Primary Mucoepidermoid Carcinoma of the Pleura

A Clinicopathologic Study of Two Cases

Cesar A. Moran, MD,[1] *and Saul Suster, MD*[2]

Key Words: Pleura; Carcinoma; Salivary gland; Thorax; Mucoepidermoid

DOI: 10.1309/91C02GARN2U5GGNE

Downloaded from https://academic.oup.com/ajcp/article/120/3/381/1759079 by guest on 21 August 2022

Abstract

Two cases of primary mucoepidermoid carcinoma of the pleura are described. The patients are 2 men, 48 and 61 years old. Clinically, both men sought care because of chest pain in the right side and breathing difficulty. Neither of the patients had a history of head and neck tumor, and physical examination revealed that no tumor was present in the head and neck area. Radiographic studies in both men disclosed the presence of a pleural-based mass. Both men underwent surgical excision of the mass. Histologically, in both cases the pleura showed areas of fibrinous pleuritis with an underlying neoplastic cellular proliferation composed of cells with epidermoid features without keratinization and presence of mucocytes. Both tumors were classified as low-grade tumors. Both patients were alive and well 8 and 12 months after surgical resection. The cases herein presented highlight the importance of including other epithelial tumors in the differential diagnosis of pleural tumors.

Malignant neoplasms arising in the pleura are dominated commonly by malignant mesothelioma or adenocarcinoma.[1,2] When the tumor is stated to represent a pleural-based mass, solitary fibrous tumor is another important tumor condition that should be considered in the differential diagnosis.[3,4] Outside the conditions previously mentioned, any other tumor in the pleura represents a rarity and usually poses a diagnostic challenge. Among other unusual tumors that can occur in the pleura are thymomas, angiosarcomas, synovial sarcomas, lymphomas, and smooth muscle tumors.[5-9]

The cases herein presented add to the list of unusual tumors of the pleura that may pose a challenge, namely when confronted with needle biopsy specimens. Awareness of the possibility of mucoepidermoid carcinomas in the pleura is of high importance to avoid unnecessary treatments, which can dramatically affect the patient's prognosis.

Case Reports

Case 1

A 48-year-old man sought care because of chest pain and dyspnea of several weeks' duration. Radiographic examination disclosed the presence of a pleural-based mass in the right side. Surgical resection of the pleural mass was undertaken.

Pathologic Features

The resected mass measured approximately 4 cm in greatest diameter and was described as solid, tan, and without areas of hemorrhage or necrosis. At histologic

© American Society for Clinical Pathology

examination, the tumor was characterized at low power by the presence of extensive areas of a bland spindle cell proliferation lacking atypia or mitotic activity. Embedded in this fibrous stroma were numerous epithelial islands composed of cells showing epidermoid characteristics, namely medium-sized cells with eosinophilic cytoplasm, round to oval nuclei, and inconspicuous nucleoli. These epithelial islands also were admixed with cells producing mucin (mucocytes) **Image 1A** and **Image 1B**. Mitotic activity, necrosis, and hemorrhage were absent. Histochemical stains for mucicarmine showed numerous areas of mucin-producing cells. Immunohistochemical studies showed positive staining for a broad-spectrum keratin cocktail and carcinoembryonic antigen and focal staining for keratin 5/6 and thrombomodulin in the epithelial component, while vimentin showed a strong positive reaction in the fibroblastic proliferation. The results for calretinin and thyroid transcription factor 1 were negative.

Case 2

A 61-year-old man sought care because of right-sided chest pain and shortness of breath of several weeks' duration. Radiographic examination disclosed a pleural mass. Surgical excision of the mass was performed.

Pathologic Features

The resected mass measured approximately 5 cm and was described as soft and light brown to tan. Neither necrosis nor hemorrhage was present. Histologic examination revealed that the overlying pleura was characterized by the presence of a fibrinous exudate and areas of fibrous pleurisy **Image 2A** and **Image 2B**. Underlying the inflammatory reaction, there was a neoplastic cellular proliferation arranged in cords and also cystically dilated spaces lined by cells with epidermoid characteristics **Image 3A** and **Image 3B**. Higher magnification revealed that the cellular proliferation was composed of cells of medium size, with round to oval nuclei and inconspicuous nucleoli. In some areas, the neoplastic cellular proliferation was composed of cells with oncocytic and clear cell features **Image 4**. Mitotic activity, necrosis, and hemorrhage were absent. Histochemical stains for mucicarmine showed numerous areas of mucin-producing cells. Immunohistochemical studies for broad-spectrum keratin cocktail and carcinoembryonic antigen showed positive staining, while cytokeratin 5/6 and thrombomodulin showed only focal staining. The results for calretinin and thyroid transcription factor 1 were negative.

Discussion

Primary salivary gland–type tumors of the lung represent a minor component of all tumors in the lung—no more than 1% of all pulmonary neoplasms. By far, the most common salivary gland–type tumor of the lung is mucoepidermoid carcinoma,[10] followed by adenoid cystic carcinoma.[11] Other types of salivary gland–type tumors represent a rarity in the lung.[12-16] Clinically, the tumors seem to be more common in adult women. The tumors are described more commonly in a central location, although peripheral tumors have been documented.

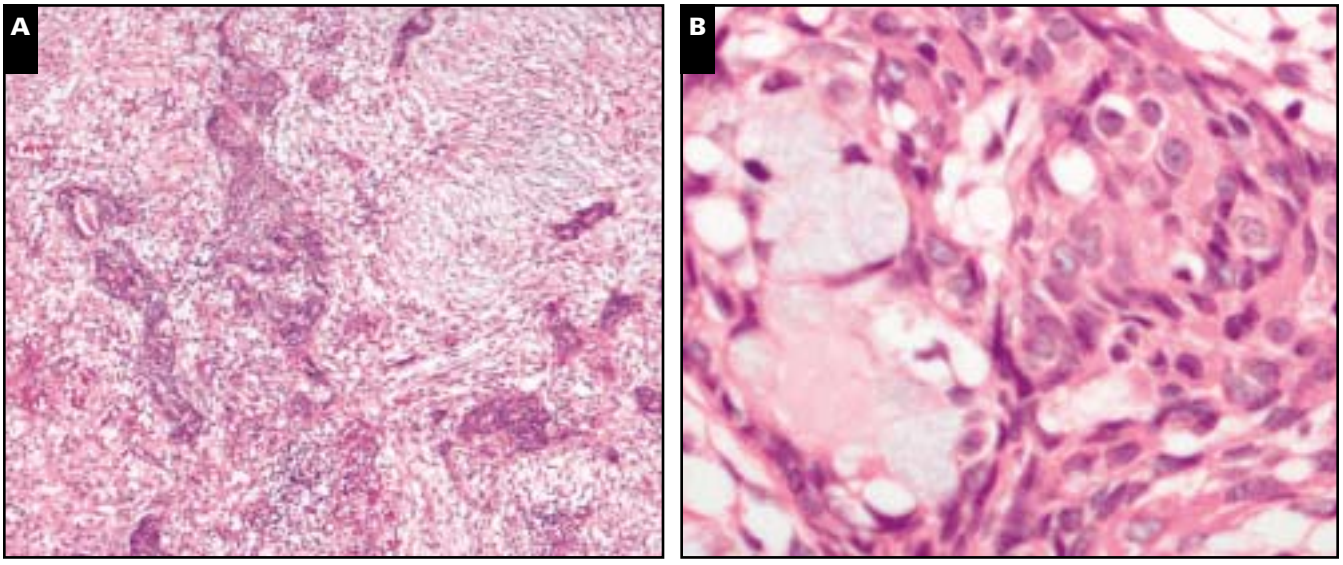

Image 1 **A**, Low-power view of a pleural mucoepidermoid carcinoma showing epithelial islands embedded in a spindle cell stroma (sclerosing mucoepidermoid carcinoma) (H&E, ×25). **B**, Higher magnification showing the characteristic presence of epithelial cells admixed with mucocytes (H&E, ×75).

Downloaded from https://academic.oup.com/ajcp/article/120/3/381/1759079 by guest on 21 August 2022

DOI: 10.1309/91C02GARN2U5GGNE
© American Society for Clinical Pathology

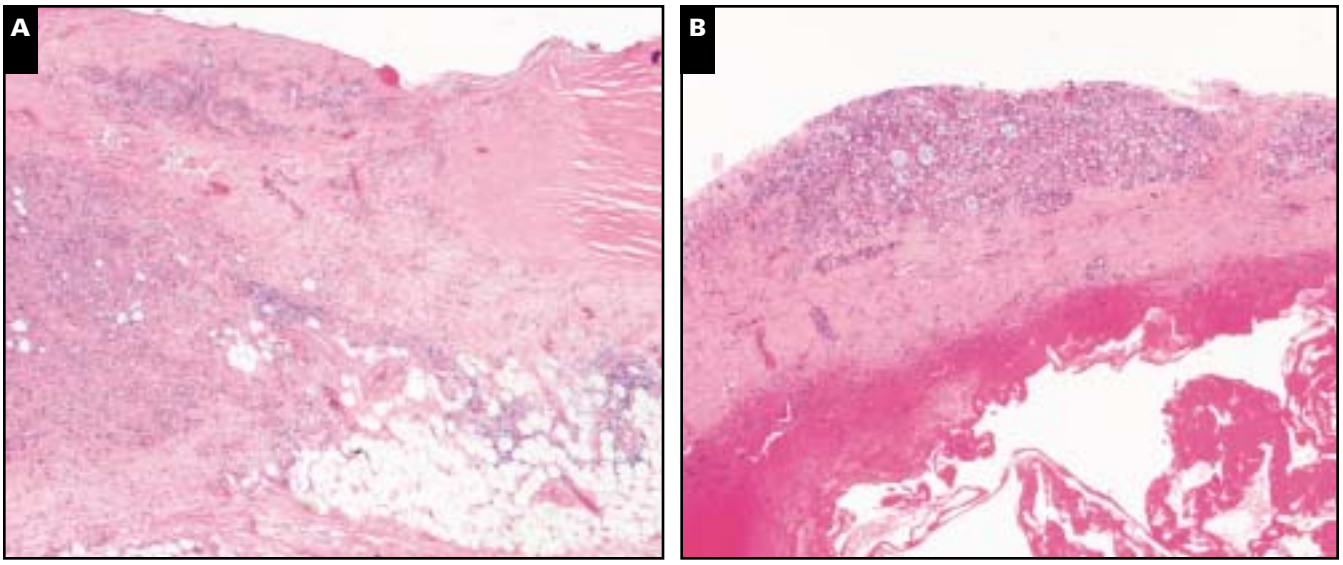

Image 2 **A**, Pleura and adipose tissue infiltrated by an epithelial neoplastic proliferation (H&E, ×25). **B**, Mucoepidermoid carcinoma overlying the pleura, which also shows fibrinous pleuritis (H&E, ×60).

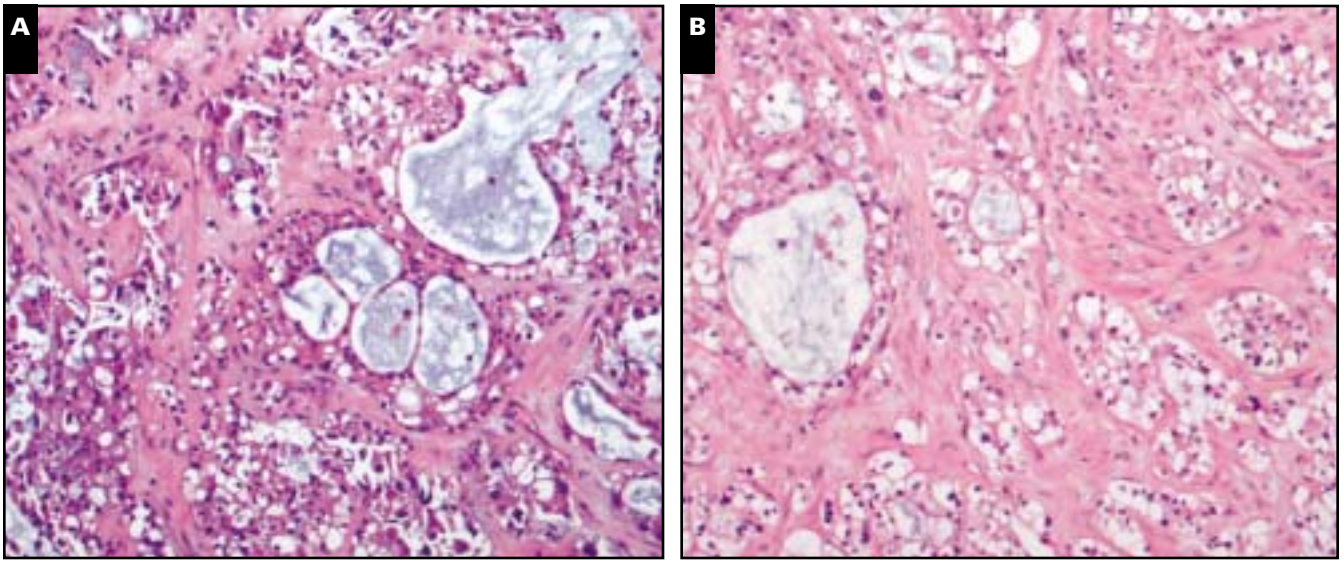

Image 3 **A**, Intermediate magnification of a neoplastic cellular proliferation infiltrating the pleura and characterized by solid and cystic areas (H&E, ×40). **B**, Higher magnification of the neoplastic cellular proliferation showing cystically dilated structures and solid areas infiltrating fibroconnective and adipose tissue (H&E, ×60).

Yousem and Hochholzer[10] described 58 cases of mucoepidermoid carcinomas and stated that these tumors derived from minor salivary gland tissue of the proximal tracheobronchial tree. In their study, the majority of cases belonged to the low-grade category. The tumors were endobronchial polypoid masses. None of the cases described as low-grade tumor occurred in the periphery of the lung or in the pleura. Interestingly, the authors also mentioned that some of their cases showed areas of oncocytic, clear cell, and sclerotic change. However, the authors concluded that those features did not have a role in the behavior of these tumors. Factors that were considered of prognostic value included histologic grade, advanced stage, and probably lymph node metastases.

In our cases, the tumors exclusively involved the pleural surface without lung involvement. Thus, both cases initially were interpreted as biphasic mesothelioma in one case and adenocarcinoma in the second case.

In both tumors, immunohistochemical analysis was performed to confirm the diagnosis of mesothelioma or adenocarcinoma, and in both cases, the immunohistochemical findings were more in keeping with those of adenocarcinoma. Adenocarcinomas involving the pleural surface are not uncommon, and, in some cases, they clinically and

Downloaded from https://academic.oup.com/ajcp/article/120/3/381/1759079 by guest on 21 August 2022

© American Society for Clinical Pathology

DOI: 10.1309/91C02GARN2U5GGNE

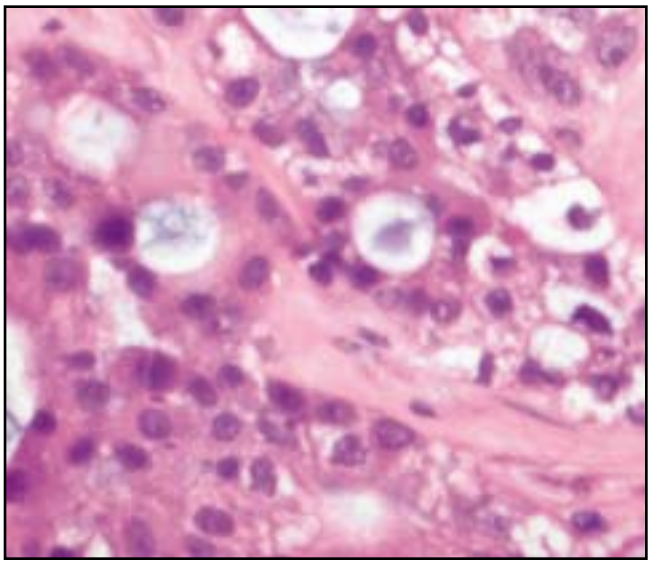

Image 4 High-power magnification of a pleural mucoepidermoid carcinoma showing oncocytic and clear cell changes (H&E, ×75).

radiologically may mimic malignant mesothelioma. The term coined for these types of adenocarcinomas is *pseudomesotheliomatous adenocarcinoma.*[2] In this setting, immunohistochemical analysis has a role in differentiating them from mesothelioma. Unfortunately, in cases of mucoepidermoid carcinoma, the issue of immunohistochemical analysis is more challenging because mucoepidermoid carcinomas also may exhibit positive staining for carcinomatous epitopes, thus leading to an erroneous interpretation.

In our case of sclerosing mucoepidermoid carcinoma, the biggest problem would be if one were confronted with a needle biopsy specimen, because some of the features of the tumor would be reminiscent of a biphasic tumor. Basically, the tumor needs to be separated from biphasic mesothelioma or synovial sarcoma. In the former, the presence of a pleural mass would be a helpful hint because in most cases of mesothelioma, one would expect to have diffuse pleural thickening. In addition, the immunohistochemical results of positive staining for carcinomatous epitopes would place the tumor in a different category. In the case of synovial sarcoma, immunohistochemical studies for keratin would be helpful because the spindle cell component of synovial sarcoma would show some positivity for keratin. In addition, the presence of cellular atypia and mitotic activity would be of great help. In a small biopsy specimen, other considerations would be a squamous cell carcinoma[17,18] and solitary fibrous tumor, if the sampled area were a solid epithelial component or a fibroblastic proliferation, respectively. In such instances, the diagnosis cannot be made until surgical resection of the tumor mass is accomplished.

On the other hand, one needs to consider the possibility of a metastasis from a mucoepidermoid carcinoma of salivary glands. In this setting, a careful clinical history and a proper physical examination would lead to the correct interpretation.

One issue that is unresolved in these cases is the origin of mucoepidermoid carcinoma of the pleura. Since there is not minor salivary gland tissue in the pleura, one is left to assume the possibility of ectopic salivary gland tissue. However, in neither of our cases was such a finding present. On the other hand, similar tumors also have been described in other anatomic areas in which salivary gland tissue is not present; such is the case with mucoepidermoid carcinomas of the thymus.[19]

We have described 2 cases of low-grade mucoepidermoid carcinoma, one with prominent sclerosing change. These tumors highlight the importance of including other types of epithelial tumors in the differential diagnosis of pleural tumors. Proper recognition of mucoepidermoid carcinoma in the pleura may avoid unnecessary treatment for these patients and will properly include them in a separate category of patients. It is possible that only complete surgical resection of these tumors is adequate treatment. However, it would be important to identify more cases to formulate more meaningful conclusions.

From the Departments of Pathology, [1]M.D. Anderson Cancer Center, Houston, TX; and [2]Ohio State University, Columbus.

Address reprint requests to Dr Moran: Dept of Pathology, Box 85, M.D. Anderson Cancer Center, Houston, TX 77030.

References

1. Bedrossian CWM, Bonsib S, Moran CA. Differential diagnosis between mesothelioma and adenocarcinoma: a multifocal approach based on ultrastructure and immunohistochemistry. *Semin Diagn Pathol*. 1992;9:124-140.
2. Koss MN, Travis WD, Moran CA, et al. Pseudomesotheliomatous adenocarcinoma: a reappraisal. *Semin Diagn Pathol*. 1992;9:117-123.
3. England D, Hochholzer L, McCarthy MJ. Localized benign and malignant fibrous tumors of the pleura: a clinicopathologic study of 223 cases. *Am J Surg Pathol*. 1989;13:640-658.
4. Moran CA, Suster S, Koss MN. The spectrum of histologic growth patterns in benign and malignant fibrous tumors of the pleura. *Semin Diagn Pathol*. 1992;9:169-180.
5. Moran CA, Suster S, Koss MN. Smooth muscle tumors presenting as pleural neoplasms. *Histopathology*. 1995;27:227-234.
6. Falconeri G, Bussani R, Mirra M, et al. Pseudomesotheliomatous angiosarcoma: a pleuropulmonary lesion simulating malignant pleural mesothelioma. *Histopathology*. 1997;30:419-424.
7. Moran CA, Travis WD, Rosado-de-Christenson M, et al. Thymomas presenting as pleural tumors. *Am J Surg Pathol*. 1992;16:138-144.

Downloaded from https://academic.oup.com/ajcp/article/120/3/381/1759079 by guest on 21 August 2022

DOI: 10.1309/91C02GARN2U5GGNE
© American Society for Clinical Pathology

8. Gaertner E, Zeren H, Fleming MV, et al. Biphasic synovial sarcomas arising in the pleural cavity: a clinicopathological study of five cases. *Am J Surg Pathol.* 1996;20:36-45.
9. Perez MT, Cabello-Inchausti B, Viamonte M, et al. Pleural body cavity–based lymphoma. *Ann Diagn Pathol.* 1998;2:127-134.
10. Yousem SA, Hochholzer L. Mucoepidermoid tumors of the lung. *Cancer.* 1987;60:1346-1352.
11. Moran CA, Suster S, Koss MN. Primary adenoid cystic carcinomas of the lung: a clinicopathologic and immunohistochemical study. *Cancer.* 1972;73:1390-1397.
12. Moran CA, Suster S, Askin FB, et al. Benign and malignant salivary gland type tumors of the lung: clinicopathologic and immunohistochemical study of eight cases. *Cancer.* 1994;73:2481-2490.
13. Moran CA, Suster S, Koss MN. Acinic cell carcinoma of the lung ("Fechner tumor"): a clinicopathologic, immunohistochemical, and ultrastructural study of five cases. *Am J Surg Pathol.* 1992;16:1039-1050.
14. Fechner RE, Bentnick BR. Ultrastructure of bronchial oncocytoma. *Cancer.* 1973;31:1451-1457.
15. Moran CA. Primary salivary gland–type tumors of the lung. *Semin Diagn Pathol.* 1995;12:106-122.
16. Wilson R, Moran CA. Epithelial-myoepithelial carcinoma of the lung: immunohistochemical and ultrastructural observations and review of the literature. *Hum Pathol.* 1997;28:631-635.
17. Ruttner JR, Heinzl S. Squamous cell carcinoma of the pleura. *Thorax.* 1977;32:497-500.
18. Dharkar DD, Leininger BJ, Kraft JR. Primary squamous cell carcinoma of pleura. *IMJ Ill Med J.* 1986;170:27-29.
19. Moran CA, Suster S. Primary mucoepidermoid carcinoma of the thymus: a clinicopathologic study of 6 cases. *Am J Surg Pathol.* 1995;19:826-834.

Downloaded from https://academic.oup.com/ajcp/article/120/3/381/1759079 by guest on 21 August 2022

© American Society for Clinical Pathology

DOI: 10.1309/91C02GARN2U5GGNE