Human Pathology (2017) 67, 94–100

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Human PATHOLOGY

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Original contribution

# Breast implant capsule–associated squamous cell carcinoma: a report of 2 cases☆

Daniel L. Olsen MD, Gary L. Keeney MD, Beiyun Chen MD, PhD, Daniel W. Visscher MD, Jodi M. Carter MD, PhD*

*Department of Laboratory Medicine and Pathology, Mayo Clinic, Rochester, MN 55905*

Received 17 May 2017; revised 16 June 2017; accepted 5 July 2017

**Keywords:**
Squamous cell carcinoma;
Breast;
Implant;
Capsule;
Metaplasia

**Summary** The use of prosthetic implants for breast augmentation has become commonplace. Although implants do not increase the risk of conventional mammary carcinoma, they are rarely associated with anaplastic large cell lymphoma. We report 2 cases of breast implant capsule–associated squamous cell carcinoma with poor clinical outcomes. Both patients (56-year-old woman and 81-year-old woman) had long-standing implants (>25 years) and presented with acute unilateral breast enlargement. In both cases, squamous cell carcinoma arose in (focally dysplastic) squamous epithelium-lined breast implant capsules and widely invaded surrounding breast parenchyma or chest wall. Neither patient had evidence of a primary mammary carcinoma or squamous cell carcinoma at any other anatomic site. Within 1 year, one patient developed extensive, treatment-refractory, locoregional soft tissue metastasis, and the second patient developed hepatic and soft tissue metastases and died of disease. There are 2 prior reported cases of implant-associated squamous cell carcinoma in the plastic surgery literature; one provides no pathologic staging or outcome information, and the second case was a capsule-confined squamous cell carcinoma. Together, all 4 cases share notable commonalities: the patients had long-standing breast implants and presented with acute unilateral breast pain and enlargement secondary to tumors arising on the posterior aspect of squamous epithelialized implant capsules. Because of both its rarity and its unusual clinical presentation, implant capsule–associated squamous cell carcinoma may be underrecognized. The aggressive behavior of the tumors in this series underscores the importance of excluding malignancy in patients with long-standing breast implants who present with acute unilateral breast pain and enlargement.


## 1. Introduction

Breast augmentation or reconstruction with prosthetic implants is a common surgical procedure with more than 1 million procedures performed globally per year [1]. Breast implants are classified into silicone gel–filled and saline-filled types and can have smooth or textured surfaces. The most frequent complications of breast implant placement include capsular contracture and implant rupture/leakage [1]. Implant-associated mesenchymal tumors, chiefly desmoid-type fibromatosis but also various sarcomas, such as angiosarcoma, are exceptionally rare events [2,3]. Despite initial concerns, a number of studies have demonstrated that breast implants do not confer an increased risk of developing conventional mammary carcinoma [1,4]. However, a very rare but well-recognized

☆ Disclosures: None of the authors declare a conflict of interest or reportable funding source.

* Corresponding author at: Department of Laboratory Medicine and Pathology, Mayo Clinic, 200 1st St SW, Rochester, MN 55905.
*E-mail address:* carter.jodi@mayo.edu (J. M. Carter).

http://dx.doi.org/10.1016/j.humpath.2017.07.011
0046-8177/

complication of implant placement is the development of anaplastic large cell lymphoma (ALCL). Implant-associated ALCL [5,6] is more frequently seen in patients with textured breast implants, typically develops with a periprosthetic fluid collection (seroma), and has a variable clinical course [6-9].

To date, 2 case reports of breast implant capsule–associated squamous cell carcinoma (SCC) have been published in the plastic surgery literature [8,10]. In both cases, SCC arose within squamous epithelialized breast implant capsules. In one report, the patient had capsule-confined invasive SCC and was disease-free with limited follow-up. In the second report, clinicopathologic staging details and follow-up information were not provided.

We report 2 patients with SCC arising in epithelialized breast implant capsules with poor clinical outcomes. Both patients presented with advanced local disease and developed metastasis within 1 year. Notably, these cases and the 2 prior reports share a similar clinical presentation: acute onset of unilateral breast pain and enlargement, with remote histories of breast augmentation. In all 4 cases, the tumors arose on the posterior aspect of the implant capsule. The unusual clinical presentation and rarity of these tumors may result in underrecognition and delayed diagnosis.

## 2. Cases

### 2.1. Case 1

A 56-year-old woman presented in 2012 with a 4-week history of a painful, enlarged left breast with associated red-purple skin discoloration. She had undergone bilateral silicone breast implants for cosmesis in 1984 and reported having capsular contraction within weeks of implant insertion. Both implants were eventually replaced in 1994 with 300-mL textured saline implants. Upon clinical presentation in 2012, because of the acute changes in the left breast, surgical removal of the implants was recommended. Imaging performed at an external institution was not available for review. At surgery, both implants were intact. However, upon incising the left breast implant capsule, a large volume of thick white fluid was encountered, and the surgeon identified and biopsied a mass on the posterior surface of the implant capsule. Pathologic examination of the biopsy revealed invasive well- to moderately differentiated SCC associated with focally dysplastic squamous epithelium lining the implant capsule. Clinical and radiologic staging was negative for a primary cutaneous site or metastasis.

The subsequent left mastectomy showed an implant capsule with densely keratinizing squamous epithelialization with areas of hyperkeratosis (Fig. 1A-D). There was focal squamous dysplasia composed of increased basal mitoses and nuclear hyperchromasia and atypia, adjacent to invasive keratinizing, well-to moderately differentiated SCC (forming 8 nodules ranging up to 3.5 cm in largest dimension). The tumor invaded through the capsule into the surrounding breast parenchyma and chest wall skeletal muscle (Fig. 2A-D). There was no evidence of atypia, or conventional invasive or in situ mammary carcinoma within the breast parenchyma. Surgical resection margins were negative for tumor. Multiple (9) sentinel and nonsentinel axillary lymph nodes were negative for malignancy. There was no evidence of silicone-associated reaction in the breast parenchyma or lymph nodes. The neoplastic cells did not express estrogen or progesterone receptors and were negative for HER2 overexpression or amplification. The patient received multiple cycles of chemotherapy, along with radiation therapy. Within 8 months, she developed biopsy-proven invasive SCC in the subcutaneous soft tissues of the left axilla, compatible with locoregional metastasis. Within a year of surgical excision of the axillary metastasis followed by radiation and additional chemotherapy, multiple palpable nodules of biopsy-proven subcutaneous soft tissue metastases occurred in the left upper arm, axilla, and upper chest wall. At the time of last clinical follow-up, she was being treated with palliative radiation therapy.

### 2.2. Case 2

An 81-year-old woman presented with a palpable left breast mass adjacent to a silicone implant. Her clinical history was remarkable for a wide local excision of a reportedly benign breast mass followed by reconstruction with a silicone breast implant in the 1970s (implant details are not available). In 2012, she reported acute onset of pain and enlargement of the left breast. Ultrasonographic imaging demonstrated a partially cystic 2.9-cm left breast mass with features suggestive of hematoma. The imaging was performed at an external institution and was not available for review. Following an initial short period of conservative therapy, she presented with increased swelling and with an interval growth of the mass to 5 cm. Implant removal was recommended. Intact implants were removed from the patient, and biopsy of the mass on the implant capsule demonstrated invasive SCC associated with focally dysplastic squamous epithelium lining the implant capsule. The dysplastic areas showed similar cytologic features to the invasive component (Fig. 3A-D). Clinical examination and radiologic staging were negative for a distant primary site or metastasis.

The patient underwent left mastectomy and sentinel lymph node biopsy. Histopathologic examination revealed a 5-cm invasive, moderately differentiated SCC with areas of high-grade sarcomatoid/spindle cell differentiation, centered on the posterior aspect of a squamous epithelialized implant capsule with focal dysplasia (Figs. 3C and D, and 4A). The tumor invaded into the underlying breast parenchyma. The breast epithelium showed mild proliferative fibrocystic changes but no atypia, or in situ or invasive mammary carcinoma. Surgical resection margins were negative for malignancy. Multiple (3) sentinel axillary lymph nodes were negative for malignancy. There was no evidence of silicone-associated reaction in the