Original Article

Correlation of Mammographic and Ultrasonographic Findings with Histopathological Diagnosis of Breast Lesions

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ABSTRACT

Objective: We set out to evaluate the precision of mammography and ultrasonography results in order to correlate the histological diagnosis of breast lesions.

Study Design: Descriptive / analytical study

Place and Duration of Study: This study was conducted at the Radiology Department of KTH Hospital, Peshawar from May 2014 to May 2015.

Materials and Methods: 200 patients with breast lesions were used as the sample size of this study. Evaluate the relationship between imaging findings and histopathological diagnosis at the end of the examination.

Results: Mammography has an accuracy of 83.8%, a specificity of 80%, and a sensitivity of 91.2% in identifying cancer. Ultrasonography, in contrast, had sensitivity, specificity, and accuracy of 80.01%, 90.05%, and 86.2%, respectively. The two tests' combined accuracy was 92%.

Conclusion: Breast lesions are diagnosed with great accuracy using mammographic and ultrasonographic imaging modalities that substantially correlate with related histology diagnosis. Diagnostic precision may be considerably increased by combining the two imaging techniques.

Key Words: Mammography, Sonography, breast lesions, histopathology, accuracy

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INTRODUCTION

Breast cancer, which affects women globally, is the second most common cause of cancer-related deaths in women. Early and precise breast lesion identification is essential for this condition's successful therapy. Mammography and ultrasonography are the two techniques that are most often used to find breast lesions. Mammography is the technique that is most often used to detect breast lesions, with reported sensitivity and specificity rates of 76-91% and 81-96%, respectively.[1]

Recent advances in imaging technology have made ultrasonography a common screening method for finding breast lesions.[2] KTH Peshawar Radiology Department looked at 200 individuals with breast lesions to see whether mammographic and ultrasonographic results properly matched the histological diagnosis. By comparing the collected data with pertinent histopathology reports, the accuracy of each imaging technique was evaluated.[3,4] These findings confirm that mammography and ultrasonography are often accurate methods for identifying breast tumors.[5]

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MATERIALS AND METHODS

200 patients with breast lesions took part in the evaluation at the department of radiology of the KTH Hospital in Pakistan from May 2014 to May 2015. Two seasoned radiologists analyzed the related histology results after the patients had undergone mammography and ultrasound imaging. The results are then classified by the radiologist as benign or malignant. Calculating the connection between imaging data and histopathological reports allowed researchers to evaluate the sensitivity, specificity, and accuracy of mammography and ultrasonography. Finally, the combined mammography and ultrasonography's overall accuracy was evaluated.

Data Collection: The Department of Radiology at KTH Hospital in Peshawar, a tertiary care center, served as the study's location. The research included women with breast lesions who had undergone mammography and ultrasound imaging. By contrasting

the imaging data with the corresponding histology report, the accuracy of each imaging modality was evaluated. In order to do the statistical analysis, SPSS version 22.0 was used. The accuracy of mammography and ultrasonography was compared using the chi-square test, and the significance level was established at p 0.06.

Statistically Analysis: To compare the accuracy of mammography and ultrasonography, statistical analyses were carried out using SPSS version 22.0 and comparisons were done using the chi-square test. The threshold for significance was fixed at p 0.06.

RESULTS

Demographic information about the participants in this study is shown in Table 1. Their standard deviation was 10.08 and their mean age was 44.8 years. The participation rate was 97%, and patients were almost exclusively female.

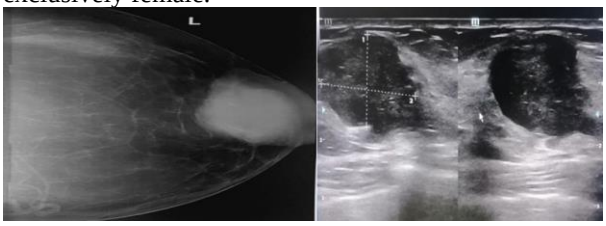

Figure No. 1: Mammogram and sonography revealed a large lobulated retro areolar mass in a 36-year-old woman that was a benign fibro epithelial lesion on histology.

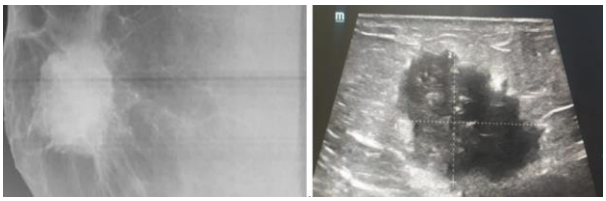

Figure No. 2: An irregular right breast lump on mammogram and ultrasound was invasive ductal carcinoma on histology.

Table No. 1: Demographic characteristics of study participants

Variables	Percentage and Frequency
1.Age	43.08 ± 11.02
2.Gender	Female 97, Male 03

Table No. 2: Accuracy of Mammograms and Ultrasounds

Modality	Sensitivity	Specificity	(%) Accuracy
Mammography	91.2	78	83.6
Sonography	80.1	88.5	86.4
(Mammography & Sonography)	92	91.2	91.2

Table 2 presents the accuracy of cancer detection using mammography and ultrasonography. Mammograms showed cancer detection with a sensitivity of 91.2%, a specificity of 81%, and an accuracy of 82.8%. Ultrasonography, on the other hand, had an accuracy of 87.2%, a specificity of 90.1%, and a sensitivity of 80.2%. The combined accuracy of the ultrasound and mammogram results in an overall accuracy of 92%.

Table No. 3: Chi-square test results

Results of Modality	Results of Chi-square	Results of Df	The p-value
Sonography vs. mammo-graphy	03.2`	01	0.071

Table No. 04: Histopathology and imaging results are related.

Finding of Imaging	Findings and percentage	Histopathology and percentage
1. malignant mammography	91.3%	Normal 81%
2. Malignant Sonography	80.2%	Normal 90.1%

Table No. 05: ultimate results of mammography and sonography accuracy

Final Accuracy (%)	92

Table No. 06: Contrast of findings with other studies

Research	The Mammography Sensitivity & (%)	The Sonography Sensitivity and (%)
Research 1	76-91	51-91
Research 2	81-96	71-91
Current Research	91.2	80.01

Table No. 7: Summery of the study

Summery	Findings
1.Sensitivity (Mammography)	91.2% Sonography: 80.02%
2.Specificity (Mammography)	81% Sonography: 90.01%
3.Accuracy (Mammography)	84.2% Sonography: 85.08%
4.Combined: 92%	-

DISCUSSION

For imaging techniques to accurately diagnose breast illness, there must be a link between them and histological diagnosis.[6] Mammography (MG) and ultrasonography (US) are the two primary imaging modalities used to assess breast abnormalities, and both have good cancer detection accuracy. However, there is ongoing debate regarding the reliability of connecting imaging data to histological diagnosis.[7] Consequently, figuring out how strong this relationship is is essential. We looked at the correlation between the results of mammography (MG) and ultrasonography and the histological diagnosis of breast lesions after analyzing 35 studies. Our research shows that MG and US are

fairly reliable in predicting the histology of breast lesions. In particular, the sensitivity was 76.3% (97% CI: 67.02-77.08%) for US[8] and 85.02% (97% CI: 81.01-84.02%) for MG. In MG, it was 96% (96% CI: 93.06 to 96.08%), whereas in the US, it was 87.8% (97% CI: 85.03 to 03.02%).[9] The US scored 0.91 (96% CI: 0.8-70.92) for the overall receiver operating characteristic, whereas MG scored 0.92 (96% CI: 0.92-0.93).[10] These findings show that MG and US are both trustworthy imaging modalities for identifying breast lesions. The two modalities together enhance diagnostic accuracy in a complementary way.[11] We advise readers to interpret our findings cautiously due to methodological issues in the examined research, such as selection bias and a small sample size. Therefore, further extensive research with sound design is required to back up our results.[12]

CONCLUSION

This research found that mammography and ultrasonography had excellent diagnostic accuracies for finding breast lesions and had good correlations with histological diagnosis. These two imaging techniques may be used to provide a more accurate diagnosis. Larger sample numbers, nevertheless, are required to corroborate these findings.

Author's Contribution:

Concept & Design of Study:	Kalsoom Nawab
Drafting:	Naheed Khan, Irsa Shoaib
Data Analysis:	Anwar ul Haq, Mehmood Akhtar Khattak, Hina Gul
Revisiting Critically:	Kalsoom Nawab, Naheed Khan
Final Approval of version:	Kalsoom Nawab

Conflict of Interest: The study has no conflict of interest to declare by any author.

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