

PET POSITIVE PLEURAL PLAQUES DECADES AFTER PLEURODESIS: MESOTHELIOMA?

Ellen A. Middleton¹

Jonathan C. Daniel²

Kenneth S. Knox¹

Kathleen Williams¹

Departments of Medicine¹ and Surgery², University of Arizona College of Medicine,
Tucson, AZ

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Abstract

A 59-year-old patient was evaluated for abnormal chest CT and hypermetabolic pleural foci on FDG-PET scan. The scans were obtained as routine surveillance for resection of an in situ pancreatic tumor. The patient had a remote history of automobile manufacturing and the abnormalities were suggestive of asbestos exposure. Because hypermetabolic areas were concerning for pleural malignancy, a VATS lung biopsy was performed and revealed chronic talc-induced pleuritis. The patient had a history of pneumothoraces with bilateral talc pleurodesis at the age of 16. As cancer screening and surveillance increasingly relies on extensive imaging modalities, physicians should be aware of the chronic complications of talc pleurodesis and the possibility of false positive imaging tests.

Background

The treatment of primary spontaneous pneumothorax (PSP) varies greatly among physicians. Treatment options include observation, chest tube decompression, simple catheter aspiration, medical thoracoscopy with pleurodesis, and surgical intervention. Talc pleurodesis is often performed as part of the intervention and although both safe and effective, the long term complications of talc exposure are not well defined. Specifically, no documented cases of pleural malignancy after instillation of talc exist. We report a patient with increased pleural activity on 18-fluorodeoxyglucose positron-emission tomography (FDG-PET) mimicking mesothelioma which ultimately proved to be chronic talc-induced pleuritis decades after pleurodesis for PSP. Biopsy and definitive diagnosis via video assisted thoracoscopic surgery (VATS) changed the course of care for this patient.

Case Report

The patient is a 59-year-old man with past medical history significant for pancreatic adenocarcinoma in situ status post Whipple procedure in January 2009. His follow up radiologic examination revealed calcified pleural-based nodules on his CT scan. The concern for malignant mesothelioma arose, particularly as he had a history of asbestos exposure while working with automobile manufacturing in his youth.

The patient was referred to the thoracic surgery service for evaluation. FDG-PET scan was performed and pleural nodules with a maximum SUV of 13.1 were noted (Fig 1).

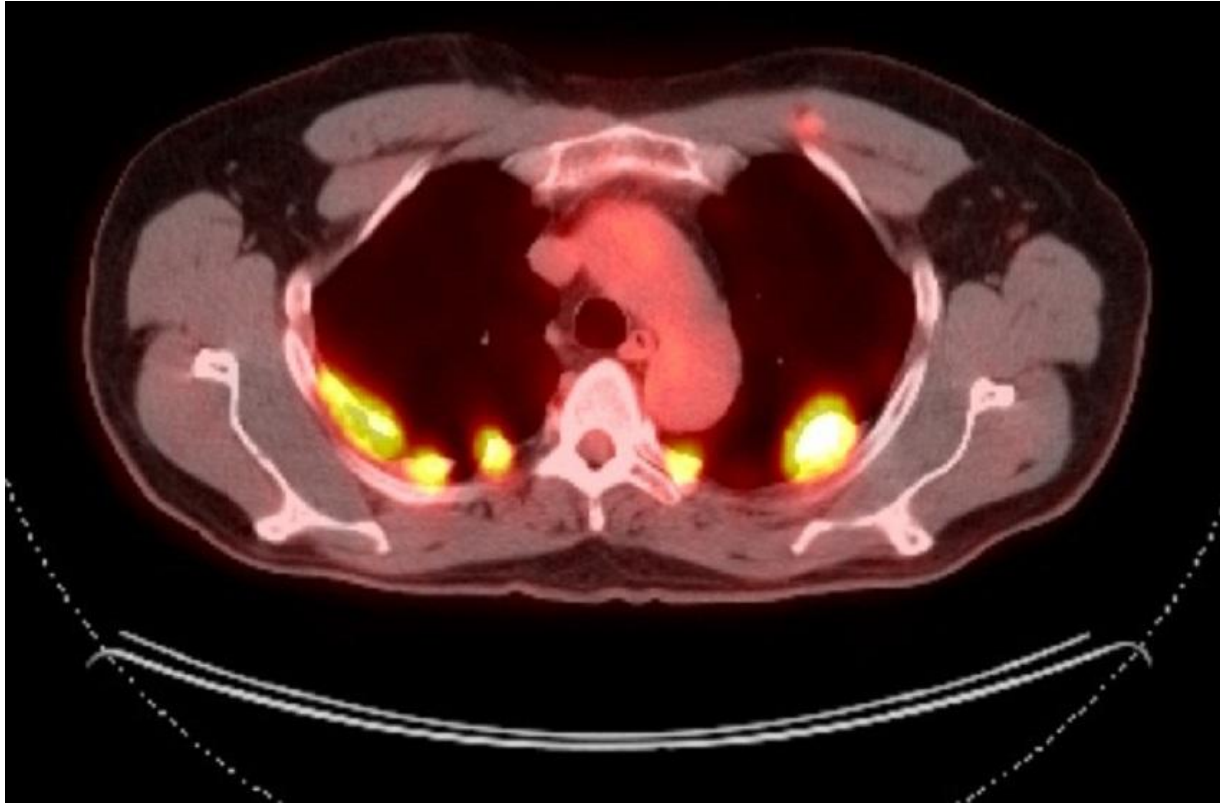


Figure 1. FDG-PET and CT showing bilateral pleural nodules.

Pulmonary function testing revealed a mild restrictive ventilatory defect. VATS was performed and the patient underwent left thoracoscopic lysis of adhesions, pleural biopsy, and wedge resections of pleural plaques adhered to the lung. Frozen section intra-operatively was consistent with talc crystals and fibrosis. Pathologic examination later confirmed chronic pleuritis due to talc extending into lung parenchyma without evidence of granuloma, malignancy, or presence of ferruginous bodies (Fig. 2).

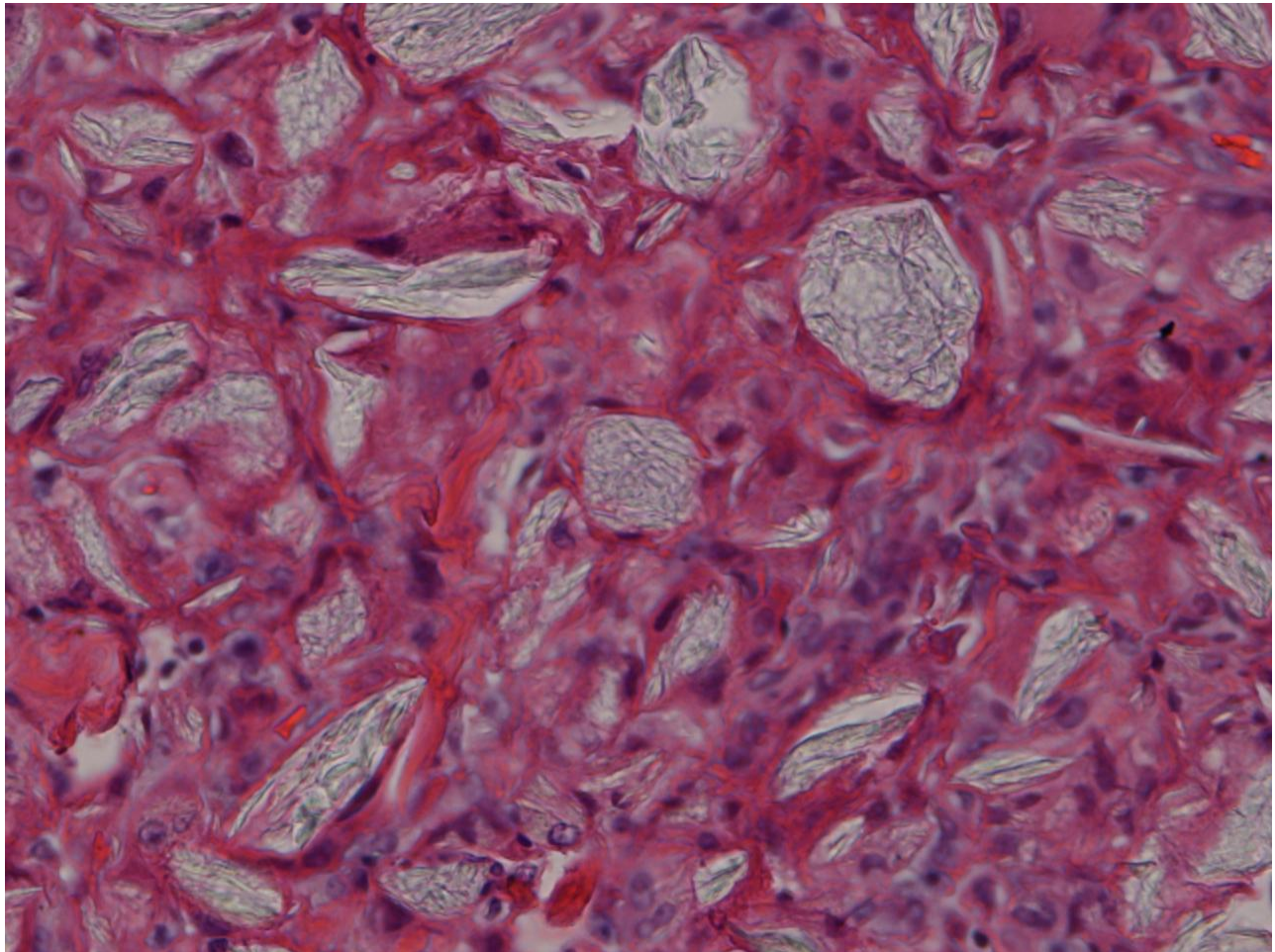


Figure 2. The patient's biopsy specimen showing inflammation and polarizable birefringent crystals consistent with talc.

Discussion

Treatment of PSP with talc pleurodesis is an effective and relatively safe means of preventing recurrence. Both acute and long-term adverse effects of talc pleurodesis are few. In our patient, the FDG-PET scan was highly suspicious for malignancy and mesothelioma. A study following patients from 14 to 40 years after pleurodesis for PSP did not show evidence of mesothelioma or increased incidence of lung cancer (1). Lange *et al.* (2) demonstrated that greater than two decades post pleurodesis a large percentage of patients have pleural thickening demonstrated by plain chest x-ray and

this may lead to mild restrictive impairment. In the era of the FDG-PET scan, a diagnostic dilemma is emerging as it appears many of these changes can manifest as chronic inflammatory lesions with increased metabolic activity.

Recent case reports have documented talc related pulmonary processes that appeared malignant by FDG-PET. Tenconi *et al.* (3) documented a case in which a patient was experiencing cough, chest pain, and weight loss associated with hypermetabolic (SUV 4.8) pleural plaques by FDG-PET scan. The patient underwent thoracotomy and total pleurectomy revealing talc pleural granulomas from a pleurodesis 42 years prior. The authors concluded that the treatment of choice for PSP should be VATS blebectomy and pleural scarring. Similarly, Ahmadzadehfar and colleagues (4) presented a patient with pleural, mediastinal, and intrapulmonary lesions demonstrating high glucose uptake on FDG-PET imaging five years following talc pleurodesis. The pathology was consistent with talc granulomatosis.

FDG-PET is commonly used in the diagnosis of pulmonary nodules and staging of lung cancer. It is emerging as an imaging modality in the diagnosis and management of malignant mesothelioma. The International Mesothelioma Interest Group's consensus statement states FDG-PET is an accurate and reliable tool to differentiate malignant and benign pleural lesions. The group made the recommendation that one must exercise caution when interpreting surveillance images from patients with talc pleurodesis in the setting of mesothelioma as those patients demonstrate higher average SUV (5). No mention is made of the patient that has the radiographic appearance of mesothelioma, but histologically has talc related lesions.

Two case series have examined the progression of pleural involvement in cancer patients following pleurodesis for malignant effusion or postthoracotomy air leak.

Nguyen and colleagues (6) performed serial FDG-PET scans between 1 month and 58 months. SUV values ranged from 1.9 to 12.6 and it was concluded that FDG uptake may persist or increase over time in chronic inflammatory plaques. Kwek *et al.* (7) similarly evaluated patients between 10 days and 71 months after pleurodesis and

found an SUV range from 2.0 to 16.3. One patient was found to have a new area of contralateral increased FDG uptake representing pleural metastasis. The authors concluded that talc deposits can lead to false positive FDG-PET scan but it is essential to monitor stability of hypermetabolic foci.

Conclusion

As the population ages, the medical community can expect to see an increased number of patients who underwent talc pleurodesis decades previously. The utility of FDG-PET imaging to define malignant disease is likely limited in patients whose history includes talc pleurodesis. Physicians must be aware of the pitfalls of emerging radiologic modalities Documented reports of FDG-PET false positives for pleural malignancy include asbestos reaction, pleurisy, recent surgery, radiotherapy, and pleural effusion secondary to inflammatory processes (7). Review of prior CT scans to evaluate the progression or stability of pleural plaques is essential. False-positive results can be devastating to patients, and often lead to invasive procedures.

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Corresponding author:

Kathleen Williams, DO

Assistant Professor of Medicine

Pulmonary Critical Care Division

1501 N Campbell Ave

Tucson, AZ 85724-5030

Tel: (520) 626-6114 Fax: (520) 626-6970

Author Contributions:

- Acquisition of data: Dr. Daniel
- Drafting of the manuscript: Dr. Middleton
- Critical revision of the manuscript for important intellectual content: Drs. Middleton, Knox, and Williams.

Abbreviation List:

CT- Computed tomography

FDG-PET- Positron-emission tomography with 18-fluorodeoxyglucose

PSP- Primary spontaneous pneumothorax

VATS - Video-assisted thoracoscopic surgery