Value of breast imaging in women with painful breasts: observational follow up study

Lucien E M Duijm, Gerard L Guit, Jan H C L Hendriks, Joost O M Zaat, Willem P T M Mali

Department of Radiology, Kennemer Gasthuis Locatie Elisabeth Gasthuis, 2035 RC Haarlem, Netherlands
Lucien E M Duijm, *radiologist*
Gerard L Guit, *radiologist*

Department of Radiology, Radboud University Hospital, 6500 HB Nijmegen, Netherlands
Jan H C L Hendriks, *radiologist*

Institute for Research in Extramural Medicine, Vrije Universiteit, 1081 BT Amsterdam, Netherlands
Joost O M Zaat, *general practitioner*

Department of Radiology, University Hospital Utrecht, 3584 CX Utrecht, Netherlands
Willem P T M Mali, *professor*

Correspondence to: Dr Duijm, Department of Radiology, Catharina Hospital, 5602 ZA Eindhoven, Netherlands
atielbeek@knmg.nl

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Abstract

Objectives To determine the value of breast imaging in patients with localised or diffuse pain in the breast in whom physical examination shows no abnormalities.
Design Observational follow up study.
Setting Radiology department of a teaching hospital in the Netherlands.
Subjects Altogether 987 women referred for radiological breast imaging because of pain alone and a control group of 987 asymptomatic women referred for a screening mammogram.
Main outcome measures Correlation of the radiological findings with clinical and pathological findings over two years of follow up.
Results Radiological examination of the painful breast(s) showed the following: normal findings in 854 (86.5%) women, benign abnormalities in 85 (8.6%; mainly small cysts or mastopathy), abnormalities that were probably benign in 36 (3.6%), suspicious findings in 8 (0.8%), and malignancy in 4 (0.4%). Biopsy of the painful area was performed in 10 of the 939 women with normal findings or benign abnormalities, in two of 36 women with radiological abnormalities that were probably benign, and in all women with suspicious or malignant findings. Only the four lesions that had been classified radiologically as malignant were found to be malignant at surgery. The prevalence of breast cancer was similar in symptomatic and control women.
Conclusions Breast imaging in women who present with pain alone is of value only in providing reassurance—no abnormalities are usually found in the painful area, radiological abnormalities classified as benign do not generally have any clinical consequences, and the prevalence of cancer is low in these women. Biopsy of the painful area should be performed only where radiological findings are suspicious.

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] However, the value of breast imaging in these cases is not well defined. For this reason, we performed a prospective observational study to assess the outcome of breast imaging in patients referred for mammography because of a painful breast. The frequency of radiological abnormalities and their clinical importance were determined. We also investigated whether a biopsy specimen of the painful area is necessary in women whose radiological findings are not suspicious.

Methods

All women with a painful breast(s) referred by general practitioners or hospital specialists to the radiology department of a teaching hospital between 1 January 1992 and 1 January 1996 were included in the study. The "complaint" encompassed several types of pain—it could be described as nagging or stinging, local or diffuse, or continuous or intermittent. Any patients whose letter of referral mentioned a palpable lesion in the painful breast were excluded, as were patients with a history of breast cancer or breast augmentation. Older age and a family history of breast cancer are well established risk factors for breast cancer. In order to characterise the study population we therefore asked each woman whether any first degree family member had been affected by breast cancer.

Imaging studies

The performance of the radiological examination and the mammographic and ultrasound criteria used have been described previously.[10] Briefly, breast imaging consisted of a two view mammography (craniocaudal and mediolateral oblique views) and additional local compression or magnification mammograms where necessary. Ultrasonography was performed subsequently to evaluate any non-conclusive mammographic findings and localised breast pain when a dense looking mammogram was negative. Ultrasonography was performed instead of mammography where pain was restricted to one breast quadrant in patients aged under 25 years. The radiologist asked the patient to point out the painful area if this was not clearly mentioned in the letter of referral. This ensured that the painful area was included in the standard

Classification of radiological appearances

- Normal (no apparent abnormalities)
- Benign (for example, a cyst, lipoma, or mastopathy)
- Probably benign (for example, asymmetric area of fibroglandular density or a cluster of non-specific microcalcifications)
- Suspicious (for example, solid mass with irregular or not well defined borders)
- Malignant (for example, spiculated mass or microcalcifications of the ductal type)

views. To make sure that women had no clinical signs, the radiologist examined the breast after reviewing the clinical information and mammograms. The radiological appearances were classified as shown in the box.

For the purpose of this study, we provided two radiology reports for each patient. The first report detailed the imaging findings for the painful breast(s). The second report gave the imaging results for both breasts, and thus included any radiological abnormalities detected in an asymptomatic breast. For example, the first report was classified as normal and the second report as benign if imaging showed no abnormalities in the painful breast but a cyst in the asymptomatic contralateral breast.

Follow up

All patients were monitored for two years, and three follow up procedures were used to provide the best possible information on their breast cancer status at the end of follow up. Firstly, the general practitioners of all referred women were sent a questionnaire two years after the initial radiological examination. They were asked if the patients were still registered with them and whether (and when) the patients had been referred to a hospital other than Kennemer Gasthuis for further evaluation of the breast complaints. Where patients had been referred elsewhere, we asked whether any additional biopsies had been performed. One of the authors (LD) telephoned those general practitioners—and, where there was insufficient information, their patients—who had not returned the questionnaire within one month. Secondly, we received all the pathology reports for breast biopsies performed in our hospital during the follow up period and checked these. Finally, all patient files were linked to those of the Amsterdam Integral Cancer Register. Patients whose general practitioner confirmed that they had not developed breast cancer during the observation period and who were not found in the pathology records or the cancer register were assumed not to have breast cancer.

Comparison group

To determine whether breast pain is associated with an increased risk of breast cancer we included a comparison group of asymptomatic women who had been referred for screening mammograms for a variety of reasons (for example, a family history of breast cancer, reassurance, or fear of breast cancer). As with the study women, all asymptomatic women underwent breast examination after mammography and were asked whether any first degree relative had breast cancer. Controls were frequency matched to cases in relation to age (in 10 year age groups) and the prevalence of a first degree relative with breast cancer. Identical radiological procedures and follow up methods were used for cases and controls. The study protocol was approved by the institutional review board of the hospital.

Results

During the study, 6864 patients underwent breast imaging in our department and 1712 (24.9%) of these were asymptomatic. Pain alone was mentioned as the reason for referral in 1029 (15.0%) cases. Of these 1029 women, 27 with a history of breast cancer and eight who had had breast augmentation were excluded. A palpable lesion was detected during physical examination in seven patients. Altogether 84.1% of the remaining 987 patients had been referred by general practitioners and 15.9% by hospital specialists. Fifty five of the 987 (5.7%) women had a first degree relative with breast cancer. The pain was unilateral or bilateral in 76% and 24% of the patients respectively. The average age was 50.4 years (range 10-86 years; table 1). Table 2 shows that most of the radiological findings in the painful breast(s) (report 1) were either normal (86.5%) or showed benign abnormalities (8.6%). The imaging findings for both breasts, which included abnormalities detected in asymptomatic breasts (report 2), were as follows: normal 817 (82.8%), benign 96 (9.7%), probably benign 54 (5.5%), suspicious 12 (1.2%), and malignant 8 (0.8%).

Follow up

Altogether 151 of the 163 (92.6%) general practitioners to whom questionnaires were sent responded. The questionnaire results showed that 948 women were (to the general practitioner's knowledge) free of breast cancer at the end of follow up, three women had died of a disease other than breast cancer during follow up, and the current general practitioner of five women who had moved was unknown. Telephone calls to the 12 general practitioners (and if necessary, to their patients) who had not returned all the questionnaires provided complete follow up data for the remaining 31 patients.

Biopsy findings

In 10 of the 939 women with normal or benign radiological findings in the painful breast(s), a biopsy of the painful area was performed after the radiological examination. The only abnormality was fibrocystic disease found in one patient. Fine needle aspiration cytology was done in two of the 36 patients with a lesion that was probably benign, and no malignant cells were detected. Stereotactic or ultrasound guided

Table 1 Age distribution of the study population and number with a first degree family member with breast cancer. Values are numbers (percentages)

	Cases (n=987)	Controls (n=987)
Age (years)		
<30	61 (6.2)	55 (5.6)
30-49	455 (46.1)	462 (46.8)
50-69	383 (38.8)	391 (39.6)
⩾70	88 (8.9)	79 (8.0)
History of breast cancer	55 (5.6)	55 (5.6)

Table 2 Radiological findings in the painful breast(s) in relation to age group. Values are numbers (percentages)

	Age group				
Radiological findings	**<30**	**30-49**	**50-69**	**⩾70**	**Total**
Normal	54	396	327	77	854 (86.5)
Benign	4	43	33	5	85 (8.6)
Probably benign	3	12	17	4	36 (3.6)
Suspicious	0	4	3	1	8 (0.8)
Malignant	0	0	3	1	4 (0.4)

open biopsy was performed in the eight patients with suspicious lesions. Histological examination of the specimen showed fibroadenoma in three cases and fibrocystic disease in five. Histological examination showed cancer in the four patients with a lesion in the painful breast that was classified radiologically as malignant. A further four cancers were detected in an asymptomatic breast and were confirmed by histological examination. These four, non-palpable cancers were classified radiologically as malignant. Of the eight patients with a breast malignancy, three were younger than 50, three were aged 50-69 years, and two were older than 70.

Subsequent breast cancer

Breast cancer was diagnosed in two more patients within two years of the initial radiological examination. The reason for the initial referral was a diffuse tenderness of the breasts in both women, and their radiology report was classified as normal. Mammography was repeated in 15 months and 16 months respectively so that a recently noted palpable breast lesion could be evaluated. Review of the first mammograms showed no signs of malignancy. These cancers were either radiographically occult at the time of the initial presentation or had developed after the first mammogram.

Control women

Breast cancer was verified histologically shortly after breast imaging in 7 of 987 (0.7%) control women; radiological findings were classified as suspicious or malignant in all but one of them. Cancer was diagnosed in two more control women, 14 months and 22 months respectively after a true negative radiology report.

Discussion

In our series, the reason for mammography was pain alone in 15% of the patients. In the study of Locker et al, whose subjects comprised women referred to a hospital breast unit by general practitioners, pain was the presenting symptom or reason for mammography in 14.3%, and the prevalence of breast cancer in these women was 2.4%.[11] This is substantially higher than the cancer prevalence of 0.4% found in painful breasts in our study. However, several patients in Locker's study had a palpable breast cancer in the painful breast. In addition, these authors did not mention whether any of the breast cancers were located in an asymptomatic, contralateral breast in cases where pain was unilateral. In our study, apart from the four patients in whom cancer was diagnosed in the painful breast, there were four cancers located in an asymptomatic contralateral breast. Therefore the total prevalence of breast cancer in the symptomatic group was 0.8%. A comparable cancer prevalence of 0.7% was found in the asymptomatic group, suggesting that pain is not associated with an increase in cancer risk. However, these results should be interpreted with caution because of the few cancers in our study. The Dutch breast cancer screening programme detects 6.4 cancers per 1000 screened women aged 50-69 years in initial screening rounds.[11] This is somewhat lower than the 7.8 cancers detected per 1000 symptomatic women (3 of 383) of the same age group in our study. However, comparison of these two populations is rather limited as different clinical and radiological procedures are used. For example, in the screening programme a physical breast examination is not performed and the radiological examination comprises only a two view mammogram.

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.[12] However, it is doubtful whether pain can be attributed to a non-palpable cyst a few millimetres in size, and many of these benign lesions will undergo spontaneous regression.[13] 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.[14]

Our study suggests that biopsy of a painful area is not indicated in patients with radiological findings that are not suspicious, as in these cases no breast cancers were overlooked. This strategy is substantially different from the established management of palpable breast lesions, where biopsy may follow a negative radiology report. It is well known that mammography or ultrasonography does not always show whether a palpable lesion is malignant.[15–17]

None of the 36 non-palpable lesions grouped radiologically as probably benign proved to be malignant at follow up. The probability of malignancy in these lesions is 0.5-2% and mammographic surveillance will identify almost all of the lesions which are actually malignant— usually while the tumours are still curable.[18 19] Therefore, periodic mammographic follow up of lesions classified as probably benign may be a reasonable alternative to biopsy.[10 20]

We recognise that there are a few limitations and possible biases in our study. Our results will be influenced by referral bias, as general practitioners and hospital doctors do not always refer patients who present with pain to a radiologist. Several women would have been sufficiently reassured by a negative physical examination and would not have demanded a mammogram. We are not certain that the follow up period of two years was long enough to detect a slow growing breast cancer in the painful area in a patient with false negative radiological findings. We performed the physical examination after reviewing the mammograms and this may have been influenced by the imaging findings. Finally, the equipment and level of radiological reporting at our department may not always correspond to that in other hospitals.

The primary value of breast imaging in women with painful breasts seems to be that of reassurance, as no

Key messages

- General practitioners and hospital specialists often request a mammogram for women with localised or diffuse pain in the breast but no palpable abnormalities
- The particular value of breast imaging in patients with breast pain alone is reassurance
- Biopsy of the painful area is unnecessary where the radiological findings are not suspicious

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. Patients referred for further assessment will have the *x* ray results already available and this should improve efficiency at the surgical clinic. Biopsy of a painful area is redundant in the case of unsuspicious radiological findings.

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Contributors: LD designed the study, collected and interpreted the data, wrote the first draft of the paper, and is the guarantor. GG designed the study, contributed to interpreting the data and writing the paper. JH discussed core ideas and helped in interpreting the data and writing the paper. JZ guided all data analysis (particularly methodological issues) and helped to write the paper. WM discussed core ideas, helped to interpret the data, and participated in the preparation of the manuscript.

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Memorable patients

Continued need for special treatment

It is not known how many survivors there are from the war in the Far East. Of the 61 000 allied prisoners taken at Singapore all but between 13 000 and 16 000 survived compared with the very high mortality among native slave labourers. This was due largely to the discipline of the men and the remarkable effectiveness of the medical corps working in dreadful conditions.

This unique feat of doctoring is generally unrecognised in Britain. Not so in Australia and Thailand. One of the most famous of the allied surgeons, Sir Edward Dunlop, has been awarded the highest order of chivalry in Thailand, the Order of the White Elephant. Throughout the war he worked with the Thai resistance, who supplied him with drugs and rudimentary equipment. Similarly, the Australian prime minister has recently decorated the grandson of Boonpong, one of the Thai leaders.

All these veterans are now at least 75 and the vast majority will die within the next few years. All have been psychologically damaged and have never received psychiatric treatment. One survivor, Eric Lomax, author of *The Railway Man*, has described the difficulties of recovery and reconciliation in great depth. He was tortured; most prisoners were not, although they were regularly beaten. My father was a survivor of the railway and seemed well adjusted. However, while he was in hospital with cancer he suffered hallucinations that terrified him and bewildered the medical and nursing staff. This was despite the fact that he had not had nightmares for years. These were astonishingly vivid. He said that he could smell and hear the jungle again.

The paradox for these survivors is that despite being surrounded by brutality and barbarity, the country was stunningly beautiful and created strong images in full colour. In my father's case they were sufficient for him to jump out of bed and run down a ward still attached to his drips, tearing his arms and damaging equipment. He had not slept in rows with other men since the war. Once he returned home, the nightmares ceased and with excellent nursing care he died peacefully. Presumably with foresight it might have been possible to alleviate these occurrences, if not to avoid them.

The issues of apology and compensation will linger on with no chance of either being forthcoming, and will aggravate the feelings of bitterness. In common with all those traumatised by war, these men will continue to need informed care from the profession which helped their survival so long ago.

P J Bertin, *personnel consultant, Canterbury*