

A Hospital-Based Outcome Assessment using Sonography and Mammography in Women Presented with Breast Pain

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Received: 09-03-2023 / Revised: 21-03-2023 / Accepted: 25-04-2023

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Conflict of interest: Nil

Abstract

Aim: The aim of the present study was to assess the outcome of sonography and Mammography in women with breast pain.

Methods: All women with diffuse & focal breast pain referred to the department of Radio-diagnosis, Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, India, for six months were included in the study. During the study period, a total of 450 patients underwent Breast Imaging. Pain alone was mentioned as the reason for referral in 100 cases (22.22%).

Results: The mean age of patients in the study was 36. 23 (range 17-60 years). 20 patients (20%) had a family history of breast cancer, and 10 (10%) had a history of Hormone use at the time of examinations. The Imaging findings on the painful; breasts were: 70 (70%) normal, 28 (28%) Benign and 2 (2%) had suspicious imaging findings of malignancy. The findings in the rest of the breasts were mild alteration in density and echo texture. FNA cytology examination was suspicious for cancer in 2 patients, and 30 were benign. The negative predictive value in our study was 90%.

Conclusion: The primary use of sonography and Mammography in women with breast pain seems reassuring for the patients and clinicians. The primary value of breast imaging in women with painful breasts seems to be that of reassurance, as no abnormalities are usually detected, radiological abnormalities classified as benign do not generally have any clinical consequences, and the prevalence of cancer in a painful area is low.

Keywords: Sonography, Mammography, Breast Pain.

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Introduction

Breast imaging is valuable in the investigation of symptomatic breast disease. Established management of palpable breast lesions includes the triple assessment of physical examination, Mammography, and percutaneous biopsy. [1,2] Mammography is the method of choice for screening women over 50 years of age who have no symptoms [3–6] and women with a family history of breast

cancer.[7,8] In addition, doctors often refer patients with a painful breast but no palpable lesion for further evaluation by a radiologist.[9]

Breast pain is generally of two kinds: a cyclical waxing and waning pain, which is usually diffuse, bilateral, and is usually associated with menstrual cycle, and a noncyclical pain, which is usually unilateral and localized. When patients

present with breast pain, the physicians generally perform a thorough history and a physical examination to evaluate for any underlying masses. Patients with cyclical diffuse breast pain without a palpable mass are often treated clinically. [10,11]

Imaging evaluation using Mammography in symptomatic breast disease is well established. [12] Imaging evaluation using ultrasound, in addition to Mammography, is often performed in symptomatic patients to evaluate for underlying breast disease. [13] The use of Mammography and US in evaluation of a palpable breast lump is well established and has shown a negative predictive value of 99.8–100%. [14,15] Diffuse breast pain is generally considered less concerning compared with focal breast pain. However, in current clinical practice, imaging guidelines for the evaluation of breast pain, specifically focal breast pain, are less established. There is inconsistency among various practices regarding the use of mammograms and/or the US for evaluating these patients. In most clinical practices, Mammography is utilized as the first imaging modality to evaluate symptomatic breast disease, except in younger populations (usually <35 years), where the US is usually used as the first modality.

The evaluation of breast pain usually begins with a thorough history and physical examinations. Recommendation for breast imaging depends on the age of the patient, the nature of breast pain, and the presence or absence of a mass or other findings on physical examination. The evaluation of breast pain varies according to its assignment within the 3 broad classifications of cyclic mastalgia, non-cyclic mastalgia, and extramammary (non-breast) pain. [16] The distinctions are important because the evaluation and the likelihood of response to intervention vary among the different types of breast pain. [17] The established management of palpable breast lesions includes the triple assessment of physical examination,

Mammography, and percutaneous biopsy. [18] In the absence of palpable mass, Mammography is often done in women less than 30 years of age to exclude an occult lesion, although sonography is the modality of choice.

The aim of the present study was to assess the outcome of sonography and Mammography in women with breast pain.

Materials and Methods

All women with diffuse & focal breast pain are referred to the department of Radio-diagnosis, Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, India, for six months. were included in the study. During the study period, a total of 450 patients underwent Breast Imaging. Pain alone was mentioned as the reason for referral in 100 cases (22.22%). Patients with pain and associated palpable abnormality were excluded. Pain was defined as focal if it is localized to a specific area & diffuse pain if the patient could not localize to a specific area. Mammographic examinations were performed with Senographe 500T (Senix HF) & the ultrasonographic examination was performed with a 7 MHZ OR 8 MHZ linear array transducer: ASU-3000. All examinations were performed by the first Author, who is experienced in both Mammography & breast sonography.

Breast imaging consisted of a two-view Mammography (craniocaudal and medio-lateral oblique views) and additional local compression where necessary. The routine focused ultrasonographic examination that was targeted to the area of clinical concern was carried out subsequently to evaluate any non-conclusive mammographic findings in focal or diffuse breast pain when a dense-looking mammogram is negative. All sonographic examinations were performed with the patient in the supine position, with her ipsilateral arm raised above her head. The Imaging appearances were classified as normal, benign or suspicious. The breast imaging

was considered to be normal if there was no apparent abnormality, benign when a cyst, fibroadenoma, or mastopathy was detected and suspicious when solid mass with irregularity or not well-defined borders were found. Finally, the pathologic examination records of the patients for whom cytologic evaluations were done for breast pain were obtained from the central health Laboratory during the study period.

An instrument for data collection was developed, and data was extracted from the mammographic information sheet, ultrasound form and FNA results. Age, Address, date of initial visit, educational

status, menstrual status, hormone use, family and personal history of breast cancer, a specialty of the referring physician, type and size of breast pain, mammography/ultrasound findings and FNA results were the pertinent information obtained.

On the basis of the information, we categorized findings as being true negative, false negative, true positive, or false positive and the negative predictive value of combined sonography and Mammography was calculated. Data was analyzed using the SPSS version 12.0.

Results

Table 1: Patient demographics in 100 breast imaging examinations performed for breast pain

Patient age group	Family History of Breast Cancer					History of hormone intake				Total
	Yes		No		Total	Yes		No		
	N	%	N	%		N	%	N	%	
Below 20	3	15	4	5	7	2	20	4	4.44	6
20 – 29	10	50	30	37.50	40	4	40	36	40	40
30 – 39	3	15	25	31.25	28	3	30	30	33.34	33
40 – 49	2	10	15	18.75	17	1	10	12	13.34	13
50 – 59	2	10	3	3.75	5	0	0.0	6	6.66	6
60 – 69	0	0.0	3	3.75	3	0	0.0	2	2.22	2
Total	20	20	80	80	100	10	10	90	90	100

The mean age of patients in the study was 36. 23 (range 17-60 years). 20 patients (20%) had a family history of breast cancer, and 10 (10%) had a history of Hormone use at the time of examinations.

Table 2: Radiological findings in the painful Breast in relation to age groups

Patient age group	Combined Mammography and sonography						Total
	Normal Breast		Benign		Suspicious		
	N	%	N	%		%	
Below 20	7	10	1	3.57	0	0.0	8
20 - 29	26	37.14	10	35.71	1	50	37
30 - 39	22	31.42	10	35.71	0	0.0	32
40 - 49	11	15.71	5	17.85	1	50	17
50 - 59	3	4.28	1	3.57	0	0.0	4
60 - 69	1	1.43	1	3.57	0	0.0	2
Total	70	70	28	28	2	2	100

The Imaging findings on the painful; breasts were: 70 (70%) normal, 28 (28%) Benign and 2 (2%) had suspicious imaging findings of malignancy. The findings in the rest of the breasts were mild alteration in density and echo texture.

Table 3: Pathologic findings in the painful breast in relation to age group

Patient age group	Pathology				Total
	Benign		Suspicious		
	N	%	N	%	N
Below 20	7	23.34	0	0.0	7
20 - 29	12	40	0	0.0	12
30 - 39	5	16.66	2	100	7
40 - 49	6	20	0	0.0	6
Total	30	93.75	2	6.25	32

FNA cytology examination was suspicious for cancer in 2 patients, and 30 were benign.

Table 4: Pathology findings Vs. Combined Mammography and sonography

Imaging findings	Pathology				Total
	Benign		Suspicious		
	N	%	N	%	N
Negative or benign findings at mammography/sonography in the area of pain	27	90	2	4.3	29
suspicious findings at mammography/sonography in the area of pain	3	10	0	0.0	3
Total	30	93.75	2	6.25	32

The negative predictive value in our study was 90%.

Discussion

Sixty-Nine percent of healthy women self-referred to breast screening clinics reported pain that was severe enough to interfere with their daily routine. [19] It is the breast symptom that most frequently causes women to seek medical attention and one that causes significant patient anxiety. [20] Cyclic breast pain is the most common type of breast pain, accounting for about two-thirds of cases. It usually affects women who are in their 30s or 40s. Cyclic breast pain occurs in a pattern clearly related to the menstrual cycle. It usually occurs in both breasts and involves the entire breast, particularly the upper and outer portions, extending into the underarm area. Women often describe this

type of breast pain as dull, heavy or aching. It tends to be most intense during the week or two before the period and to ease up afterward. Noncyclic is breast pain constant or intermittent breast pain that is not related to the menstrual cycle.

The mean age of patients in the study was 36. 23 (range 17-60 years). 20 patients (20%) had a family history of breast cancer, and 10 (10%) had a history of Hormone use at the time of examinations. The prevalence of breast cancer in women younger than 40 years is significantly less than that of above 40 years of age. [21] Clinical examination of the breast and assessment of the patient's individual risk for breast cancer should be the main determinant of the need for imaging. [22]

In general, breast imaging should be tailored to the age of the patient, the risk

for breast cancer, and other aspects of the clinical presentation. Because of the theoretical risk of radiation, low prevalence of breast cancer and the dense nature of the breast in young women, sonography is often selected as the diagnostic modality in younger women, while mammogram should be considered in women with focal breast pain who are aged 30 years or older, have a family history of early breast cancer, or have other risk factors for breast cancer. [23] Ultrasonography should also be considered for focal breast pain in older women as an adjunct to Mammography to increase the sensitivity of imaging.

The Imaging findings on the painful breasts were: 70 (70%) normal, 28 (28%) Benign and 2 (2%) had suspicious imaging findings of malignancy. The findings in the rest of the breasts were mild alteration in density and echo texture. The findings by Dui Jim et al. [24] & Leung et al. [11] where finding showed that 86.5 % and 77.3 % were normal, respectively. The benign cysts in this study were small cysts & none of them had undergone cyst puncture and fluid aspiration, as the natural course of this process is spontaneous regression. [26] In most patients, no radiological abnormalities were found in the painful breast(s). The benign findings mainly consisted of small cysts or mastopathy (for example, sclerosing adenosis or microcystic hyperplasia). Larger cysts are a well-documented cause of local tenderness, which can be relieved by cyst puncture and fluid aspiration. [18] However, it is doubtful whether pain can be attributed to a non-palpable cyst a few millimeters in size, and many of these benign lesions will undergo spontaneous regression. [25] Further routine intervention, therefore, is not recommended. In cases where radiologically guided aspiration of non-palpable cysts is performed, cytological examination is unnecessary if the fluid obtained is not bloody. [26]

The negative predictive value of imaging in this study was 90%. Similar to one study in the U.S. showed a negative predictive value of 100% . [27] Our study implies that a biopsy of the painful area of the breast might not be indicated in patients with imaging findings that are not suspicious of cancer. Nevertheless, in order to come to a solid conclusion, there is a need to improve the test characteristic of current ultrasound and mammography diagnosis in the future by introducing ultrasound machines with high-resolution and high-quality image-producing mammography machines. Periodic mammography follow-up of lesions classified as benign might be a reasonable alternative to biopsy at this time. This strategy is substantially different from the established management of palpable breast lesions, where biopsy may follow a negative radiology report. [28,29]

Conclusion

The primary use of sonography and Mammography in women with breast pain seems reassuring for the patients and clinicians. The primary value of breast imaging in women with painful breasts seems to be that of reassurance, as no abnormalities are usually detected, radiological abnormalities classified as benign do not generally have any clinical consequences, and the prevalence of cancer in a painful area is low. As an alternative to referral to a breast surgeon, general practitioners may prefer to refer their patient to a radiologist for Mammography. The radiology report can then be used to determine whether the patient needs to see a surgeon.

References

1. Thomas JM, Fitzharris BM, Redding WH, Williams JE, Trott PA, Powles TJ, Ford HT, Gazet JC. Clinical examination, xeromammography, and fine-needle aspiration cytology in the diagnosis of breast tumors. *Br Med J.* 1978 Oct 21;2(6145):1139-41.

2. Hermansen C, Poulsen HS, Jensen J, Langfeldt B, Steenskov V, Frederiksen P, Jensen OM. Diagnostic reliability of combined physical examination, Mammography, and fine-needle puncture ("triple-test") in breast tumors: A prospective study. *Cancer*. 1987 Oct 15;60(8):1866-71.
3. Andersson I, Aspegren K, Janzon L, Landberg T, Lindholm K, Linell F, Ljungberg O, Ranstam J, Sigfusson B. Mammographic screening and mortality from breast cancer: the Malmö mammographic screening trial. *British Medical Journal*. 1988 Oct 15; 297(6654):943-8.
4. Nyström L, Wall S, Rutqvist LE, Lindgren A, Lindqvist M, Rydén S, Andersson J, Bjurstam N, Fagerberg G, Frisell J, Tabar L. Breast cancer screening with Mammography: an overview of Swedish randomized trials. *The Lancet*. 1993 Apr 17;341 (8851):973-8.
5. Nab HW, Voogd AC, Crommelin MA, Kluck HM, vd Heijden LH, Coebergh JW. Breast cancer in the southeastern Netherlands, 1960–1989: trends in incidence and mortality. *European Journal of Cancer*. 1993 Jan 1;29(11) :1557-9.
6. de Koning, H.J. and Boer, R., 1997. Quantitative interpretation of age-specific mortality reductions from trials by microsimulation. In NIH Consensus Development Conference on Breast Cancer Screening for Women Ages 40-49: NIH Consensus Development Conference, Natcher Conference Center, National Institutes of Health, Bethesda, Maryland. Office of the Director, National Institutes of Health. January 21-23,1997; 93.
7. Hayward RS, EP S. Ford DE, Roizen MF, Roach KW. Preventive care guidelines. *Ann Intern Med*. 1991;114:758-83.
8. Tilanus-Linthorst MM, Bartels CC, Obdeijn AI, Kuenen-Boumeester V, Klijn JG, Oudkerk M. Good results in periodic screening in women with increased risk of breast cancer; retrospective study. *Nederlands tijdschrift voor geneeskunde*. 1995 Mar 1;139(9):445-9.
9. Locker AP, Stickland V, Manhire AR, Caseldine J, Blamey RW. Mammography in symptomatic breast disease. *The Lancet*. 1989 Apr 22;333 (8643):887-9.
10. Monica Morrow. The evaluation of common breast problems. *Am Fam Physician* 2000; 61:2371–8.
11. Leung JW, Kornguth PJ, Gotway MB. Utility of targeted sonography in the evaluation of focal breast pain. *Journal of ultrasound in medicine*. 2002 May; 21(5):521-6.
12. Locker AP, Stickland V, Manhire AR, Caseldine J, Blamey RW. Mammography in symptomatic breast disease. *The Lancet*. 1989 Apr 22;333(8643):887-9.
13. Houssami N, Brennan M, French J, Fitzgerald P. Breast imaging in general practice. *Australian Journal of General Practice*. 2005 Jun 1;34(6):467.
14. Soo MS, Rosen EL, Baker JA, Vo TT, Boyd BA. Negative predictive value of sonography with Mammography in patients with palpable breast lesions. *American Journal of Roentgenology*. 2001 Nov;177(5):1167-70.
15. Dennis MA, Parker SH, Klaus AJ, Stavros AT, Kaske TI, Clark SB. Breast biopsy avoidance: the value of normal mammograms and normal sonograms in the setting of a palpable lump. *Radiology*. 2001 Apr;219(1): 186-91.
16. Smith RL, Pruthi S, Fitzpatrick LA. Evaluation and management of breast pain. In *Mayo Clinic Proceedings*. Elsevier. Mar 1, 2004; 79(3): 353-372.
17. Davies EL, Gateley CA, Miers M, Mansel RE. The long-term course of mastalgia. *Journal of the Royal Society of Medicine*. 1998 Sep;91(9):462-4.
18. Tabar L, Pentek Z, Dean PB. The diagnostic and therapeutic value of

- breast cyst puncture and pneumocystography. *Radiology*. 1981 Dec;141(3):659-63.
19. Believe RM. Mastodynia- *Obstet Gynecol Clin North Am* 1994, 21: 461-477. 1994; 21: 461- 477.
 20. Morrow M. The evaluation of common breast problems. *American family physician*. 2000 Apr 15;61(8):2371.
 21. American College of Radiology, Appropriate imaging workup of palpable breast masses, In - ACR Appropriateness Criteria. Reston, VA: American College of Radiology, 2000; 961- 964.
 22. Rosolowich V, Saettler E, Szuck B, Lea RH, Levesque P, Weisberg F, Graham J, McLeod L. Mastalgia. *Journal of Obstetrics and Gynecology Canada*. 2006 Jan 1;28(1):49-57.
 23. Feig SA, Ehrlich SM. Estimation of radiation risk from screening mammography: recent trends and comparison with expected benefits. *Radiology*. 1990 Mar;174(3):638-47.
 24. Duijm LE, Guit GL, Hendriks JH, Zaat JO, Mali WP. Value of breast imaging in women with painful breasts: observational follow up study. *BMJ*. 1998 Nov 28;317(7171):1492-5.
 25. Brenner RJ, Bein ME, Sarti DA, Vinstein AL. Spontaneous regression of interval benign cysts of the breast. *Radiology*. 1994 Nov;193(2):365-8.
 26. Smith DN, Kaelin CM, Korbin CD, Ko W, Meyer JE, Carter GR. Impalpable breast cysts: utility of cytologic examination of fluid obtained with radiologically guided aspiration. *Radiology*. 1997 Jul;204(1):149-51.
 27. Tumyan L, Hoyt AC, Bassett LW. Negative predictive value of sonography and Mammography in patients with focal breast pain. *The Breast Journal*. 2005 Sep;11(5):333-7.
 28. Warwick DJ, Smallwood JA, Guyer PB, Dewbury KC, Taylor I. Ultrasound mammography in the management of breast cancer. *Journal of British Surgery*. 1988 Mar;75(3):243-5.
 29. Abdulabbas H. S., Abed S. Y., Mahdi Z. A.A., Al-Hindy H. A. A. M., Akram M., Laila U., Zainab R., Al-Khafaji N. S., Al-Dahmoshi H. O., & Chabuck, Z. A. G. Antiviral effects of medicinal plants: Minireview. *Journal of Medical Research and Health Sciences*, 2023; 6(2): 2424–2429.