

CASE REPORT

The Development of New, Primary, Noninvasive Carcinoma of the Breast 29 Years after Bilateral Radical Mastectomy

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■ **Abstract:** We present the case of a patient with a new, primary noninvasive breast carcinoma arising in residual breast tissue 29 years after radical mastectomy. The patient, a 75-year-old black woman with no family history of breast or ovarian cancer, had undergone left radical mastectomy in 1956 (age 35) and right radical mastectomy in 1965 (age 44). Examination revealed a 3-mm nodule in the right anterior axillary line. On excision, the lesion was a 1.5-mm intracystic papillary ductal carcinoma in situ arising in a background of atypical ductal hyperplasia (representing residual breast tissue). The patient has not agreed to testing for BRCA1 or BRCA2 mutations. The theoretical risk of new primary breast cancers arising in residual breast tissue has been suggested as a reason why prophylactic mastectomy may not be completely effective. This case suggests that even after what appeared to be aggressive radical mastectomy, enough breast tissue remained so that the patient was at risk for recurrent breast cancer. ■

Key Words: breast carcinoma, radical mastectomy

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The impending availability of genetic susceptibility testing for carcinoma of the breast has caused a renewed interest in prophylactic mastectomy. Women who carry a mutation in the *BRCA-1* or *BRCA-2* gene will face a greater than 80% risk of the development of carcinoma of the breast by age 70 years (1). Management strategies for these high-risk women include close surveillance, prophylactic bilateral mastectomies, or participation in prevention trials, such as the chemoprevention trial sponsored by the National Surgical Adjuvant Breast and Bowel Project (NSABP) (2). The efficacy of each strategy, especially of the most extreme strategy, prophylactic surgery, needs to be determined.

Prophylactic mastectomy may not be completely effective because residual breast tissue may remain after surgery. It would be reasonable to assume, however, that the potential risk decreases as the extent of surgery increases. Subcutaneous mastectomy leaves the nipple and the subareolar breast tissue intact and probably has no value as a preventive strategy. Total mastectomy removes more breast tissue, but residual microscopic tissue has been found in patients who have undergone such procedures. It would be expected that radical mastectomy would leave behind even less breast tissue.

We report a case of a new, primary noninvasive carcinoma of the breast arising in residual breast tissue in a patient who underwent radical mastectomies 29 and 39 years previously because of metachronous carcinoma of the breast. A review of the literature yielded no such previous case.

CASE REPORT

A 75-year-old black female presented with a small lump on the right chest wall that had been present for 1 month. The patient's past medical history included bilateral metachronous carcinoma of the breast, which was treated with left radical mastectomy in 1956 at age 35 and right radical mastectomy in 1965 at age 44. The family history was negative for carcinoma of the breast or ovary.

Physical examination revealed an extremely thin patient. Scars from bilateral transverse mastectomies were present on the anterior thorax, and the skin was adherent to the ribs and intercostal muscles with no evidence of residual breast tissue. At the right anterior axillary line above the scar was a 3-mm movable nodule that was not attached to the underlying tissue and that had no skin reaction. Although presumed to be benign, the nodule was excised.

Pathologic examination revealed a 1.5-mm tumor confined to the inner aspect of a well-defined cystic structure delimited by a thickened basement membrane. The tumor presented papillary formation and the lesion was consistent with a noninvasive intracystic papillary adenocarcinoma of the breast (3). The tumor arose in an

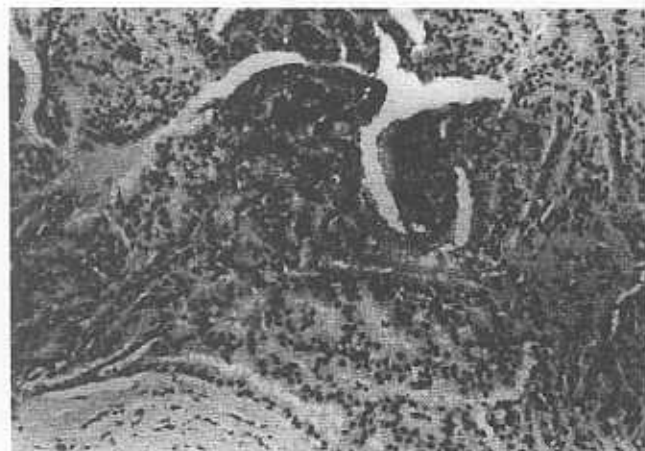


Figure 1. Photomicrograph of papillary carcinoma shows monotonous cellular proliferation without well-developed fibrovascular stalks or myoepithelial cell layer. Hematoxylin and Eosin, $\times 100$.

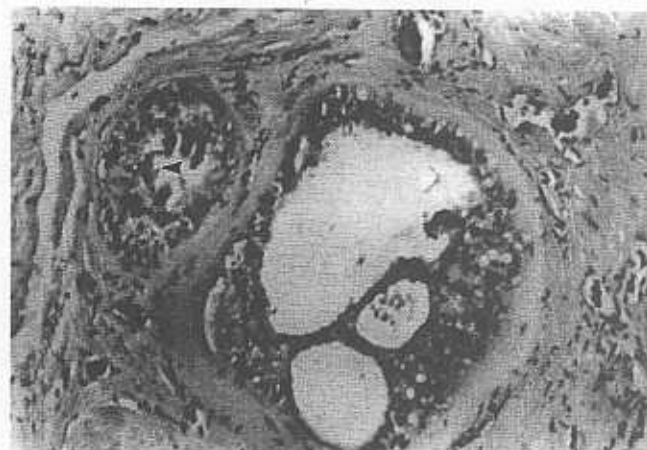


Figure 2. Photomicrograph of adjacent large duct shows partial and asymmetric involvement by atypical hyperplasia. The adjacent small duct contains a microcalcification (arrow). Hematoxylin and Eosin, $\times 100$.

area of atypical ductal hyperplasia (representing residual benign breast tissue) (Figs. 1 and 2). Wide re-excision was negative for residual tumor. All metastatic workup, bone scan, chest X-ray, and liver function tests were negative. Attempts made to obtain data on the pathology of the previous breast cancers were unsuccessful.

DISCUSSION

Unlike the presence of an invasive carcinoma, representing a metastatic process, noninvasive carcinoma of the breast that is diagnosed years after mastectomy is most consistent with either a failure of local excision or a new primary breast cancer that has arisen in residual breast tissue. Noninvasive cancer by definition, may not be considered a metastatic lesion. The presence of a ductal structure with an intact basement membrane was essential to describe this lesion as a new primary. The lesion was surrounded by other ductal structures with one duct representing atypical hyperplasia. Otessen et al. (4) classified chest wall tumors as new primaries if an associated in situ carcinoma was found. This case showed pure ductal carcinoma in situ (DCIS). This is most consistent with a new primary breast cancer as it is very unlikely that DCIS incompletely excised suddenly began to grow 29 years after a radical mastectomy. While genetic testing would be of interest, the patient has not agreed to testing for *BRCA-1* or *BRCA-2*.

When, as in this case, a complete radical mastectomy leaves behind residual breast tissue with malignant potential, the effectiveness of any prophylactic mastectomy has to be reconsidered. The effectiveness of prophylactic

surgery is most likely dependent on the amount of remaining breast tissue as well as the malignant potential of that tissue. The reported low incidence of carcinoma after prophylactic mastectomy may be attributed as much to the low risk of the patients in the series as to the efficacy of the procedure. Conversely, prophylactic mastectomy may be less effective in women whose risk is extremely high because of genetic susceptibility.

Mutations in the *BRCA-1* and *BRCA-2* genes are thought to be responsible for 5–10% of breast cancers. Testing for *BRCA-1* and *BRCA-2* is available for individuals of families in which hereditary carcinoma of the breast is suspected. The woman who chooses testing should do so only after receiving comprehensive education and counseling and with an understanding of her options for follow-up treatment if she is found to carry a *BRCA-1* mutation.

Because women in such families have opted for prophylactic mastectomies in the past when risk could be assessed at no more than 50%, it can be assumed that women who receive a positive test result (and face a risk approaching 90%) will be interested in this potentially preventive strategy. The potential psychological and medical morbidity of this approach makes it imperative that we fully understand its efficacy in preventing carcinoma.

Probably the least effective of the prophylactic operations is the subcutaneous mastectomy. After performing bilateral subcutaneous mastectomy on six cadavers, Goldman and Goldwyn (5) reported residual breast tissue beneath the areola in all 12 breasts. When the subareolar area was excluded, breast tissue was still present in eight of 12 breasts. However, reports (6,7) in the literature have documented a low incidence of new instances of carcinoma of the breast in patients who underwent subcutaneous mastectomy for benign diseases (Table 1). Pennisi

and Capozzi (6) reported the development of carcinoma of the breast in 6 of 1,500 patients after subcutaneous mastectomy, and Woods and Meland (7) reported the development of carcinoma of the breast in five of 1,500 patients who underwent subcutaneous mastectomy. These experiences might not define the actual risk of disease, however, because the data presented did not permit an accurate estimation of risk based on family history, age, atypia, or lobular carcinoma in situ (LCIS) and because the follow-up was short. The literature contains sporadic case reports (8,9) of the development of carcinoma in patients who had previously undergone prophylactic subcutaneous mastectomy for increased risk. Goodnight et al. (8) reported the development of infiltrating carcinoma in two patients who underwent subcutaneous mastectomy; one patient had LCIS, and the other had intraductal papillomatosis. Humphrey (9) reported the subsequent development of carcinoma of the breast in 3 of 16 patients who received subcutaneous mastectomy for "severe florid epithelial hyperplasia of large and small ducts, usually with atypia." Carcinoma of the breast after subcutaneous mastectomy is not surprising because a large amount of tissue remains. To our knowledge, no studies to date have supported the value of subcutaneous mastectomy in patients who are truly at high risk.

Carcinoma of the breast has infrequently been reported after total mastectomy (Table 1). Holleb et al. (10) reported two cases of infiltrating carcinoma of the breast that developed 10 and 12 years after simple mastectomy; one patient had papillomatosis, the other patient presented with a ductal discharge (the diagnosis was not specified). Ziegler and Kroll (11) reported another case of infiltrating carcinoma that developed 18 years after simple mastectomy performed because of a strong family history of carcinoma of the breast. Although

Table 1. Reported Cases of Carcinoma of the Breast in Patients with Previous Mastectomy

Author	Number of cases reported	Total number of patients	Type of mastectomy	Years after mastectomy
Holleb et al. (10)	2	NS/CR	Total	10,12
Ziegler and Kroll (11)	1	CR	Total	18
Goodnight et al. (8)	2	CR	Subcutaneous	3,7
Humphrey (9)	3	16	Subcutaneous	NS
Pennisi and Capozzi (6)	6	1,500	Subcutaneous	NS
Woods and Meland (7)	5	1,500	Subcutaneous	NS

NS = not specified; CR = case report.

simple mastectomy is expected to remove all breast tissue, Temple et al. (12) reported the presence of breast tissue extending into the pectoralis fascia, the pectoralis muscle, the lower flap, and the axillary tail in five high-risk patients who underwent total prophylactic mastectomy. In a study reported by Wong et al. (13), the effectiveness of prophylactic mastectomy was studied in female albino Sprague-Dawley rats. These animals were divided into different groups according to increasing amounts of breast tissue removed after or before the rats were exposed to the carcinogen 7,12-dimethylbenzanthracene (DMBA). No significant difference was noted in the number of breast tumors that developed in all groups, regardless of the amount of tissue removed. In our patient, radical mastectomy with removal of pectoral muscles and axillary nodes at all levels did not remove all breast tissue and did not prevent the development of a new carcinoma 29 years later, which raises the question of whether or not mastectomy is effective in preventing carcinoma of the breast in high-risk patients.

Critical analysis of the limited existing data does not warrant the assumption that any extent of mastectomy is completely preventive against breast cancer. The availability of genetic testing will present the medical community with the challenge of determining the best management for patients who are predisposed to illnesses. Women with genetic mutations that are associated with an increased risk of the development of carcinoma of the breast will likely be offered prophylactic surgery as a protective strategy and should be fully informed of the potential limitations of this approach. Those patients who choose surgical management should undergo total mastectomies for the best result but should also undergo rigorous follow-up. If these patients are followed carefully and for a long term, their courses will ultimately provide further data to define the effectiveness of this procedure in this high-risk population.

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