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Case Report

Synchronous malignant pleural mesothelioma and pulmonary carcinoma in a woman without evidence of asbestos exposure

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ABSTRACT

The synchronous development of malignant mesothelioma and pulmonary carcinoma is extremely rare. In this case, an 83-year-old woman, without evidence of past asbestos exposure, developed malignant pleural mesothelioma and pulmonary adenocarcinoma. She was discovered to have a lung lesion on an unrelated preoperative chest X-ray. Clinical evaluation suggested primary bronchogenic malignancy. She had a forty pack-year smoking history, but quit twenty years previously. At surgery, she had nodularity of the pleura. Pathology revealed adenocarcinoma of the lung and suspected malignant mesothelioma of the pleura. Malignant mesothelioma was confirmed histologically at a second surgery.

1. Introduction

Malignant mesothelioma is a rare tumor, strongly associated with asbestos exposure.[1] Pulmonary carcinoma, on the other hand, is the leading cause of cancer death in the United States.[2] Although asbestos may also cause lung cancer, the main cause is tobacco. The synchronous development of malignant pleural mesothelioma and pulmonary carcinoma is very rare, with fewer than 20 cases reported in the English-language medical literature.[3] Most cases have occurred in men, and most with previous asbestos exposure.

This is a unique case of synchronous malignant pleural mesothelioma and pulmonary adenocarcinoma occurring in a woman with no demonstrable history or objective evidence of significant past asbestos exposure and who quit smoking twenty years previously.

2. Case history

An 83-year-old woman underwent evaluation for a left upper lobe density discovered on a preoperative chest X-ray for right rotator cuff repair. She was a former one-pack per day cigarette smoker for forty years, but had quit 20 years earlier. She was a sculptor and previously worked in the printing industry. Her past medical history included hypertension, osteoarthritis, and hyperlipidemia. She had no medical history of significant pulmonary problem.

CT scanning revealed a 2-cm spiculated lesion in the left upper lobe with surrounding ground glass opacity. There was no pleural thickening, pleural effusion, interstitial fibrosis, or significant adenopathy. Positron Emission Tomography (PET) scan revealed abnormal uptake only within the left upper lobe, consistent with primary malignancy. Bronchoscopy with biopsies was negative for tumor cells.

The patient underwent mediastinoscopy and video-assisted thoracoscopic surgery (VATS), finding unsuspected parietal pleural nodules. The resected lung tissue revealed well to moderately differentiated adenocarcinoma. Immunohistochemical staining revealed positive reactivity to thyroid transcription factor-1 (TTF-1) and no reactivity to estrogen receptor (ER), progesterone receptor (PR), or gross cystic disease fluid protein-15 (GCDFP-15, BRST-2). There were no asbestos bodies or evidence of asbestosis. The tumor was felt to be of lung origin. The pleural biopsies revealed an epithelioid malignancy, suggestive of mesothelioma. Immunohistochemical staining showed no reactivity to TTF-1, cytokeratin 20 (CK20), caudal type homeobox transcription factor-2 (CDX-2), ER, PR or BRST-2, but positive staining to Wilms' tumor-1 (WT-1), calretinin, cytokeratin 5/6 (CK5/6), and faintly positive staining to vimentin.

Because of the uncertainty of the tissue diagnoses, the patient underwent a second VATS, with parietal pleurectomy. Pathology confirmed the presence of an epithelioid malignant mesothelioma. Immunohistochemistry of the pleural tissue showed positive staining to calretinin, WT-1, CK5/6, cytokeratin AE1/AE3, anti-cytokeratin (Cam 5.2), D2-40 (membranous), and cytokeratin MNF-116. There was no reactivity to TTF-1 or carcinoembryonic antigen (CEA).

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Subsequent analysis of the resected lung tissue revealed no asbestos bodies by scanning electron microscopy (SEM) and an unremarkable asbestos fiber count.

After having undergone resection of her lung cancer, she received combination chemotherapy, consisting of pemetrexed and carboplatin, directed at her mesothelioma.

3. Discussion

This case presented preoperatively as a primary lung cancer. Pleural nodules were detected at the time of surgery. Lung tissue histology confirmed adenocarcinoma of the lung. The pleural cancer, however, revealed immunohistochemical characteristics of mesothelioma, not primary lung cancer. Repeat pleural tissue analysis confirmed malignant epithelioid mesothelioma.

Malignant mesothelioma is a rare tumor, with an estimated incidence of 3000 per annum in the United States.[4] Although asbestos causes the vast majority of mesotheliomas in US males, there are data suggesting a lower attributable risk to asbestos among women.[5]

Malignant pleural mesothelioma and pulmonary carcinoma occurring synchronously is an extremely rare event. The first such case was published in 1980.[6] In 1993, Cagle et al.[7] reported the second case. Both cases occurred in individuals with significant past asbestos exposure and asbestosis. Since then, there have been fewer than 20 cases reported. Attanoos et al.[8] reported on six cases from a group of 500 with mesothelioma, all with a history of asbestos exposure. Four of the six had asbestosis. Allen and Moran[9] identified three males with synchronous pulmonary carcinoma and malignant pleural mesothelioma from a review of over 16,000 pleuropulmonary cases.

The differentiation between pulmonary adenocarcinoma and epithelioid malignant mesothelioma can pose difficulties. Pathologists frequently use batteries of immunohistochemical tests in order to make this important distinction. In this case, such testing indicated two distinct tumor types – an adenocarcinoma of the lung and a diffuse malignant mesothelioma of the pleura.

In this case, there was no apparent occupational asbestos exposure and no radiographic evidence of asbestosis or pleural plaques. Examination of the lung showed no asbestos bodies on light microscopy or SEM and no elevated tissue asbestos content.

Tobacco represents the strongest risk factor for the development of lung cancer.[2] The risk increases with duration and amount smoked. The risk decreases after increasing years of smoking cessation. In this case, she had stopped smoking about twenty years previously, thereby significantly decreasing her risk for subsequent lung cancer. Asbestos also causes lung cancer, although attribution usually requires sufficient cumulative exposure and adequate latency.[10]

In summary, this is a unique case of malignant pleural mesothelioma and pulmonary adenocarcinoma occurring synchronously in a woman without evidence for attribution for either cancer to asbestos. Her past cigarette smoking, although remote, likely contributed to her development of lung cancer. In this case, the recognition of a second cancer is important regarding management and prognosis. Furthermore, the absence of evidence for causation by asbestos may have significant medicolegal implications.

Conflict of interest

This work required no funding, represents honest work, and the author has no conflict of interest, including any financial conflict.

References

1. Sporn TA, Roggli VL. Mesothelioma. In: Roggli VL, Oury TD, Sporn TA, editors. *Pathology of asbestos-associated diseases*. 2nd ed. New York: Springer Science; 2004. p. 104–68.
2. Alberg AJ, Samet JM. Epidemiology of lung cancer. *Chest* 2003;**123**(Suppl. 1): 21–49.
3. Flood TA, Sekhon HS, Seely JM, Shamji FM, Gomes MM. Spontaneous pneumothorax and lung carcinoma: should one consider synchronous malignant pleural mesothelioma? *J Thorac Oncol* 2009;**4**:770–2.
4. Zervos MD, Bizekis C, Pass HI. Malignant mesothelioma 2008. *Curr Open Pulm Med* 2008;**14**:303–9.
5. Spirtas R, Heinemann EF, Bernstein L, Beebe GW, Keehn RJ, Stark A, et al. Malignant mesothelioma: attributable risk of asbestos exposure. *Occup Environ Med* 1994;**51**:804–11.
6. Okumura T, Okada M, Tsuji M, Inoue A, Ochiai Y. Mesothelioma with lung cancer complicating asbestosis. *Acta Pathol Jpn* 1980;**30**:579–90.
7. Cagle PT, Wessels R, Greenberg SD. Concurrent mesothelioma and adenocarcinoma of the lung in a patient with asbestosis. *Mod Pathol* 1993;**6**:438–41.
8. Attanoos RL, Thomas DH, Gibbs AR. Synchronous diffuse malignant mesothelioma and carcinomas in asbestos-exposed individuals. *Histopathology* 2003;**43**:387–92.
9. Allen TC, Moran C. Synchronous pulmonary carcinoma and pleural diffuse malignant mesothelioma. *Arch Pathol Lab Med* 2006;**130**:721–4.
10. Anonymous. Asbestos, asbestosis and cancer: the Helsinki criteria for diagnosis and attribution. *Scand J Work Environ Health* 1997;**23**:311–6.