Case report

Intrapleural silicone granuloma mimicking pleural malignancy

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ABSTRACT

We describe a 78-year-old initially presenting with left breast cancer, status post mastectomy and bilateral dual-lumen breast implant placement, subsequently developed lung cancer years later status post lobectomy, who later developed FDG-avid pleural nodularity and thickening. The differential diagnosis of pleural thickening and nodularity can be broad, including metastatic cancer, asbestos-related pleural disease, loculated fluid (including simple pleural effusion, hemothorax, or chylothorax), and pleural infection. However, in the setting of two different primary malignancies, our patient's FDG-avid pleural thickening was concerning for metastatic disease. Further workup with a core-needle biopsy of the pleural nodule revealed “droplets of foreign material and foreign body giant cell reaction consistent with contents of ruptured medical device”, without evidence of malignancy. Prior imaging did not indicate breast implant compromise. A subsequent mammogram suggested findings of bilateral implant rupture, however, no further clinical workup was performed. A screening mammogram a decade later indicated possible extracapsular silicone within the right breast and left mastectomy site and an MRI was recommended for further workup. Subsequent MRI showed bilateral extracapsular silicone implant rupture with a thick layer of silicone signal within the left pleura in a similar distribution to her pleural thickening and nodularity. Her breast MRI findings, in conjunction with her pleural biopsy result, are concordant with pleural silicone granulomas from extracapsular breast implant rupture via radio-occult tract from prior left lobectomy procedure.

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Introduction

Silicone implant rupture is a well-known late complication of breast augmentation [1]. Silicone typically spreads systemically via the hematogenous or lymphatic system, causing a silicone granuloma or siliconoma, commonly manifesting as axillary lymphadenopathy or peripheral cutaneous nodules [2,3,4]. However, there are few case reports of intrathoracic silicone migration, which can mimic malignancy. We describe a patient with pleural thickening and nodularity in the setting of prior 1) left breast cancer post mastectomy, 2) bilateral dual-lumen saline and silicone implant placement, and 3) primary lung cancer post left lower lobectomy.

Case report

A 78-year-old woman initially presented with left breast infiltrating adenocarcinoma status post bilateral mastectomies followed by bilateral dual-lumen saline and silicone implant reconstruction. A decade later, she later developed left lower lobe bronchioalveolar adenocarcinoma status post lobectomy and was found to have progressive pleural nodularity and thickening (Fig. 1) on surveillance imaging.

Her left pleural nodularity showed FDG uptake which underwent core needle biopsy showing "dense fibrous tissue with droplets of foreign material and foreign body giant cell reaction consistent with contents of ruptured medical device", such as silicone implants in the appropriate

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Fig. 1 – (A) Axial contrast-enhanced CT through the chest prior to left lower lobectomy for infiltrating adenocarcinoma in 2008. (B) Surveillance axial contrast-enhanced CT through the chest in January 2009 shows left pleural thickening and nodularity (arrow). (C) Surveillance axial contrast-enhanced CT through the chest in February 2011 shows progressively increased left pleural thickening (arrow) and nodularity (arrowhead) concerning for metastatic lung cancer. (D) PET/CT in March 2011 shows multiple hypermetabolic left pleural nodules (arrowhead) associated hypermetabolic pleural thickening (arrow) consistent with progression of non-small cell lung cancer. There were signs suggesting possible right breast implant intracapsular rupture.
Fig. 2 – (A) H&E-stained slides (100x) reveal needle core biopsies of dense fibrous tissue (eosinophilic acellular areas) with well-formed discrete empty spaces within the tissue (arrows) and cytoplasmic vacuoles (curved arrows) indicative of foreign material. Associated multinucleated foreign-body-type giant cells are present (arrowhead) amongst a background of histiocytic inflammation (asterisk). (B) H&E-stained slides (200x) reveal needle core biopsies of dense fibrous tissue (eosinophilic acellular areas) with well-formed discrete empty spaces within the tissue (arrows) and cytoplasmic vacuoles (curved arrows) indicative of foreign material. Associated multinucleated foreign-body-type giant cells are present (arrowhead) amongst a background of histiocytic inflammation (asterisks). (C) and (D) H&E-stained slides (200x) under polarized (C) and reduced (D) light reveals pale to clear refractile (arrows), but non-polarizable (*) material, within the spaces and vacuoles, consistent with silicone in the appropriate context.

context (Fig. 2). The patient declined removal of the breast implants.

Screening mammogram a decade later (Fig 3.) showed new density within the right pectoralis muscle and medial right breast suggestive of free silicone and an MRI was recommended for further evaluation.

The subsequent breast MRI (Fig 4.) showed bilateral extracapsular silicone implant rupture with a thick layer of silicone signal within the left pleura in similar distribution to her pleural thickening and nodularity noted on other sequences and prior CT. Her breast MRI findings were consistent with pleural silicone granulomas from extracapsular breast implant rupture. The free silicone likely seeded the pleura via a radiographically occult tract from prior left lobectomy for her lung bronchioalveolar adenocarcinoma.

Due to the complexity of our case report, please refer to the timeline in Figure 5 for the sequence of events.

Discussion

Silicone granuloma or siliconoma was originally described by Winer et al in 1964 after injection of free silicone for facial filler and breast augmentation [5]. Most extracapsular free silicone migrates to nearby breast tissue or regional lymph nodes inciting an inflammatory reaction and formation of granulomas [3,4]. The focal inflammation can result in variable uptake on FDG PET imaging.

Pleural siliconoma is a rare, delayed complication of extracapsular rupture and predisposed by prior chest wall
procedures, such as in our patient’s case of prior left lobectomy. In our case, our patient’s history of prior breast and lung cancer in combination with FDG-uptake within the left pleural nodules and thickening raises suspicion for metastatic disease. Furthermore, silicone specific sequences on her recent breast MRI revealed free silicone within the left pleural thickening which explains the FDG-activity, corroborating with previous biopsy results.

Extracapsular silicone implant rupture can be difficult to diagnosis clinically, often requiring MRI for diagnosis. In hindsight, and possibly with a different patient, if there were high enough clinical suspicion of implant rupture, an MRI
Fig. 4 – July 2021 Diagnostic Breast MRI. (A) and (B) Axial silicone-specific slices through the breast show subpectoral Becker dual lumen implant with outer silicone and inner saline and free silicone at the medial and lateral aspects (arrows) of the implant consistent with extra-capsular implant rupture. Additionally, the silicone specific sequence demonstrates non-enhancing silicone signal on the anterior non-dependent left pleura (arrowheads).

**Conclusion**

Pleural nodularity and thickening on imaging are nonspecific and can be caused by benign and malignant etiologies. Pleural siliconoma is a rare, delayed complication of extracapsular rupture, and therefore low in the differential for pleural nodularity. Clinical history and presentation are invaluable in narrowing the differential. If etiology remains unclear, additional follow-up imaging and workup is necessary as was in our patient’s case. Biopsy of our patient’s pleural nodule yielded benign foreign body material compatible with silicone in the appropriate context which was confirmed on subsequent bilateral breast MRI. However, conclusive diagnosis often requires tissue biopsy.

**Patient consent**

All images and patient-pertinent information have been de-identified and therefore no patient consent was necessary, per editor-in-chief Dr. Felix Chew of Radiology Case Reports.

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