



Silicone Granuloma Mimicking a Lymphatic Metastasis in a Lung Cancer Patient: A Case Report

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Silicone granulomas are rare, benign lesions that may occur after breast augmentation. Occasionally, a careful differential diagnosis is necessary because lymphadenopathy or malignancy is suspected based on an imaging study. A 56-year-old woman who visited the hospital due to a lung nodule in the left upper lobe (LUL) underwent a staging work-up with the suspicion of lung cancer. Positron emission tomography/computed tomography and chest computed tomography revealed the LUL nodule and a lesion in the left internal mammary chain (IMC), suggesting lymphadenopathy. Diagnostic wedge resection was performed, followed by curative surgery. The final biopsy result confirmed that the LUL nodule was pathologic stage IB adenocarcinoma; unexpectedly, the lesion in the left IMC was a silicone granuloma.

Keywords: Silicone granuloma, Lung neoplasms, Lymphadenopathy, Case report

Case report

A 56-year-old woman with nonspecific symptoms visited the hospital due to a lung nodule in the left upper lobe (LUL) incidentally found on chest computed tomography (CT) that was performed as part of a regular health screening. The patient had no notable history of disease or previous malignancy and had undergone bilateral augmentation mammoplasty approximately 15 years before. On chest CT, a 1.2-cm partially solid nodule suggestive of lung malignancy (e.g., adenocarcinoma) was observed in the apicoposterior segment of the LUL (Fig. 1A). In addition, a nodular lesion suggestive of lymphadenopathy was found in the left internal mammary chain (IMC) (Fig. 1B). Since lung cancer was suspected, a staging work-up, including positron emission tomography (PET)/CT, bronchoscopy, and routine preoperative testing for general anesthesia, was performed. On PET/CT, there was no evidence of distant metastasis, and hypermetabolism was seen both in the LUL apicoposterior segment and in the left internal mammary area (Fig. 1C, D). With a clinical diagnosis of LUL lung cancer accompanied by left internal mammary lymphatic metastasis, a surgical plan was developed to perform

diagnostic wedge resection via video-assisted thoracoscopic surgery (VATS) and to proceed to curative resection, if necessary, depending on the result of frozen-section biopsy. According to the plan, LUL wedge resection and internal mammary lesion excision were first performed via VATS. The frozen-section biopsy showed that the LUL nodule was adenocarcinoma and that there was no evidence of malignancy in the nodular lesion in the IMC. The patient underwent LUL lobectomy with mediastinal lymph node dissection via VATS with curative intent and was discharged 6 days post-surgery without significant complications. A permanent biopsy confirmed that the LUL nodule was a papillary adenocarcinoma with an acinar growth pattern (Fig. 2A), whereas the internal mammary lesion consisted of cystic vacuoles of various sizes and some multinucleated giant cells (Fig. 2B), a finding consistent with silicone granuloma. Contrary to the preoperative prediction, the final diagnosis of the LUL nodule was papillary adenocarcinoma (pathologic T2aN0 stage IB with visceral invasion), and that of the nodular lesion in the IMC was silicone granuloma. No prominent implant rupture was identified on the preoperative CT examination, and the patient did not have any related symptoms. Therefore, no



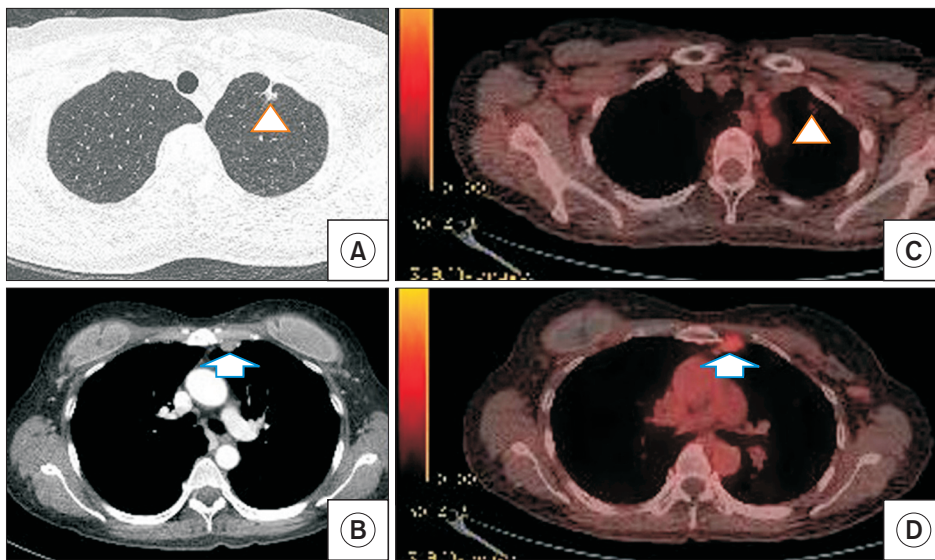


Fig. 1. Chest computed tomography shows an approximately 12-mm subpleural part-solid nodule (arrowhead) in the apicoposterior segment of the left upper lobe (LUL) (A) and a 13-mm nodular lesion (arrow) in the left internal mammary chain (B). Positron emission tomography shows ill-defined hypermetabolism (maximum standardized uptake value [SUV], 1.2; arrowhead) at the apicoposterior segment of the LUL (C) and focal hypermetabolism (maximum SUV, 3.1; arrow) in the left internal mammary area (D).

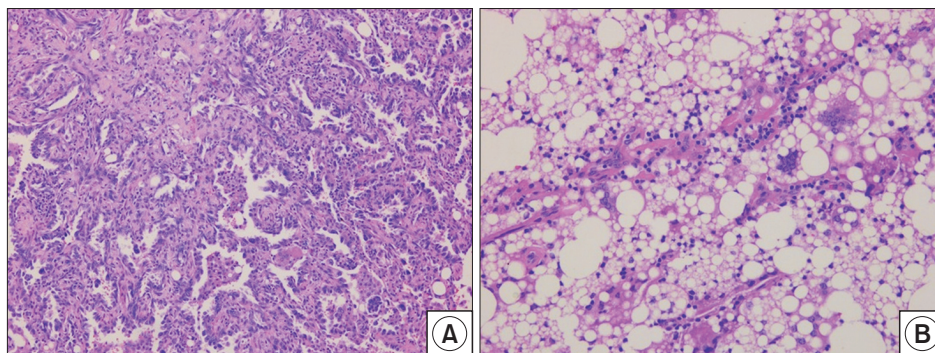


Fig. 2. Histopathologic findings of left upper lobe papillary adenocarcinoma (hematoxylin and eosin staining, $\times 100$) (A) and silicone granuloma ($\times 200$) (B).

additional examination was performed, and follow-up was scheduled at the Department of General Surgery. Currently, the patient is being regularly followed up on an outpatient basis without additional treatment, since the lung cancer is at an early stage.

The patient provided written informed consent for the publication of her clinical details and images.

Discussion

Silicone granuloma (or siliconoma) is a rare, benign lesion occurring after augmentation mammoplasty performed for cosmetic or reconstructive purposes following breast cancer surgery [1]. Leakage can occur regardless of whether silicone implants are ruptured or intact, and silicone granuloma can occur due to chronic granulomatous inflammation after leakage. A case study reported a mass in a patient's left breast on CT. This was diagnosed as silicone granuloma 6 years after implant removal based on an

ultrasound-guided core biopsy performed to make a differential diagnosis from carcinoma [2]. Silicone granuloma primarily occurs in proximal areas, such as the chest wall, axillae, and upper extremities. However, it has been reported to occur in distal areas, such as the lower extremities, which is speculated to be due to silicone migration along hematogenous or lymphatic flow since silicone is lipid-soluble [3]. A case study reported multiple pleural granulomas in a patient with a history of right middle lobectomy for lung cancer 2 years after right radical mastectomy and silicone prosthetic implantation to treat breast cancer. In that report, it was speculated that granulomas were caused by the migration of ruptured silicone particles through a thoracotomy scar into the pleural cavity [4].

The differential diagnosis varies depending on the area in which a silicone granuloma is found, as well as the history of surgical treatment for cancer (including breast cancer). Silicone granuloma is often suspected to be lymphadenopathy or metastatic breast cancer. In patients with

pleural lesions, it has even been mistaken for pleural metastasis of a prior malignancy or pleural malignancy [5].

Silicone granulomas are typically found on CT. Magnetic resonance imaging may additionally be performed to identify the presence or absence of implant rupture and the presence of silicone particles outside of an implant [5]. If a malignancy is suspected, PET/CT is likely to be performed. The differential diagnosis is not easy because of hypermetabolic uptake due to focal inflammation [6]. In the current case, there was significant uptake on the PET scan, and metastatic lymphadenopathy due to lung cancer was strongly suspected; however, this was a false-positive result.

An accurate diagnosis of silicone granuloma is made based on a core-needle or surgical biopsy depending on the location of the lesion. Silicone granuloma is not characterized by specific histologic features. In general, however, chronic inflammatory cells, a foreign-body giant-cell reaction, and fibrosis are observed, and extracellular silicone may resemble particles within empty spaces [7]. In our patient, needle biopsy was not performed for the nodular lesion in the left IMC because surgery was planned on the suspicion of lung cancer, without a preoperative tissue diagnosis.

The treatment for silicone granuloma is determined according to the lesion extent, symptom severity, and the patient's preference. If surgery is immediately performed for the purpose of diagnosis, the lesion is usually completely resected. The silicone implant may be removed as well. However, when a diagnosis of silicone granuloma is made based on biopsy (including a needle biopsy), patients may be followed up without surgery if they do not wish to undergo surgery [1].

We reported a patient in whom surgery was performed due to suspected LUL lung cancer and left internal mammary lymphatic metastasis; however, the final diagnoses were early lung cancer and pleural silicone granuloma. When lung cancer is suspected in patients with a history of augmentation mammoplasty, it is recommended to consider the possibility of silicone granuloma if lymphadenopathy is found in an uncommon area.

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Conflict of interest

No potential conflict of interest relevant to this article was reported.

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