

# An unusual case of metastatic breast carcinoma metastasizing to an antecedent rhytidectomy procedural scar



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## INTRODUCTION

Breast carcinoma remains the most common cutaneous metastasis in women.<sup>1</sup> Although breast carcinoma can arise within mastectomy scars as a sign of locoregional recurrence, distant metastasis in the skin is a less common event. We report the case of a 58-year-old white woman with a history of infiltrative ductal carcinoma who presented with multiple cutaneous papules and nodules on the scalp and retroauricular region. A single metastatic focus uniquely occurred in a prior rhytidectomy scar on the left postauricular sulcus. Only 6 cases of metastases homing to distant cutaneous scars have been reported<sup>2-6</sup>; to date, this exists as the first case in breast carcinoma (Appendix).

## CASE

In August 2010, a 54-year-old white woman with a history of rhytidectomy sought treatment for a right breast mass, which was biopsy-proven to be infiltrative ductal carcinoma (estrogen receptor-positive, progesterone receptor-positive, HER2 [human epidermal growth factor receptor 2]/neu-negative). A right nipple-sparing mastectomy with lymph node dissection revealed that 3 of the 11 involved nodes contained poorly differentiated grade 3 breast carcinoma, and the patient subsequently underwent adjuvant chemotherapy and irradiation. In December 2011, bone scans revealed metastases in the ribs, spine, and distal femur, for which she underwent radiotherapy and started fulvestrant and denosumab. In October 2012, skin metastases developed at the right retroauricular zone and the vertex scalp of the patient. Positron emission tomography-

### Abbreviation used:

HER2: human epidermal growth factor receptor 2

computed tomography imaging demonstrated progression of bone and lymph node disease, and she was started on tamoxifen.

In July 2014, the patient visited our dermatology clinic with several nontender, shiny flesh-colored 1-cm papules on the vertex scalp. A similar firm 4-mm papule was identified in an atrophic procedural scar overlying the left postauricular sulcus (Fig 1).

Biopsies from each of these sites revealed atypically large epithelioid cells in haphazard aggregates with clear-cut ductal lumen formation, consistent with metastatic breast carcinoma (Figs 2 and 3). Specific to the left postauricular sulcus, the metastatic deposit was contiguous with increased horizontally oriented fibroblasts organized in compact fascicles with hypervascularity. Immunohistochemical analysis revealed strong expression of cytokeratin and estrogen receptor, while progesterone receptor and HER2/neu were negative.

Positron emission tomography-computed tomography was ordered to evaluate disease progression and revealed further metastases on the axial and appendicular skeleton and mediastinal nodes. She was started on capecitabine and demonstrated favorable response despite moderate hand-foot syndrome. The patient has continued to remain stable without disease progression and is currently enrolled in clinical trials.

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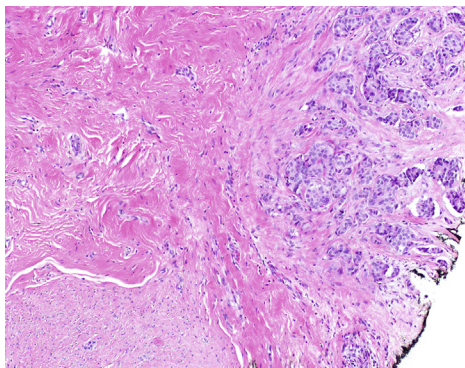
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**Fig 1.** Papular lesion within an atrophic postsurgical scar at the postauricular border.

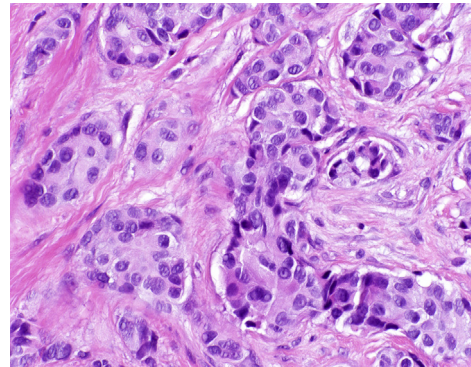


**Fig 2.** A 3-mm punch biopsy showing an aggregate of atypical epithelioid cells (right) enmeshed in dense fibrosis (left) demonstrates a theque-like arrangement. (Hematoxylin-eosin stain; original magnification:  $\times 100$ .)

## DISCUSSION

Breast carcinoma is the most common internal malignancy to metastasize to the skin.<sup>1</sup> It most commonly occurs as single or multiple nodules in the chest, often near or within mastectomy scars as locoregional recurrence. Few reports of metastases at distant, preexisting scars exist in the literature, with only 6 accounts to date. Four were secondary to colon cancer,<sup>2-4</sup> 1 to pancreatic cancer,<sup>5</sup> and 1 to gastric carcinoma.<sup>6</sup> This appears to be the first case of a cutaneous metastasis at a prior, disparate scar from metastatic breast carcinoma. Breast carcinoma has been shown to metastasize to scars in the sideburn and back after excisional biopsy but not to surgical scars antecedent to breast cancer diagnosis.<sup>7</sup>

Rarely, surgical procedures can facilitate metastasis because injuries to the vasculature can allow spillage of tumor cells into distant tissues<sup>7</sup> and tumor adhesion is improved during early stages of wound



**Fig 3.** A 3-mm punch biopsy showing constituent tumor cells displaying moderately abundant amphophilic cytoplasm with high-grade nuclear features, namely hyperchromasia, prominent nucleoli, and nucleomegaly. (Hematoxylin-eosin stain; original magnification:  $\times 400$ .)

healing.<sup>6</sup> Procedures such as fine needle aspiration have been purported to locally seed malignant cells.<sup>8</sup> Our patient's rhytidectomy preceded her breast carcinoma diagnosis and was located at a site too distant for perceived locoregional seeding. It is possible that clinically occult scalp and neck metastases were already present during her rhytidectomy. However, given the low likelihood of this scenario and unremarkable head and neck magnetic resonance imaging results 9-months prior, her cutaneous metastasis was unlikely attributable to surgical implantation. Wright et al proposed that abnormalities in extracellular matrix, lymphatic microcirculation, and local immune-surveillance in old scar tissue might contribute to a predilection for tumors metastasizing to scars.<sup>4,6</sup> Similarly, Schulman et al identified an increased proportion of FoxP3-expressing regulatory T cells in the head and neck region, suggesting an immunologic basis for metastatic spread to the scalp.<sup>9</sup> Metastases localized to the scalp might also involve hematogenous spread given the scalp's increased vasculature.<sup>10</sup> In the case of our patient, metastasis was likely a combination of hematogenous spread to an immunologically susceptible scar.

In summary, this is a rare case of a cutaneous breast cancer metastasizing to an antecedent procedural scar. The discovery of the cutaneous metastasis led to further imaging that revealed progression of skeletal and lymph node metastases for which capecitabine was initiated. For our patient, the cutaneous metastases resulted in a change in therapeutic management. This finding suggests that preexisting, healed scars might possess a pathophysiologic predilection for tumor adhesion, and that clinicians ought to be aware of the possibility of cutaneous metastases to old surgical scars.

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## APPENDIX

In order to determine the incidence of cutaneous breast cancer metastases to preexisting scars, we conducted a literature search in Pubmed using the following permutations of MeSH terms: “breast cancer” OR “breast neoplasm” OR “breast carcinoma” OR “mammary cancer” OR “mammary carcinoma,” AND “metastases” OR “metastatic,” AND “cutaneous” OR “skin.” In total, 23,652 articles published during 1930-2017 were obtained. Articles were limited to those written in English and abstracts were reviewed by 3 authors. In total, 228 potential case reports were identified and reviewed for metastasis to a distant preexisting scar, but no matches were found. There was 1 report of an occult breast cancer metastasis discovered in a basal cell

carcinoma excisional scar.<sup>S1</sup> However, this metastasis did not involve a preexisting scar (the patient’s breast cancer diagnosis preceded the scar by 14 years).

An expanded second search was subsequently conducted to identify reports of cutaneous metastases to scars by all malignancies. MeSH terms included “cancer” OR “neoplasm” OR “malignancy,” AND “metastasis” OR “metastatic,” AND “scar.” Six case reports were identified and are included in the manuscript. After these extensive literature searches, we are confident that this case represents the first documented instance of breast carcinoma metastasizing to a prior cutaneous surgical scar.

## REFERENCE

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