

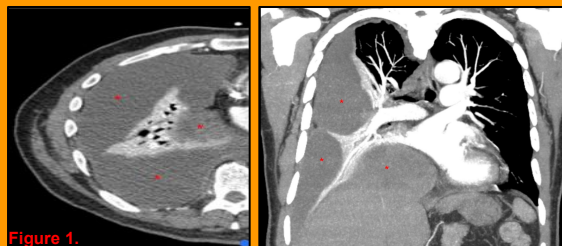
**BACKGROUND**

- Pleural effusions affect ~1.5 million patients annually in the United States. [1] Leading causes of large/massive effusions include malignancy (55%), complicated parapneumonic effusion/empyema (22%), & Tuberculosis (12%) [2]
- Concurrent pleural masses + exudative effusion creates a critical diagnostic overlap between malignancy & organizing infection
  - Pleural biopsy via medical thoracoscopy or image guided cutting-needle biopsy are 2 options to help establish definitive diagnosis when it remains unclear
- Sarcomatoid mesothelioma accounts for approximately 10% of all pleural mesotheliomas, & sarcomatoid carcinoma accounts for 0.1-0.4% of all lung malignancies [3,4]
- No established framework exists for clinical decision-making when immunohistochemistry is truly non-discriminatory. This case illustrates the importance of early diagnosis & the need for further histochemical tests that can help distinguish each disease

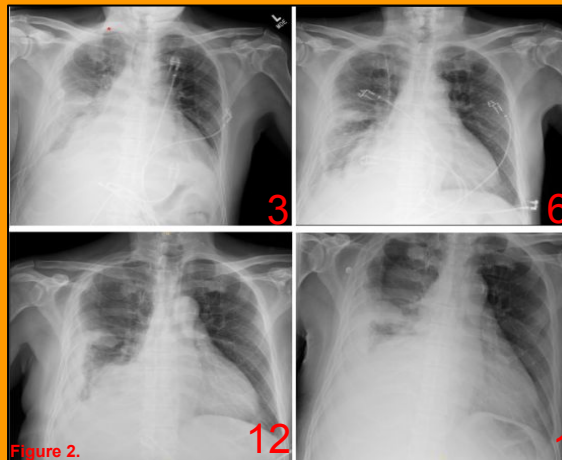
**CASE DETAILS**

- 74-y/o M, history of hypertension, hyperlipidemia, 12 pack-year smoking use, c/o 2-3 months of progressive dyspnea after being diagnosed with COVID-19.
  - CT chest w/ contrast in *Figure 1* showed large, loculated right pleural effusion w/ compressive atelectasis
  - Thoracentesis/chest tube drained 1.8L sanguineous fluid but cytology was nondiagnostic, & *Figure 2* shows chest X-rays (CXR) taken periodically throughout hospitalization
- Robotic thoracoscopy with decortication revealed innumerable pleural masses; biopsy showed malignant spindle cells with mixed immunohistochemistry
- Final diagnosis was sarcomatoid neoplasm, indistinguishable between sarcomatoid carcinoma vs mesothelioma
- He was hospitalized for 12 days, discharged home, then returned 1 week later due to worsening dyspnea, opting for eventual hospice
- Our case highlights the diagnostic challenges & histochemical overlap between sarcomatoid mesothelioma & carcinoma

**Figure 1.** Axial & Coronal chest CT w/ contrast - diffuse R pleural effusion w/ compressive R lung atelectasis. Asterisks highlight pleural fluid encircling R lung parenchyma



**Figure 1.**



**Figure 2.** Serial CXRs, hospital days 3, 6, 12, & readmission day 1. Top Left: Right perihilar & right lower lobe opacities from atelectasis and interstitial edema. Small right apical pneumothorax (asterisk) after successful pigtail catheter placement also noted. Top Right: Worsening right lung opacities w/ loculated pleural fluid. Bottom Left: Interval pigtail catheter removal & stable right pleural effusion w/ surrounding right lower lobe airspace opacities. Bottom Right: Worsening large multiloculated right pleural effusion and basilar consolidation.

**DISCUSSION**

- Sarcomatoid pleural spindle cell neoplasms are rare overlapping morphology & variable immunohistochemistry, making sarcomatoid mesothelioma & carcinoma difficult to differentiate
- Accurate classification matters because management diverges: mesothelioma management is guided by subtype (epithelioid vs. non epithelioid) & typically treated with surgery for the former & immunotherapy such as ipilimumab plus nivolumab for the latter. [4] Carcinoma management is treated similarly to non-small cell lung cancer with early stages treated surgically vs. metastatic disease treated with chemo/immunotherapy [5]
- Limited access to emerging histochemical markers like GATA Binding Protein 3 & Mucin 4 can prolong diagnostic uncertainty & delay treatment during narrow therapeutic windows

**CONCLUSION**

- Early thoracoscopy &/or biopsy is crucial for patients who have indeterminate pleural effusions with concern for possible malignancy. However, exceptionally rapid clinical deterioration within 3 weeks for our patient highlights the uniformly poor prognosis of sarcomatoid pleural malignancy & importance of early diagnosis for accurate treatment

**REFERENCES**

1. Shen-Wagner, J., Gamble, C., & MacGivray, P. (2023). Pleural effusion: Diagnostic approach in adults. *American Family Physician*, 108(5), 464-475.
2. Porcel, J. M., & Vives, M. (2003). Etiology & pleural fluid characteristics of large & massive effusions. *Chest*, 124(3), 978-983.
3. Janes, S. M., Alrifai, D., & Fennell, D. A. (2021). Perspectives on the treatment of malignant pleural mesothelioma. *The New England Journal of Medicine*, 385(13), 1207-1218.
4. Liu, X., Guo, L., Ding, X., & Kang, Z. (2024). Pulmonary sarcomatoid carcinoma: A rare case report, diagnostic dilemma & review of literature. *Medicine*, 103(27), e38797.
5. Kindler, H. L., Ismaila, N., Bazhenova L., et al. (2025). Treatment of pleural mesothelioma: ASCO guideline update. *Journal of Clinical Oncology*, 43(8), 1006-1038.
6. Dombldes, C., Leroy, K., Monnet, I., et al. (2020). Efficacy of Immune Checkpoint Inhibitors in Lung Sarcomatoid Carcinoma. *Journal of thoracic oncology*, 15(5), 860-866.

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