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The profusion of breast lesions in breast biopsies showed imaging and pathological discordance

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ABSTRACT

Introduction: For nonpalpable breast lesions, imaging-guided breast tissue biopsy has become a viable alternative to open surgical biopsy. It can be difficult to talk about abnormal results of the connection between imaging and pathology findings because they can help with decision-making about additional treatment options by arriving at a full diagnosis.

Materials and Methods: This was a retrospective study. A specialist radiologist collected and classified radiological data from 500 patients' imaging-guided breast biopsies over a 6-year period using the BIRADS format. The discordance between histopathology reports was investigated.

Results: A total of 500 cases were reviewed. Approximately 4.6% (23) of cases fell into BIRADS 2 category, 33.6% (168) of cases fell into the BIRADS 3 category, 24.4% (122) into the BIRADS 4, 36.6% (183) into BIRADS 5 categories and 0.8% (4) into BIRADS 6 categories. Approximately 49.2% (n = 246) cases were benign, 3.4% (17) belonged to the high-risk category, and 47.4% (237) were malignant. The number of discordant cases was 12 (2.4%), mostly due to technical factors. The sensitivity of biopsies to detect malignancy was 85%, specificity was 96%, and accuracy of biopsy in diagnosing cancer was 90%.

Discussion: The most sensitive way for detecting early breast cancer is the "triple assessment." Because of the high occurrence of carcinoma in these lesions, an effective communication line between a physician, radiologist, and pathologist is required for surgical excision in discordance.

Conclusion: In discordant cases, the ultimate choice is based on two concordant findings out of the three parameters, either due to abnormal imaging results or abnormal pathology findings. A multidisciplinary breast conference is held, with the pathologist taking an active role.

Keywords: BIRADS, breast carcinoma, core biopsy, discordance, imaging

INTRODUCTION

When compared to open surgical biopsy for clinically and/or radiologically worrisome nonpalpable breast lesions, imaging-guided breast biopsy has become the gold standard. [1] Cost effectiveness, less problems, and minimum cosmetic deformities for patients are just a few of the benefits. Despite recent advancements in biopsy procedures, false negative diagnoses are still common, causing delays in diagnosis and treatment. Imagingpathological discordance has been shown to vary from 1% to 8%, with 24 percent of these discordant cases indicating the presence of cancer. [2] Technical faults, failure to act on a discrepancy, or a lack of follow-up after a benign result are all possible causes of discordance. To provide a reasonable explanation for the discordance and deliver appropriate timely management for the

benefit of the patient, a multidisciplinary team discussion with documenting of aberrant outcomes between imaging and histology is required.

OBJECTIVES

The primary goal of this research was to look into the full range of breast illnesses in a tertiary care setting. The study's secondary goal was to see how common radio pathological discordance was in image guided breast core biopsies.

METHODOLOGY

The study was a retrospective study conducted over a period of 5 years. All patients who received image guided breast core biopsy for breast lesions met the study's inclusion criteria. Patients with past breast carcinomas, posttreatment biopsies, fine needle aspiration cytology (FNAC) biopsies, and no prebiopsy breast imaging were all excluded from the study. The mammograms/ultrasound (USG) findings were examined by professional radiologists, who assigned a BIRADS (Breast Imaging Reporting and Data System) score. Bent *et al*. [4] suggested that the likelihood of malignancy would be 2%–10% for category 4A, 11%–50% for category 4B, and 51%–95% for category 4C. In accordance with pathology findings, results 4A and 4B were deemed most likely benign, while results 4C and onward were deemed most likely malignant. [5,6] When developing a correlation with a tissue diagnosis, this was taken in mind. The appropriate histological slides were obtained, a double-blind study was conducted by two independent pathologists, and the findings were reported and tallied. The radiological and histological findings were found to be inconsistent, which was later supported by the excision biopsy report. R version 4.0.0[7] and OpenEpi Ver 3.04 software were used to analyse the data. [8]

RESULTS

This research looked at 500 cases in total. The average age was 46. The majority of the patients were between the ages of 40 and 60, with 25% (n = 126) being between the ages of 20 and 40, 19% (n = 95) being over 60, and 3.6 percent (n = 18) being under the age of 20. The majority of the patients had a breast lump. Patients were classified based on BIRADS classification. 0.8% (*n* = 4) belonged to BIRADS-6, 37% (*n* = 183) BIRADS-5, 5.6% (28) BIRADS-4C, 2.4% (*n* = 12) BIRADS-4B, 16.4% (*n* = 82) BIRADS-4A, 33.6% (*n* = 168) BI-RADS-3, and 4.6% (*n* =23) BIRADS-2. Biopsies were performed on BI-RADS-6 cases primarily to determine the molecular classification so that proper treatment could be started. In nervous patients and those with a family history of breast cancer, BIRADS-2 tumours were biopsied/excised. On core biopsy, a variety of breast lesions were discovered, which were categorised into the following categories: Table 2 shows that 49.2% of the cases (n = 246) were benign, 3.4 percent (17) were high-risk (phyllodes, papillary lesions, ADH), and 47.4% (237) were malignant. Fat necrosis (0.2 percent), diabetic mastopathy (0.6 percent), hamartoma (0.2 percent), complex radial scar (0.2 percent), Pseudo angiomatous stromal hyperplasia (0.2 percent), lipoma (0.4 percent), sebaceous cyst (0.4 percent), verruca vulgaris (0.2 percent), and galactocele were few benign lesions.

Table 1: Distribution of histopathological proven benign, high risk and malignant lesions in relation to BIRADS class is given in the table below

	BIRADS	BIRADS	BIRADS	BIRADS	BIRADS	BIRADS	BIRADS	Total
	2	*3*	*4A*	*4B*	*4C*	*5*	*6*	
Benign	19	156	61	3	2	5	-	246
High risk	4	4	3	1	2	3	-	17
Malignant	-	8	18	8	24	175	4	237
TOTAL	23	168	82	12	28	183	4	= 500

Table 2: Relative frequency of the range of histopathological diagnosis of all the lesions included in the study

Type of Lesions	Number of cases	Percentage
Benign		
Benign breast tissue	27	5.4
Fibroadenoma (and variants)	124	25
Fibrocystic changes	52	10
Inflammation	14	3
Granulomatous process	5	1
Benign Papilloma	9	1.8
Benign phyllodes	4	0.8
Others	11	3
High risk		
DCIS	4	1
ADH	4	0.8
Intraductal Papilloma	3	0.6
Borderline Phyllodes	6	1.2
Malignant		
Malignant Phyllodes	5	2.1
Invasive carcinomas*	229	46
Lymphoma	1	0.2
Squamous cell carcinoma	1	0.2
Angiosarcoma	1	0.2

**Including Invasive ductal carcinoma, no special type, lobular carcinoma, papillary carcinoma, medullary ductal carcinoma, mucinous carcinoma and metaplastic carcinoma*

Invasive ductal carcinoma, not otherwise specified, had the highest relative frequency (40%) among all lesions, followed by lobular carcinoma (2.6%), papillary carcinoma (1.6%), medullary carcinoma (0.8%), mucinous carcinoma (0.8%), and metaplastic carcinoma (0.2%) [Table 2].

The linkage of radiology and histology revealed that 2.4 percent of cases (12/500) were found to be discordant. The final excision report confirmed the discrepancy. The patients with discordancy were on average 47 years old. Six of the discordant cases (50%) belonged to the BIRADS-3 category, five to the BIRADS-5 category (42%), and one to the BIRADS-4C group (8%). There were three types of reasons for the discrepancy. In four cases (33 percent), sampling mistake was recorded, interpretation error/abnormal radiologic presentation was reported in six cases (50 percent), and type of lesion was noted in two cases (16 percent). The details of discordant cases are shown in Table 3. According to statistical research, the false negative rate for cancer was 14 percent when BIRADS was compared to histology with a cutoff of BIRADS-4B and above as suspicion of malignancy. Biopsies had an 85 percent sensitivity for detecting cancer. The final biopsy result had a 96 percent specificity. The accuracy of

biopsy in diagnosing cancer was 90%. In the BIRADS-4C and above categories, the positive predictive value was 96 percent, and the negative predictive value was 86 percent.

Three interesting cases of imaging-pathology discordance were noted with valuable learning points.

CASE 1

A 58-year-old lady with no history of fever or diabetes appeared with a breast lump. An irregular, ill-defined spiculated lesion, assigned to the BIRADS-5 category, was seen on imaging (X-ray mammography and ultrasound). The image guided biopsy's histopathology revealed characteristics of a granulomatous inflammation, which seems on imaging to be a carcinoma [Figure 1].

CASE 2

Multiple nonspecific lumps in both breasts were found in a 57-year-old woman. Multiple cysts with fluid levels were discovered on imaging in both breasts. On ultrasonography, one thick-walled cyst with internal echoes was diagnosed as a complex cyst and categorised as a BIRADS-3 lesion. This thick-walled cyst was biopsied and revealed features of aggressive breast cancer. This instance exemplifies the nontraditional mode of malignant tumour presentation, which must be considered [Figure 2].

Table 3: Details of Imaging-Pathology discordant lesions

Age	BIRADS category	Biopsy report	Reason for discordance
65	5	Fibrocollagenous tissue	Sampling error
50	3	Invasive carcinoma	Interpretation error
74	3	Invasive carcinoma	Interpretation error
49	5	Xanthogranulomatous lesion	Nature of the lesion
50	3	Invasive carcinoma	Interpretation error
47	4C	Lipoma	Sampling error
48	3	Invasive carcinoma	Interpretation error
48	5	Benign tissue	Sampling error
38	3	Invasive carcinoma with lobular features	Interpretation error
48	5	Suboptimal, hemorrhage only	Sampling error
57	3	Invasive carcinoma	Interpretation error
59	5	Granulomatous mastitis	Nature of the lesion

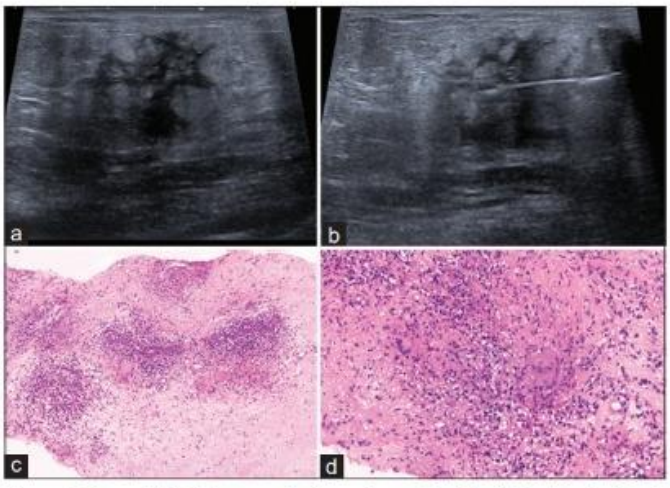

Figure 1: (a and b) Ultrasound shows irregular, ill-defined spiculated lesion categorized as BI-RADS 5 lesion. (c) H and E, 200×, Core of fibrous tissue with multiple granulomas. (d) H and E, 400×, Non necrotizing epithelioid granulomas with giant cells and surrounding chronic inflammatory cells

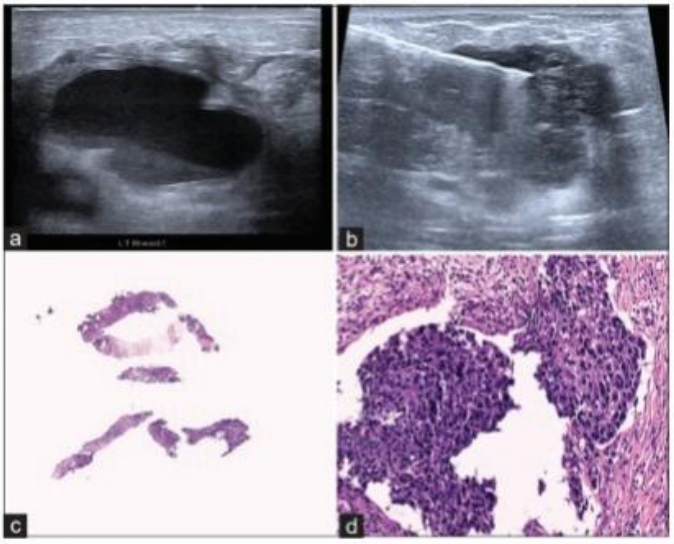

Figure 2: (a and b) Ultrasound shows multiple cysts in both breasts with fluid levels. One cyst had thick wall with mobile internal echoes on ultrasound - labeled as a complicated cyst and categorized as BI-RADS 3 lesion. (c) H and E,10×, Multiple cores of Fibrocollagenous tissue infiltrated by nests of cells. (d) H and E,400×, Core of fibrous tissue infiltrated by nests of atypical cells with increased nucleocytoplasmic ratio, hyperchromasia and presence of atypical mitotic figures, suggesting an Invasive carcinoma

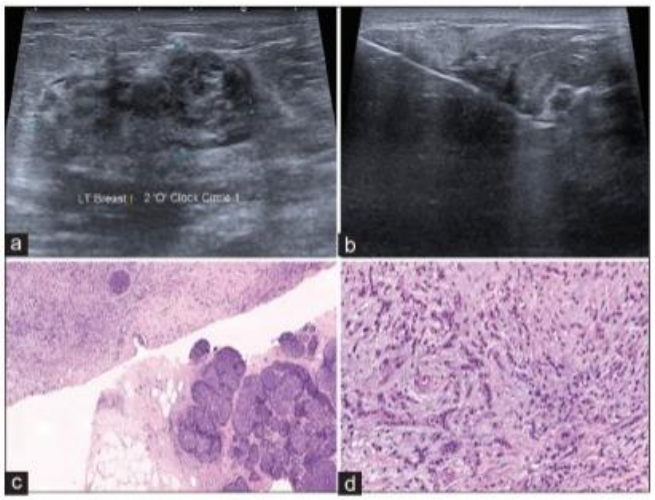

Figure 3: (a, b) Ultrasound of breast shows heterogeneous parenchyma, vague abnormality with tiny cystic changes characterized as BI-RADS 3 lesion. (c) H and E, 100×, Multiple cores of tissue with features of lobular carcinoma *in situ* in the ducts. (d) H and 4, 400×, Infiltration of the tissue by tumor cells arranged in an Indian file pattern, suggestive of a Lobular carcinoma

CASE 3

A 38-year-old asymptomatic woman with a cancer family history came in for routine screening. With the ACR3 category, the X-ray was ordinary. The ultrasound revealed a nonspecific anomaly with small cystic alterations consistent with localised fibrocystic abnormalities, which was classified as BIRADS-3. Because of the patient's anxiety and positive family history, a biopsy was conducted. Invasive breast cancer with lobular characteristics and lobular carcinoma in situ component was found in a core biopsy. This instance further emphasises the necessity of the triple assessment in breast cancer early detection [Figure 3].

DISCUSSION

Pathologists, radiologists, and surgeons are the essential components of a multidisciplinary team that is required for the best treatment of breast cancer patients. In order to achieve concordance between histology and radiological results and initiate appropriate treatment, effective communication between pathologists and radiologists is critical. The BIRADS reporting system has been widely utilised to classify breast imaging anomalies. Biopsies are performed more frequently in tumours that are suspect of malignancy (BIRADS-4) or highly indicative of malignancy (BIRADS-5). Based on the risk of malignancy, the BIRADS-4 group is further divided into 4A, 4B, and 4C. According to Bent et al.,[9], the risk of malignancy was 2 percent–10 percent for 4A, 11 percent–50 percent for 4B, and 51 percent–95 percent for 4C in research. These subcategories are optional to utilise, the clinical information acquired from them is limited, and treatment regimens are not standardised.

Radiologists and surgeons can do biopsies. For most breast lesions, imaging-guided core biopsies have nearly replaced open surgical biopsies. Safe, accurate, low-cost, fewer problems, faster healing, and less cosmetic deformity are just a few of the benefits. Imaging guided core needle biopsy has a lower false negative rate (1.6%) than surgical biopsies, according to studies (2.5 percent). [10,11] FNAC, core needle biopsy, vacuum assisted biopsy (VAB), wire localised biopsy, and excisional biopsy are all options for sampling a breast lesion. The procedure employed is determined by the lesion's location and palpability. A VAB approach allows for larger samples to be obtained, potentially eliminating sampling mistakes. [12] A comprehensive clinical history, imaging findings, and a radiological differential diagnosis are all required when reporting a breast biopsy. The margins of the lesion, its size, quantity, and kind of calcifications are all important radiological factors when reporting a mammogram. According to Pavel et al., core needle biopsy revealed malignancy in 43 percent of lesions, which is identical to 47 percent carcinomas in our instance. [13]

When the pathology report provides an acceptable and reasonable explanation for the radiological results, it is said to be in concordance. When the pathology findings do not provide an adequate explanation for the radiological data, discordance is present. Parikh and Tickman defined five types of probable outcomes from a radiology pathology correlation and suggested a therapeutic strategy for each of them. Concordant malignancy, discordant malignancy, concordant benign, discordant benign, and a high risk/borderline group are examples of these. [14]

Discordant diagnoses must be resolved, which may necessitate a second biopsy or surgical removal. According to the literature, discordancy can occur in up to 8% of all biopsies recorded. [1] Technical or pathological reasons may be associated with discordancy. The needle's gauge, the lesion's location, and the extent to which the lesion was removed are all technical considerations. Pathological variables may influence the severity of ADH and its histological characteristics. The use of path/rad tissue trays for the localization of microcalcifications was described by Ryan et al. as a way to reduce discordance and eliminate false negative diagnosis. [15] The belief that correlation performed for calcifications could be enhanced by separating cores without calcifications from those within a study done by Margolin *et al*.[16] was not particularly found useful to pathologists, in a study done by Easley *et al*.[17] Granulomatous lesions of the breast have a wide spectrum of radiological findings and can mimic carcinoma on imaging, similar to that seen in our case.[18] Diagnosis of lobular carcinoma is very challenging as it presents as a nonpalpable lesion clinically and the opacity may be equal to or less than the surrounding fibro-glandular tissue mammographically.[19] High-risk lesions include atypical ductal hyperplasia, lobular neoplasm, radial sclerosing lesion, papillary lesions, and phyllodes tumours, which are difficult to differentiate on biopsy alone. These lesions are not cancerous, but they have a higher chance of becoming cancerous in the future. [20] The mode of treatment for these lesions is a source of debate. After a proactive dialogue

across different specialties, a unique case-by-case approach is necessary to handle the patients. Because of the high risk of upgrading to a malignancy, surgical biopsy is usually required regardless of the concordance. [4]

Breast biopsies are reported with the help of a pathologist. There has been no discernible improvement in correlation rates as a result of having designated breast pathologists. [2] When cases were discussed at interdepartmental or multidisciplinary breast conferences, however, correlation rates improved significantly. To ensure that proper efforts are taken to prevent overlooking a malignancy, it is always wise to write a discordant finding as an additional comment in a pathology report. This would eliminate the need for inevitable delays in diagnosis and treatment. Similarly, a pathology report may recommend follow-up, which could help with proper patient treatment.

CONCLUSION

Core needle biopsies have become a standardised specimen that pathologists receive on a regular basis. The cornerstone of a thorough diagnosis is a biopsy-proven identification of a breast lesion. In every circumstance, a triple assessment is required. When the findings are ambiguous, be cautious and avoid overdiagnosis. Request a second biopsy or excision in circumstances when the results are inconclusive. Pathologists' active participation in decision-making is critical. Participation in regularly held multidisciplinary breast conferences is beneficial in correlating the findings of the "triple test" in challenging cases, allowing for a more informed decision and the implementation of appropriate treatment protocols.

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