**Abstract:** This case report presents a unique, late complication of breast reconstruction surgery. A woman, who underwent left mastectomy and several reconstruction procedures with silicone implants presented with symptomatic enlarged internal mammary lymph nodes on her contralateral side. The nodes, which were suspicious for breast cancer metastasis on positron-emission tomographic computed tomography, were removed by thoracoscopy. The histopathologic result revealed silicone adenopathy. This report is particularly interesting because it presents a rare case in which silicone has migrated to the contralateral internal mammary nodes. This complication was not previously documented in the medical literature and serves as a possible differential diagnosis to metastatic breast cancer.

**Key Words:** breast reconstruction, implant, prostheses, silicone, lymphadenopathy, internal mammary lymph nodes

55-year-old woman, without a family history of breast cancer, was diagnosed, 7 years ago, with infiltrating ductal carcinoma of her left breast. She initially underwent needle localization lumpectomy and axillary lymph node dissection, which revealed stage IIB breast cancer (T2, N1, M0, 4 of 20 axillary lymph nodes with metastatic carcinoma) and a positive estrogen receptor/progesterone receptor (ER/PR). Following an incomplete excision of the tumor, relumpectomy was performed and again the excision was incomplete. This necessitated a mastectomy, which was executed 2 months later. An immediate breast reconstruction with a submuscular implant (Becker 25/400 mL; Mentor Medical Systems, Santa Barbara, CA) was performed.

The tumor margins were clear on histopathology and the systemic workup was found negative. The operation was followed by chemotherapy, radiotherapy, and hormonal (tamoxifen) adjuvant therapy. One year later, a right breast reduction surgery was executed to achieve breast symmetry.

Due to capsular contracture and inadequate symmetry, the implant was removed followed by a capsulotomy and a Siltex Round High Profile Implant (gel filled 500 mL) (Mentor Medical Systems) was inserted in a submuscular plane.

Postoperatively, a serotic secretion from the suture line was observed followed by an implant exposure, which obligated the removal and replacement of a new and similar implant. On inspection the implant was found intact. Swabs obtained from the prosthesis pocket diagnosed the presence of enterobacter intermedium.

In the following year minor scar revisions and nipple-areola complex (NAC) reconstruction with local flaps and tattoo were accomplished. A few months later, another episode of infection of the left reconstructed breast obliged the removal of the implant. The implant was found to be intact, surrounded by clear serotic fluid. The culture obtained from the fluid revealed an infection with *Staphylococcus aureus*, which was treated by antibiotics. After its resolution, a capsulotomy was performed and an insertion of a Siltex Anatomic Becker (35/365 mL) (Mentor Medical Systems) implant was attained.

She was followed routinely by her oncologist for 6 years and 9 months after her initial diagnosis with no evidence of breast cancer local recurrence nor metastasis. However, in the last year she began to suffer from intermittent right anterior parasternal pressure-like pain. She had a normal surveillance bone scan only a month previously.

A CT scan had revealed a mass of 10.5 × 21 mm located on the right border of the sternum, abutting the pleura and the expected drainage chain of the right internal mammary nodes (Fig. 1A). CT-guided fine needle aspiration was executed with the cytologic finding of lymphoid tissue, probably from a reactive lymph node. The continuation of the patient’s clinical symptoms and patient’s psychological worry about possible breast cancer metastasis lead the medical staff to further investigate the cause of the complaints using an F-18 FDG positron-emission tomographic computed tomography (PETCT). The PETCT demonstrated a pathologic signal in the right parasternal area in a location consistent with the right internal mammary lymph nodes (Fig. 1B) and raised the suspicion of breast cancer metastasis.

Since the medical literature reports of silicone lymphadenopathy involving the internal mammary nodes are extremely rare, silicone lymphadenopathy was considered as a low probability for such a differential diagnosis. In addition, the concern of a false negative result from the fine-needle aspiration (FNA) necessitated a complete excision of the lymph nodes and retrieving tissue for histopathologic examination. Therefore, the patient underwent a thoracoscopic excisional biopsy of the 2 enlarged internal mammary nodes from her right chest. The histopathologic findings of both nodes were consistent with a reaction to silicone compound.

Due to the diagnosis of silicone lymphadenopathy and the suspicion for an implant silicone leak, as a source for the migration of silicone, the patient was referred to the Plastic Surgery Unit for consultation.

A magnetic resonance imaging (MRI) was performed to evaluate the integrity of the implant. The implant was found to be intact (Fig. 1C) yet silicone “bleeding” or minor rupture could not be excluded. Therefore, the patient underwent explantation of the Siltex Anatomic Becker 35/365 mL prosthesis (Mentor Medical Systems). Intraoperative inspection found the prosthesis to be completely intact with surrounding clear viscous fluid, which was sent for cytologic evaluation. No gross gel “bleeding” was observed. Total capsulectomy and reconstruction using a similar implant was performed. Cytology from the fluid showed acute inflammation cells without silicone.

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**BREAST SURGERY**

Contralateral Internal Mammary Silicone Lymphadenopathy Imitates Breast Cancer Metastasis

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Histologic Findings: Internal Mammary Nodes, Implant Capsule and Fluid Cytology

Two lymph nodes were excised, the largest of which was 1 cm in diameter. On gross examination the lymph node tissue was unremarkable.

On histologic examination, numerous macrophages and giant cells with vacuolated cytoplasm were observed in the lymph node sinuses. Scattered empty spaces containing small fragments of refractive unstained material were seen. The picture was consistent with the pathology text book description of silicone lymphadenopathy (Fig. 2). The fluid cytology showed acute inflammation cells without evidence of silicone particles. On histopathologic examination, the capsule did not show any silicone particles.

DISCUSSION

Silicone implants for breast augmentation and reconstruction are in wide use. The safety of breast silicone implants has been subject to extensive epidemiological studies and are considered safe, ie, the large scale of epidemiologic evidence does not support a causal association between breast implants and breast or any other type of cancers, definite or atypical connective tissue diseases, adverse offspring effects, or neurologic disorders. However, the only
study to examine the actual incidence rate of breast implant rupture has reported a rupture-free survival of 98% at 5 years and 83% to 85% at 10 years for newer “third-generation” implants. This study has followed-up women with silicone breast implants with repeated MRI and concluded that the risk of implant rupture increases with the implant age. A minimum of 15% of modern implants can be expected to rupture between the 3rd and 10th year after implantation.

In addition to the radiologic clinical studies, which are able to detect gross ruptures or silicone leaks, some pathologic studies were conducted. It has been demonstrated at autopsy of women with bilateral breast implants that silicone routinely migrates from the site of the breast implant into the breast tissue, lymph nodes, and abdominal fat. Spectrometry analysis has detected silicone in all capsules, while, a statistically significant increase of silicone polymers were measured in the axillary lymph nodes, breast, and abdominal fat from the individuals with silicone breast implants when compared with the nonimplanted group. The later study proves that breast implants leak and should be regarded as subject to degradation regardless of whether a macroscopical or radiological rupture is observed.

Reinforcement to this assumption is found in several reports that have found silicone in lymph nodes of patients with intact implants. Gel “bleeding” is defined as the migration of microscopic silicone droplets through an intact implant shell, and is a phenomenon sometimes grossly visible at explantation. Even when an implant is found to be grossly intact at explantation without macroscopic gel bleeding, as in our presented case, distribution of silicone to body tissues is indeed possible. Two mechanisms have been postulated for migration of silicone; the first is a physical migration and the second is by entrapment and movement of silicone microdroplets by macrophages. Our patient suffered previously from 2 implant infections and subsequent explantations, yet all implants were grossly intact. The causal affect of implant infection on possible silicone leak and migration has not been discussed nor elaborated in the literature.

Internal mammary silicone lymphadenopathy as a complication following breast prosthesis implantation is a unique clinical entity that has been described only once before. However, contralateral internal mammary silicone lymphadenopathy mimicking cancer metastasis represents a new clinical entity. Estourgie et al dissected sentinel lymph nodes after lymphoscintigraphy to study the lymphatic drainage patterns of the breast. It was observed that the drainage is directed to the axillary, supraclavicular, infracavicular, interpectoral, and internal mammary nodes. More sentinel lymph nodes were found in the internal mammary chain in cases of medial quadrants tumors (32.4% in the upper inner quadrant of the breast and 52% in the lower inner quadrant) and in cases of no palpable breast lesions. The main location of the lymph nodes is behind the second to forth intercostals spaces. Internal mammary nodes can be the first site of breast cancer metastasis. Veronesi et al reported a 9% incidence of internal mammary metastases in patients with negative axillary nodes. No recent major anatomic studies of the breast lymphatic drainage have presented data regarding lymphatics crossing from the breast to the contralateral internal mammary lymph chain. Vendrell-Torner evaluated in 250 healthy women the physiologic lymphatic drainage of the breast using radioactive isotopes. Of those women, in only 2 cases radioactivity was marked across the midline, in the contralateral internal mammary chain nodes of the first and second intercostals spaces. Rossi et al, on the other hand, reported a higher percentage of contratlar-eral radioactivity. The presented case stresses the clinical importance of this physiologic phenomenon.

The presented patient’s complaints, ie, parasternal pressure-like pain, along with the CT and PET-CT results, presented a puzzling clinical case requiring further diagnostic steps and decisions based on published medical evidence-based literature. Had the enlarged internal mammary lymph nodes been diagnosed as breast cancer metastasis, ie, stage IIIB (N3) breast cancer according to the American Joint Committee on Cancer staging system, the patient could have been treated with all the therapeutic consequences involved.

Obtaining tissue specimens for histopathologic evaluation from internal mammary nodes, unlike from suspected axillary nodes, requires a more complicated approach and expertise. Fine-needle aspiration, in our patient, had a low diagnostic yield as its result only suggested a reactive lymph node. The risk of false-negative results by FNA created the need for excisional biopsy as the next diagnostic step. Thoracoscopy is a minimally invasive solution with relatively low risk to the patient. Indications for thoracoscopy are becoming wider and include unusual and infrequent indications because thoracic diseases, including carcinoma, mediastinal adenopathy and undiagnosed masses, are more amenable to biopsy and possible resection.

REFERENCES