
TITLE: PREVALENCE OF BREAST CANCER IN BI-RADS CATEGORY 3 LESIONS

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ABSTRACT

Objective:

To determine the prevalence of breast cancer in patients found on mammography to have the Breast Imaging Report and Data System (BI-RADS) category 3 lesions.

Materials and methods:

1,704 women who underwent mammography during the one-year period from January 1st to December 31st 2001 were determined to have BI-RADS category 3 lesions. Of these, 1,100 had medical records available for review. Patients were included in the study if biopsies of the lesions were available, or if not, the followup time was at least two years. Presence of breast cancer was defined as cancer detected within two to three years after the initial mammogram at the site of the initial mammographic lesion. Patients not biopsied after two years were determined not to have breast cancer at the time of initial mammogram.

Results:

397 patients fulfilled the inclusion criteria. Biopsies were performed on 51 (12.8%) patients. Invasive breast cancer was found in two patients (2 of 397, 0.5%) and lobular carcinoma in situ in one.

Conclusion:

Our data suggest that the prevalence of breast cancer in patients with BI-RADS category 3 mammogram is extremely low (0.5%).

INTRODUCTION

The American College of Radiology has developed the Breast Imaging Reporting and Data System (BI-RADS), which is intended to standardize the terminology in the mammographic report, the assessment of the findings, and the recommendation

of the action to be taken. "Probably benign finding" is the third of six numbered categories, used for categorizing lesions which are almost certainly benign, i.e., the risk of cancer is less than 2%. For these lesions, periodic mammographic surveillance is recommended

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as the preferred alternative to surgical or percutaneous biopsy, principally to avert morbidity and to reduce cost.¹⁻⁷

The purpose of this study was to determine the prevalence of breast cancer in patients found on mammography to have BI-RADS category 3 lesions in Ramathibodi hospital.

MATERIAL AND METHODS

From January, 1st to December, 31st 2001, mammography was performed on 12,696 women at the breast diagnostic center, department of radiology, Ramathibodi hospital. In our practice, mammogram and subsequently ultrasound were performed in the same visit in all women. The final assessment was based on the combination of mammogram and ultrasound findings. Medical records and mammographic reports as well as sonographic reports of these patients were retrospectively reviewed. There were 1,704 women whose mammograms were classified as BI-RADS category 3 (13.4%). Patients were included in our study if they were followed for at least two years with mammography and/or sonography (if the lesions were invisible on mammograms), or if they underwent diagnostic fine-needle aspiration, core-needle biopsy or surgical biopsy. Exclusion criteria included cases which were not true category 3 lesions. For example, patients with negative findings on mammogram and ultrasound but had breast symptoms or had history of contralateral breast cancer or patients with typical category 2 lesions, were sometimes classified as category 3. Using these criteria, 397 patients were enrolled into this study. Age, history of contralateral breast cancer, presenting symptoms, physical examination, mammographic findings, corresponding sonographic findings, size of masses or complicated cysts and follow-up data were recorded. In the follow-up group, the lesions were compared to their appearances on last images and

classified as stable, disappeared, progression and regression (when their sizes were smaller or the initial hypoechoic masses appeared as a simple cysts in the subsequently images.) Presence of breast cancer was defined as cancer detected within two to three years after the initial mammogram at the site of the initial mammographic lesion.

RESULT

Age of the patients ranged from 29-75 years old (median 49 years old). History of contralateral breast cancer was found in 34 cases (8.6%). Three hundred and nineteen patients (80%) had no breast symptoms. Sixty-three patients (15.9%) complained of palpable breast masses. Breast pain was noted in 12 patients (3%). Nipple discharge was found in three patients (0.8%). On breast examination, 350 cases (88%) had negative findings, while 47 cases (12%) had palpable masses. Mammographic findings are shown in table 1. Sonographic findings are shown in table 2. Size of masses or complicated cysts ranged from 0.3 -6 cm (mean 1 cm., S.D. 0.6). Fifty-one patients (12.8%) underwent tissue sampling for diagnosis. Benign pathologies were found in 48 patients. The reasons for intervention were surgeon's preference in 19 cases, progression of lesions in 14 cases and patient's request in 14 cases. For the follow-up group, the median imaging follow-up interval was 35 months (ranged 24-47 months). On last images, 50% of lesions were stable, 17% regressed, 5% progressed and 16% disappeared. We found two malignancies, which were invasive ductal carcinoma (stage T1N0M0) in one and invasive lobular carcinoma (stage T1N1M0) in another. The positive predictive value for malignancy in category 3 lesions was therefore 0.5%. One case of lobular carcinoma in situ (LCIS) was also found. This high-risk lesion was a serendipitous finding unrelated to imaged abnormality.^{8,9} Details of cases with malignancy and lobular carcinoma in situ are listed in table 3.

TABLE 1: Mammographic findings

Findings	Number of cases	%
Mass	99	25
Calcifications	97	24.4
Asymmetric density	32	8
Architectural distortion	18	4.5
Mass containing calcifications	8	2
Abnormal axillary lymph node	4	1
Follow-up post excision, core-needle biopsy	4	1
Collapsed implants	1	0.3
Negative finding	134	33.7

TABLE 2: Sonographic findings

Findings	Number of cases	%
Mass	154	38.8
Complicated cyst	84	21
Mass containing calcifications	3	0.8
Abnormal axillary lymph node	3	0.8
Architectural distortion	2	0.5
Calcifications	1	0.3
Collapsed implants	1	0.3
Negative finding	149	37.5

TABLE 3: Details of cases with malignancies and lobular carcinoma in situ

Case	Age	Mammographic finding	Sonographic finding /size (cm.)	Reason for biopsy	Interval from diagnosis to biopsy (months)	Pathology
1	59	Asymmetric density	Solid nodule 0.7	Progression of lesion	12	IDC, T1N0M0
2	48	Negative	Solid nodule 0.7	Progression of lesion	30	ILC, T1N1M0
3	43	Mass	Solid nodule 1.2	Surgeon's preference	7	LCIS

Abbreviations: IDC = Invasive ductal carcinoma
 ILC = Invasive lobular carcinoma
 LCIS = Lobular carcinoma in situ

DISCUSSION

Mammography is accepted to be an effective screening method for breast cancer. Its wide use has resulted in the increase in the number of discoveries of small lesions, as well as microcalcifications, which are not palpable on the physical examination. Many lesions are judged to have a low probability of malignancy and can be periodically followed up. The basic purpose of this approach is to avert the morbidity and substantial cost of biopsies for benign lesions.¹⁻⁷ The three most common findings categorized as BI-RADS category 3 are (a) noncalcified solid masses with a round, oval, or gently lobular contour and margins that are predominantly circumscribed (b) clustered tiny round or oval calcifications and (c) focal asymmetric densities which partially thin on spot compression.^{1,5} BI-RADS category 3 for ultrasound includes lesions which are solid masses with circumscribed margin, nonpalpable complicated cysts and clustered microcysts.¹ The two most common mammographic findings which were classified as category 3 in our study were breast masses and calcifications, which were found in 25% and 24.4% of patients, respectively. The most frequently encountered abnormality seen by ultrasound was a breast mass, followed by complicated cyst.

The scientific evidence establishing the safety

and efficacy of surveillance for BI-RADS category 3 lesions is based on many studies. Sickles² reported 17 out of 3,184 cases developed cancer (0.5%). According to two studies from Veras et al. in 1992⁴ and 2002,⁷ they found 9 out of 535 and 2 out of 511 patients had breast cancer (1.7% and 0.4%, respectively). Recently, Yasmeen et al. reported 30 patients with breast cancer from 2,927 category 3 cases (1%).¹⁰ Our result, a prevalence of breast cancer of 0.5% (2 from 397 patients), was comparable to those of previous studies.

The surveillance protocol provided by the American College of Radiology is 6 month-interval follow-up for at least 2 or 3 years.¹ Interval progression of the lesions is prompt biopsy.⁵ Progression of cancer during mammographic surveillance depends on the rate of growth or doubling time of an individual lesion. These values show great variation. Although rare, some cancers may grow so slowly that their size at mammography may not change for 1 or 2 years.^{4,11} We also found an invasive lobular carcinoma which showed slow progression over 30 months.

Cancers initially considered to be "probably benign" eventually will be diagnosed early in their course, while they still have a favorable prognosis.^{2,4,5,7}

In our study, there were one case of invasive ductal carcinoma, T1N0M0, compatible with stage I and one case of invasive lobular carcinoma, T1N1M0, compatible with stage IIA.¹² Both patients carried good prognosis. We found one LCIS, a high-risk lesions associated with an increased risk of malignancy in either breast. In general, it is not seen in both mammogram and ultrasound and is likely to be an incidental finding at excisional biopsy.^{8,9}

LCIS = Lobular Carcinoma In Situ.

Ultrasound is a very useful adjunctive diagnostic tool for detecting abnormality, particularly in dense breasts, which significantly increased the sensitivity of mammography for cancer detection.¹³ Ultrasound can differentiate solid from cystic lesions. Thus, mammographic appearance of a mass which is shown to be a simple cyst by subsequently ultrasound can be classified as category 2 with confidence. However, it can depict internal echo within the cysts, a finding termed complicated cysts, resulting in a classification as category 3. This may be the reason why there are many category 3 lesions in our practice.

Our study has several limitations. Firstly, there were high percentage of lost data due to unavailable medical records and many patients were lost to follow-up. Secondly, considerable variation exists among radiologists in the interpretation of the radiologic findings. More complete data collection, extensive follow-up, and standardization of interpretation of radiologic findings should lead to more accurate and reliable estimates of breast cancer prevalence in future studies.

CONCLUSION

Our data suggest that the prevalence of breast cancer in patients with BI-RADS category 3 is extremely low, i.e. 0.5%. All breast cancers found subsequently were early stage breast cancers.

REFERENCES

1. American college of radiology. Breast imaging reporting and data system (BI-RADS) 4th ED. Reston, Va: American college of radiology, 2003
2. Sickles EA. Periodic mammographic follow-up of probably benign lesions: results of 3,184 consecutive cases. *Radiology* 1991; 179:463-8
3. Orel SG, Kay N, Reynolds C, Sullivan DC. BI-RADS categorization as a predictor of malignancy. *Radiology* 1999;211:845-50
4. Veras X, Leborgne F, Leborgne JH. Nonpalpable, probably benign lesions:role of follow-up mammography. *Radiology* 1992; 184: 409-14
5. Sickles EA. Probably benign breast lesions: when should follow-up be recommended and what is the optimal follow-up protocol? *Radiology* 1999;213:11-4
6. Buchbinder SS, Leichter IS, Lederman RB, Novak B, Bamberger PN, Sklair-Levy M, et al. Computer-aided classification of BI-RADS category 3 breast lesions. *Radiology* 2004; 230: 820-3
7. Veras X, Leborgne JH, Leborgne F, Mezzera J, Janmandreu S, Leborgne F. Revisiting the mammographic follow-up of BI-RADS category 3 lesions. *AJR* 2002;179:691-5
8. Berg WA, Mrose HE, Loffe OB. Atypical lobular hyperplasia or lobular carcinoma in situ at core-needle breast biopsy. *Radiology* 2001; 218: 503-9
9. Foster MC, Helvie MA, Gregory NE, Rebner M, Nees AV, Paramakul C. Lobular carcinoma in situ or atypical lobular hyperplasia at core-needle biopsy: is excisional biopsy necessary? *Radiology* 2004; 231: 813-9
10. Yasmeen S, Romano PA, Pettinger M, Chlebowski RT, Robbins JA, Lane DS, Hendrix SL. Frequency and predictive value of a mammographic recommendation for short-interval follow-up. *JNCI* 2003; 95: 429-36

11. Kopan DB. Mammographic appearance of breast cancer. In:Kopan DB. Editors. Breast imaging.2nd ed. Philadelphia:Lippincott-Raven; 1997. p.375-408
12. Singletary SE, Allred C, Ashley P, Bassett LW, Berry D, Bland KI, et al. Revision of the American joint committee on cancer staging system for breast cancer. J Clin Oncol 2002; 20: 3628-36
13. Zonderland HM, Coerkamp EG, Hermans J, Van de Vijver MJ, Van Voorthuisen AD. Diagnostic of breast cancer: contribution of US as an adjunct to mammography. Radiology 1999; 213: 413-22