

## Analysis of malignancy detected by needle-localized breast biopsy

RENEE A. HILLHOUSE, DO; KEITH A. NORVILL, DO;  
SAM W. BUCHANAN, DO; ROBERT B. McFAUL, DO;  
DAVID A. STONE, DO; CHARLES T. WILSON, DO

The medical records of 192 women with nonpalpable mammographically detected breast lesions who underwent needle-localized breast biopsy between January 1989 and January 1991 and between March 1992 and March 1994 were reviewed. Of the 192 patients examined, 100 underwent biopsy for evaluation of microcalcifications suggestive of malignancy. Ninety-two biopsies were performed for non-specific radiodensities not inclusive of microcalcifications. This study examines the radiographic characteristics of the nonpalpable breast lesion. Although presence of microcalcifications on mammograms are an important finding in detection of breast carcinoma, it must not be considered pathognomonic. Other distinguishing factors require evaluation to assess the indication for biopsy. Central to this study was the presence of microcalcifications alone or as detected in association with a dominant mass. Cancer was discriminated in 38 (20%) of the patients studied. Mammographic findings with microcalcification, regardless of the presence of a mass, were found to be malignant in 20% of patients undergoing biopsy. Nine percent of biopsies done to evaluate microcalcifications alone were malignant. The finding of microcalcification associated with a dominant mass proved malignant in 34% of patients who had a biopsy done. The authors include guidelines for increasing the effectiveness of needle-localized biopsies of the breast.

(Key words: Needle-localized breast biopsy, microcalcification, dominant breast mass, breast carcinoma, mammography)

In North America today, breast cancer will develop in 1 of 11 women.<sup>1</sup> Breast cancer, which is responsible for greater than 25% of all cancer deaths in women, has proved to be best treated when discovered in its early stages.<sup>1</sup> Mammography is the most effective method available today to detect early nonpalpable lesions of the breast. Determining which lesion to evaluate by biopsy is a frequent surgical dilemma.<sup>2</sup>

From the University of North Texas Health Science Center at Fort Worth—Texas College of Osteopathic Medicine, where, at the time this article was written, Dr Hillhouse was a general surgery resident and Dr Buchanan is program director, General Surgery Residence; Drs McFaul, Stone, and Wilson are attending physicians. Dr Norvill was a neurosurgery resident, Doctors Hospital, and is currently at Doctors Hospital, Columbus, Ohio. Dr Hillhouse is currently a senior otolaryngology, head, and neck surgery resident, Kirksville (Mo) College of Osteopathic Medicine program.

Correspondence to Renee A. Hillhouse, DO, 4401 Belmont Dr, Joplin, MO 64804.

Needle-localized breast biopsy has proved to be a significant, cost-effective method of detection of early carcinoma in many women.<sup>2</sup> Surgeons performing breast surgery use needle localization to examine nonpalpable lesions or regions of microcalcifications suggestive of malignancy which are found on screening mammography.<sup>3-5</sup>

Several studies have attempted to define criteria that would distinguish benign from malignant lesions based on size of the opacity and number of microcalcifications present on mammograms.<sup>2</sup> Our study examines the finding of microcalcification found on mammograms and the association of such detected microcalcification with or without the presence of a radiographically detected mass and the incidence of detection of breast carcinoma.

## Materials and methods

A retrospective review was conducted of the medical records of 192 women with nonpalpable mammographically detected breast lesions who underwent needle-localized breast biopsy between January 1989 and January 1991 and between March 1992 and March 1994. Biopsies were performed by the coauthors (S.W.B., R.B.M., D.A.S., and C.T.W.), practicing general surgeons at the Osteopathic Medical Center of Texas, the teaching hospital for the University of North Texas Health Science Center, Fort Worth, Tex. Lesions suggestive of malignancy appeared on mammograms in one of three forms: (1) the presence of microcalcifications, (2) microcalcifications associated with a nonpalpable dominant mass, and (3) nonpalpable mass. Microcalcifications appearing as more than five in a cluster or those with a branched chain pattern are considered to be suggestive of malignancy.

Needle localization was done by a radiologist or radiology resident in the Radiology Department using craniocaudal and mediolateral coned-down projections. A radiopaque grid was used to localize the mass or the microcalcification with or without a dominant mass present. A needle-localization guidewire was inserted contiguous to the region in question, and placement was confirmed by a second plain x-ray film. After localization, methylene blue dye was injected through the insertion needle to mark the breast tissue surrounding the lesion. The guidewire was then taped to the skin, and the patient was transferred to the surgical suite for biopsy.

After sterile preparation of the breast with a povidone iodine (Betadine) or chlorhexidine gluconate (Hibiclens) solution and sterile draping, the skin was incised proximal to the guidewire. Sharp dissection was then carefully carried down through the subcutaneous tissue and breast parenchyma to the hook of the guidewire. An attempt was made to remove all dye-containing tissue by means of wide local excision.

The excised tissue was returned to the Radiology Department for radiographic study of the specimen to confirm that all of the suspected lesion was included in the specimen, ensuring that the region of concern was truly sampled. The entire specimen inclusive of the localization wire and containing the mammographically detected lesion was placed in either a formaldehyde solution for permanent paraffin pathologic sectioning or in an empty specimen container for immediate frozen sectioning and submitted to the Pathology Department.

Serial histologic slides of sections appropriately prepared by hematoxylin-eosin staining and histologic techniques were microscopically examined for evidence of malignancy by one of two pathologists on duty. Cell-receptor analysis by flow cytometry was done as well.

## Results

A total of 192 biopsies of breast tissue were performed for nonpalpable lesions originally detected by routine screening mammography in patients aged 34 to 80 years (mean, 55.9 years; median, 46 years). The most common findings indicating biopsy were, in descending order, the presence of microcalcification, a mammographically detected mass, and microcalcification concomitant with a mammographically detected dominant mass.

Surgical pathology reports revealed that the most common pathologic process found was benign fibrocystic change. Malignancy was confirmed in 38 (20%) of patients; 82% of the carcinomas detected were invasive, with the majority of these being ductal carcinoma (*Table 1*).

Malignancy was confirmed in 20% of the biopsies performed for microcalcifications irrespective of the presence of a mammographically detected mass; in 9% for microcalcification alone; and in 34% for microcalcification with a dominant mass (*Table 2*).

The significance of the presence of a mammographically detected microcalcification in conjunction with a dominant mass as an indicator of malignancy was tested by statistical analysis. The observation of a dominant mass in conjunction with a microcalcification is a significant indication of malignancy, as proved by a  $\chi^2$ -test of independence, which determined  $\chi^2=9.75$ , proving the hypothesis to be significant ( $P<.01$ ).

## Discussion

Screening mammography has proved successful in detecting early breast carcinoma.<sup>6</sup> When breast cancer is treated in its early stages, a successful 10-year survival rate of 95% to 100% can be expected.<sup>1</sup> Mammographic screening guidelines published by the American Cancer Society recommend baseline mammograms for women 35 to 39 years old, with follow-up repeat-

**Table 1**  
**Histopathologic Types of Breast Carcinoma Detected**

| Histopathologic type     | Carcinomas detected (N=38) |      |
|--------------------------|----------------------------|------|
|                          | No.                        | %    |
| <b>Ductal</b>            |                            |      |
| Intraductal in situ      | 27                         | 72.0 |
| Cribriform               | 3                          | 8.0  |
| <b>Comedo</b>            |                            |      |
| Medullary                | 1                          | 2.5  |
| Papillary                | 2                          | 5.0  |
| In situ                  | 1                          | 2.5  |
| <b>Lobular</b>           |                            |      |
| Invasive                 | 2                          | 5.0  |
| <b>Bronchogenic lung</b> | 1                          | 2.5  |
| <b>Adenocarcinoma</b>    | 1                          | 2.5  |

**Table 2**  
**Mammographic Findings Associated With Malignancy**

| Mammographic finding                       | No  | Benign |    | Malignant |    |
|--------------------------------------------|-----|--------|----|-----------|----|
|                                            |     | No.    | %  | No.       | %  |
| Microcalcification                         | 100 | 80     | 80 | 20        | 20 |
| Microcalcification without a dominant mass | 51  | 46     | 91 | 5         | 9  |
| Microcalcification with a dominant mass    | 44  | 29     | 66 | 15        | 34 |

ed every 1 to 2 years until a woman reaches age 50 and yearly thereafter. Adherence to these guidelines has greatly increased the number of nonpalpable lesions mammographically detected.<sup>8</sup>

The surgeon and the radiologist are faced with the responsibility of deciding how to manage such lesions. Accurate histologic diagnosis, with minimal destruction of breast architecture, is essential.<sup>7</sup> Needle-localized biopsy, since its institution, has become a highly refined and accurate method of approaching these nonpalpable lesions. A 85% to 95% success rate of sampling the lesion in question has been reported, dependent on the radiologist's technical skill.<sup>6</sup> Twenty-four percent of all needle-localized breast biopsies detect malignancies that otherwise may not become clinically evident for many years.<sup>1</sup>

With this knowledge, the surgeon must decide which lesions require biopsy. Microcalcification alone, which may be the result of increased cellular activity or vascular deposition, is not necessarily an indication of malignancy or need for biopsy. Whether these microlesions progress to more definitive lesions is not yet proved. Our study was an effort to help to determine guidelines of biopsy by correlation of the presence of microcalcification and a dominant mass found on screening mammography. Thirty-four percent of biopsies done because of the presence of both microcalcification and a dominant mass proved malignancy, whereas only 9% of the biopsies done because of microcalcification alone showed malignancy. Therefore, a lesion found on mammogram to have microcalcification and a dominant mass is 3.8

times more likely to be malignant than those without a mass present. In light of this information, a surgeon is obligated to proceed with biopsy when serial screening mammography for increase in size and density of a lesion can result in misdiagnosis and progression of an otherwise easily treated carcinoma to a higher stage that may require more aggressive therapy. Intervention by surgical biopsy with needle localization of microcalcification with associated masses is essential. Many times, lumpectomy with frozen section examination to determine disease-free margins may be all that is necessary in treatment of noninvasive early breast carcinoma.

### Comment

A retrospective study of 192 needle-localized breast biopsies done to evaluate non-palpable mammographically detected lesions revealed that the roentgenographic finding of microcalcification present with a dominant mass is more likely to be malignant. Aggressive treatment of such lesions is recommended. Biopsy should be undertaken without delay to improve cancer detection, early treatment, and survival rate.

### References

1. Rusnak CH, Pengelly D, Hosie R, Rusnak CN: Pre-operative needle localization to detect early breast cancer. *Am J Surg* 1989;157:505-507.
2. McCreery BR, Frankl G, Frost DB: An analysis of the results of mammographically guided biopsies of the breast. *Surg Gynecol Obstet* 1991;172:223-226.
3. Tresadern JC, Asbury D, Hartley G, et al: Fine-wire localization and biopsy of non-palpable breast lesions. *Br J Surg* 1990;77:320-322.
4. Senofsky GM, Davies RJ, Olson L, et al: The predictive value of needle localization mammographically assisted biopsy of the breast. *Surg Gynecol Obstet* 1990;171:361-365.
5. Alexander HR, Candela FC, Dershaw DD, Kinne DW: Needle-localized mammographic lesions. *Arch Surg* 1990;125:1441-1444.
6. Rappaport W, Thompson S, Wong R, et al: Complications associated with needle localization biopsy of the breast. *Surg Gynecol Obstet* 1991;172:303-306.
7. Landercasper J, Gundersen SB Jr, Gundersen AL, et al: Needle localization and biopsy of nonpalpable lesions of the breast. *Surg Gynecol Obstet* 1987;164:399-403.
8. Holleb AI, Fink DJ, Murphy GP: *Clinical Oncology*. Atlanta, Ga, American Cancer Society, 1991, p 155.

### Eustrongylidiasis—A parasitic infection acquired by eating live minnows

LOIS LUCENTE NARR, DO; JAMES G. O'DONNELL, DO;  
BORIS LIBSTER, DO; PAUL ALESSI, DO; DAVID ABRAHAM, PhD

The objective of this study was to heighten physician awareness of eustrongylidiasis by investigating the epidemiology of this parasitic infection. The nematode *Eustrongylides ignotus* was recovered surgically from our patient, in whom eustrongylidiasis simulated acute appendicitis. The patient had consumed two live minnows obtained from Big Timber Creek of Belmawr, NJ. The authors determined the *E ignotus* infestation rate of free-living minnows at this creek. With this data, they approximate the probability of human infection with *E ignotus* after eating live minnows and attempt to evaluate the hypothesis that eating live minnows may lead to eustrongylidiasis.

(Key words: Eustrongylidiasis, *Eustrongylides ignotus*, acute appendicitis, piscivory, limnadrilus, minnows)

The consumption of live minnows may cause eustrongylidiasis. A 17-year-old white male patient consumed two live minnows obtained from Big Timber Creek of Belmawr, NJ. Approximately 3 days later, he had right lower quadrant pain and underwent an exploratory laparotomy for suspected acute appendicitis. On surgical exploration of the peritoneal cavity, two large (0.08 m), reddish pink *Eustrongylides ignotus* nematodes were removed from the region of the appendix. Infection had resulted from the consumption of the live minnows. We ascertained the minnows' habitat and studied the infestation rate of eustrongylidiasis among this selected group of free-living minnows. Through these data, we determined the

probability of eustrongylidiasis resulting after consumption of live minnows from this selected population.

### Report of case

A 17-year-old boy had a history and findings on physical examination characteristic of acute appendicitis. He complained of right lower quadrant pain that worsened with movement, improved when he was in a bent-over position, and radiated to the right flank. The corresponding physical findings included right lower quadrant tenderness, voluntary guarding, and a temperature of 38°C. The initial laboratory studies revealed a leukocyte count of  $13.6 \times 10^3/L$ , with 72% polymorphonuclear leukocytes, 21% lymphocytes, and 7% monocytes. No eosinophils were present on the peripheral blood smear. Results of all other laboratory studies were within normal limits. An abdominal x-ray film series showed no obstruction.

The patient underwent emergency exploratory laparotomy that revealed a normal-appearing appendix. The cecum was found to be mildly erythematous, and two approximately 0.08-m reddish

Dr Narr, is chief of medicine, Department of Medicine/Family Practice, Dorchester General Hospital, Cambridge, Md; Dr O'Donnell is at the Department of Infectious Disease, Northwestern University, Chicago Osteopathic Hospital and Medical Center, Chicago, Ill; Dr Libster is at the Department of Medicine and Dr Alessi, at the Department of Infectious Disease, Our Lady of Lourdes Medical Center, Camden, NJ; and Dr Abraham, is at the Department of Microbiology and Immunology, Thomas Jefferson University, Philadelphia, Pa.

Correspondence to Lois Lucente Narr, DO, 215 Bloomingdale Rd, Federalsburg, MD, 21632.