Breast prosthetic implant-associated Squamous Cell Carcinoma: A case report and Literature Review

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Case report

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Abstract

Background

Breast reconstruction is widely used for women undergoing mastectomy. Prosthetic implants have become a common technique performed for these women because of their safety, flexibility and adjustable size. There are few reports of implant-associated squamous cell carcinoma. In addition to this report, only 8 reports including 11 cases have been reported in the English literature.

Case presentation

We report the case of a patient with breast prosthetic implant-associated squamous cell carcinoma who received mastectomy and prosthetic implants 10 years ago. She was recently hospitalized with unilateral breast enlargement. Surgical pathology showed squamous cell carcinoma around the breast implant. There was no evidence of primary squamous cell carcinoma at any other anatomic site. We analysed all 11 patients with breast implant-derived squamous cell carcinoma (SCC) from a thorough literature search to identify studies. The median age of patients at SCC diagnosis was 56.8 years old. The average time from initial breast augmentation until SCC diagnosis was 21.9 years. The prognosis was poor; 4 of the 11 patients eventually progressed or died within 1 year, 3 of the 11 patients were disease free during the follow-up period, and 4 of the 11 patients were lost to follow-up. The most widespread opinion is that chronic inflammation from breast implants plays a substantial role in the disease progression of SCC.

Conclusions

We reported the rare complications associated with breast prosthetic implants and reviewed the literature. This malignancy should be taken into account in patients with breast prosthetic implants who have acute breast pain and enlargement.

Background

Breast reconstruction after mastectomy improves quality of life and patient satisfaction. Implant-based breast reconstruction is the most popular choice in post-mastectomy women, accounting for 65% of all breast reconstructions in the USA[1-3]. It is relatively easy to learn and popularize because there is no need for another incision during the operation, and it also has the advantages of quick postoperative recovery, minimal trauma, and few complications[4, 5]. It has been reported that the main complications include 4% infection, 2.5% skin flap necrosis, 2% seroma, and 3.8% capsular contracture[6, 7]. Limited evidence of cancer caused by the prosthesis has been reported. However, here, we report a case of implant-associated squamous cell carcinoma (SCC). The patient received prosthetic implants 10 years ago, and she had acute unilateral breast pain and enlargement due to tumours arising on the posterior implant.

Case Presentation

A 45-year-old woman had a past medical history of invasive ductal carcinoma status post-mastectomy and reconstruction in 2008. She was hospitalized in June 2018 and presented with left breast swelling and enlargement for 7 days. She denied recent fever, chills, nausea, vomiting or breast trauma. She also denied erythema and tenderness around the area, and she did not have nipple discharge. Upon physical examination, a round hard mass with a diameter of approximately 6 cm was palpated in the inner upper quadrant of the left breast near the sternum. Ten years ago, the patient received a modified radical mastectomy for breast cancer, followed by breast reconstruction with prosthetic implants immediately. The prosthetic implants chosen were drop-shaped silicone prostheses. Postoperatively, she recovered well without complications such as infection or skin changes. Her surgical pathology at that time showed invasive ductal carcinoma of the left breast (Table 1). She received 6 cycles of anthracyclines and docetaxel (specific drug and dose unknown), followed by tamoxifen endocrine therapy for 3 years post-chemotherapy. Follow-up surveillance with breast ultrasound and mammography during the last 6 months revealed no abnormalities.
Table 1  
Pathology, IHC and adjuvant therapy of the first operation in 2008

| Pathology, IHC and adjuvant therapy of the first operation in 2008 |
|---------------------------------------------------------------|
| Sentinel lymph node involvement                              |
| 0/2                                                          |
| Axillary lymph node involvement Level I 0/17; Level II 0/2    |
| Staging T1N0M0, Stage I                                       |
| IHC ER+, PR++, Her2 -                                        |
| adjuvant therapy 6 cycles of anthracyclines and docetaxel, followed by tamoxifen endocrine therapy for 3 years post-chemotherapy. |

At this visit, considering her breast cancer history and physical examination, CT and MRI were performed to evaluate the possibility of recurrence (Fig. 1). Enhanced metabolic signal changes under the left pectoralis major near the armpit and at the left supraclavicular lymph nodes suggested metastasis. Ultrasound-guided core needle biopsy of the left chest wall mass demonstrated squamous cell carcinoma. The decision was made to proceed with left chest wall mass resection, prosthesis removal and left supraclavicular lymph node biopsy. Surgical pathology of the left chest wall near the armpit mass suggested poorly differentiated SCC (Fig. 2 & Fig. 3). The morphology and immunohistochemistry showed squamous cell carcinoma (Table 2).

Table 2  
Pathology and IHC of the Local-regional recurrent focus

| Left chest wall mass | Pathology: a poorly differentiated carcinoma, morphology and immunohistochemistry showed squamous cell carcinoma differentiation. |
|----------------------|--------------------------------------------------------------------------------------------------------------------------|
|                      | IHC: CK5/6+,P63+,GATA-3,foci+,Mammaglobin foci+,GCDFP15+,Syn+,CgA,foci+,CK7-,TTF-1-                                              |

adjuvant therapy GP regimen for 6 cycles, local and regional radiotherapy after GP chemotherapy, and capecitabine monotherapy was continued to maintain 8 cycles after radiotherapy, followed by OFS combined with oral anastrozole to date.

Postoperatively, she underwent chemotherapy with gemcitabine combined with a carboplatin (GP) regimen for 6 cycles with no significant progress. Local and regional radiotherapy treatments were given after GP chemotherapy, and capecitabine monotherapy was continued to maintain 8 cycles after radiotherapy, followed by OFS combined with oral anastrozole to date. The patient is currently in a stable condition with no significant progress until October 2020.

Discussion And Conclusions

There have been few reports of malignant tumours related to breast implants. In addition to this report, only 11 cases of implant-associated SCC have been reported since 1992. As shown in Table 3, all of these reported patients had a long history of breast silicone implantation (>10 years), and the average time from initial breast augmentation until SCC diagnosis was 21.9 years. The median age of patients at SCC diagnosis was 56.8 years old. The tumour had an aggressive course of prognosis; 4 of the 11 patients eventually progressed or died within 1 year, 3 of the 11 patients were disease free during the follow-up period, and 4 of the 11 patients were lost to follow-up.
Table 3
Review of the literature detailing of SCC associated with breast prosthetic implants

| Study                        | No. of Patients | Age at Diagnosis | Past medical history | Reason for Implantation | Type of Implant | Time Until SCC Diagnosis, years | Therapeutic Treatment | Outcome                              |
|------------------------------|-----------------|------------------|----------------------|--------------------------|-----------------|---------------------------------|----------------------|--------------------------------------|
| Paletta et al[18], 1992      | 1               | 52               | subglandular breast augmentation | Cosmetic | Silicone implant (Heyer Schulte) | 15                 | Radical mastectomy | Disease free at 12-month follow-up |
| Kitchen et al[19], 1994      | 1               | 52               | bilateral breast augmentation | Cosmetic | silicone implants | 11                  | Modified radical mastectomy | Not reported                        |
| Talmor et al[20], 1995       | 1               | 70               | bilateral breast augmentation | Cosmetic | liquid silicone | 25                  | Bilateral simple mastectomy and immediate reconstruction, then a left axillary lymph node dissection and deep muscle biopsy | Not reported                        |
| Zomerlei et al[10], 2015     | 1               | 58               | primary bilateral augmentation mammoplasty | Cosmetic | silicone implants | 35                  | total mastectomy, sentinel lymph node biopsy, and complete capsulectomy | Not reported                        |
| Olsen et al[21], 2017        | 2               | 56               | bilateral silicone breast implants | Cosmetic | textured saline implants, silicone breast implant | 18 42              | Mastectomy with postoperative chemotherapy and radiotherapy left mastectomy and sentinel lymph node biopsy with adjuvant radiation | Liver metastasis at 5-month follow-up and died of disease |
| Zhou et al[22], 2018         | 1               | 46               | breast augmentation | Cosmetic | silicone gel breast implant | 21                 | bilateral prosthesis explantation and bilateral capsulectomy with adjuvant radiation | Without clinical recurrence at 4-month follow-up |
| Buchanan[9] et al, 2018      | 1               | 65               | breast augmentation | Cosmetic | foam-covered silastic implants (Heyer Schulte) | 21                 | radical mastectomy and medial chest wall resection | Disease free after an 8-year follow up |
| Goldberg et al[23], 2020     | 2               | 40               | breast augmentation  Breast reconstruction status post benign lesion excision | Cosmetic | Smooth Saline Implants, Silicone implants | 11 32              | Neoadjuvant chemotherapy, Patient expired before chest wall resection Chemoradiation | Expired from malignant pleural effusions at 3-month follow-up Lost to follow-up |
| Study                          | No. of Patients | Age at Diagnosis | Past medical history                  | Reason for Implantation       | Type of Implant        | Time Until SCC Diagnosis, years | Therapeutic Treatment | Outcome                      |
|-------------------------------|----------------|------------------|---------------------------------------|-------------------------------|------------------------|------------------------------|--------------------------|-------------------------------|
| Liu et al, (current study)    | 1              | 45               | modified radical mastectomy and reconstruction | Breast reconstruction       | silicone prosthesis    | 10                           | left chest wall mass resection, prosthesis removal and left supraclavicular lymph node biopsy | Disease free after a 24-month follow up |
This study obtained approval from the Ethics Committee of the Shandong Cancer Hospital and Institute and was approved to meet the standard of clinical practice. The consent was received from the study participants and the guidelines outlined in the Declaration of Helsinki were followed.

**Competing interests**

The authors declare that they have no competing interests.

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