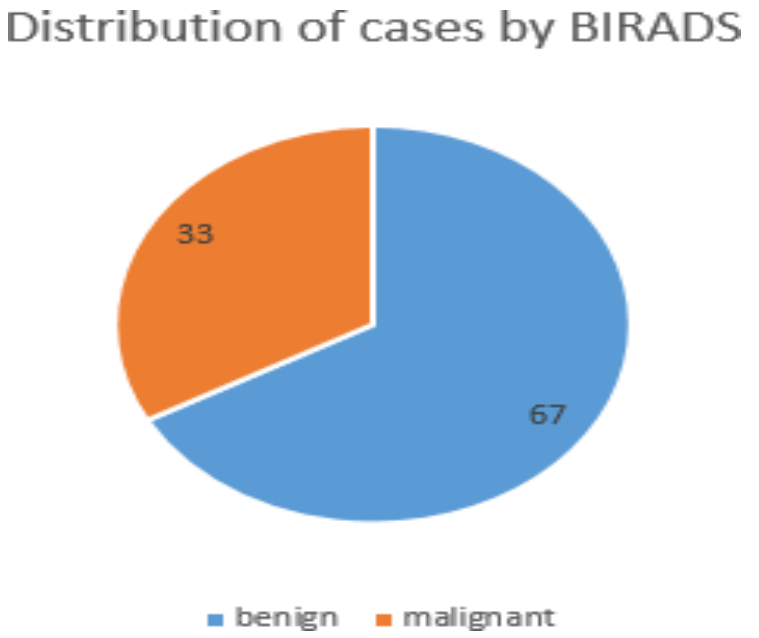

Table 3 : Summary of accuracy data for BIRADS score.

Parameter	Estimate (%)	Lower-upper 95% CI
Sensitivity	93.9	(84.9-98.3)
Specificity	82.8	(66.3-93.4)
Positive predictive value	91.04	(83.0-95.48)
Negative predictive value	87.8	(73.49-94.99)

Discussion :

The mean age of the study participants is 57.7±8.3 years. The mean age of benign cases was 50.1±9.4 years and malignant cases was 58.2±8.9 years. In the study conducted by Takalkar et al[6], a similar mean age of the cases was found, 52.6±10.5 years. In a study conducted by Arsalan et al[7], the mean age of the cases was found to be much younger 42.6±7.21 (30-60) years.

Distribution of benign and malignant lump on histopathology

In the present study, it was observed that 65 (65.0%) cases were having benign lump while 35 (35.0%) cases were having malignant lump on histopathology.

In the study conducted by Navya et al[8], similar findings were observed that 32 (64.0%)

cases werehaving benign lump while 18 (36.0%) cases were having malignant lump on histopathology

In the study conducted by Soyder et al[9], it was observed that majority of cases 42 (75.0%) were having benign lump while only 16 (25.0%) cases were having malignant lump.

Distribution of findings on BI-RADS mammogram

In the present study, it was observed that 67 (67.0%) cases were having benign lump while 33 (33.0%) cases were having malignant lump on BI-RADS score.

In the study conducted by Navya et al[8], it was observed that 30 (60.0%) cases were having benignlump while 20 (40.0%) cases were having malignant lump on BI-RADS score.

Correlation between HPE diagnosis and BI-RADS score

In the present study, it was seen that 62 cases were benign on both HPE and BI-RADS score, 4 case was benign on HPE and malignant on BI-RADS score while 6 cases were malignant on HPEand benign on BI-RADS score and 28 cases were benign on both HPE and BI-RADS score. Considering HPE as gold standard, the sensitivity and specificity of BI-RADS score is 93.9% and82.8% respectively. The positive predictive value, negative predictive value of BI-RADS score is
91.04 % and 87.8% respectively.

In the study conducted by Navya et al[8], it was found that 28 cases were benign on both HPE and BI-RADS score, 4 case was benign on HPE and malignant on BI-RADS score while 2 cases weremalignant on HPE and benign on BI-RADS score and 16 cases were malignant on both HPE and

BI-RADS score.12 Considering HPE as gold standard, the sensitivity and specificity of BI-RADSscore is 88.0% and 87.5% respectively. The positive predictive value, negative predictive value and diagnostic accuracy of BI-RADS score too concurred with these findings and were found to be 80.0%, 93% and 88% respectively.

In the study conducted by Arsalan et al, it was found that 41 cases were positive on both Biopsy (FNAC/ trucut/ excision) and BI-RADS score, 6 case was positive Biopsy (FNAC/ trucut/ excision)and negative on BI-RADS score while 3 cases were negative on both biopsy (FNAC/ trucut/ excision) and BI-RADS score. Considering biopsy (FNAC/ trucut/ excision) as gold standard, the sensitivity and specificity of BI-RADS score is 87.2% and 100.0% respectively. Positive predictive value, negative predictive value and diagnostic accuracy of BI-RADS score, in contrast to this study, were 100.0%, 33.3% and 88% respectively.

In a study conducted by Shrestha et al[10], he observed the sensitivity of 78.9 percent and

specificity of 95% on sonomammography for differentiating benign from malignant lesions using the BI- RADS score.

Conclusion: The inference derived from the present study is that BIRADS is a very useful tool specially owing to the fact that it is non invasive , which leads to lesser trauma and faster report however the tissue diagnosis using H&E and other stains remains the gold standard and should always be restored to before undertaking surgery.

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