

Acute mesenteric ischemia leading to diagnosis of advanced spindle cell carcinoma of the lung

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ABSTRACT

Acute ischemic events secondary to pulmonary malignancy are rare. Those who present with acute peripheral arterial occlusions from malignant sources will typically have advanced pulmonary malignancy or myxomatous tumors. A 79-year-old woman had presented to Vancouver General Hospital with acute mesenteric ischemia. The pathology reports after embolectomy indicated cell morphology consistent with spindle cell carcinoma of the lung. Imaging investigations revealed a right upper lobe mass not present on chest imaging studies performed 14 months previously. The findings from the present report serves to remind us that acute ischemic events in the setting of no known history of malignancy or cardiac disease should prompt investigations into possible malignant sources. (*J Vasc Surg Cases and Innovative Techniques* 2020;6:557-61.)

Keywords: Embolic; Malignancy; Mesenteric ischemia; Pulmonary; Spindle cell carcinoma

Acute ischemic events are emergent presentations requiring immediate surgical intervention. Most often, these events will occur secondary to cardioembolic or atheroembolic sources. Thus, lung cancer has not typically been considered in the differential diagnosis. A recognized, but infrequently reported situation, has been the presentation of acute ischemia secondary to embolized tumor fragments.¹⁻⁴ Even less frequently reported has been the presentation of an ischemic event that leads to the diagnosis of malignancy.³ In the present report, we have described a case of acute mesenteric ischemia that led to the diagnosis of spindle cell carcinoma of the lung. The patient's next of kin provided written informed consent to report the case and associated images.

CASE REPORT

A 79-year-old woman had initially presented to a community hospital in Vancouver (British Columbia, Canada) with a 3- to 4-week history of abdominal pain, nausea, and an approximate 10-lb weight loss. Also, she had been experiencing postprandial abdominal pain since undergoing a femoral–tibial bypass 12 days before her current presentation. The findings from

abdominal imaging studies in the emergency department at that time were not significant. Thus, she was treated for constipation and discharged in a clinically stable condition.

However, ~1 week later, she had presented to Vancouver General Hospital with ongoing abdominal symptoms and new hemodynamic compromise. Emergent repeat imaging studies revealed a new distal superior mesenteric artery (SMA) occlusion with mucosal wall changes suggestive of acute bowel ischemia (Fig 1).

At this time, her known comorbidities included significant peripheral vascular disease, recent femoral–tibial bypass, coronary artery disease, asthma, rheumatoid arthritis, hypertension, hyperlipidemia, type 2 diabetes, hypothyroidism, and a remote history of breast cancer. She had also had a heavy smoking history of 43 years. She had quit 20 years before her current presentation.

When admitted, she was in septic shock with clinical features of abdominal peritonitis, hypoxemia, and hypotension. A preoperative electrocardiogram had additionally demonstrated anterior territory ST-segment elevations with an elevated preoperative troponin level of 21.4 µg/L. Given the acuity of her bowel, it was decided to proceed to the operating room for SMA embolectomy and simultaneous resuscitation. She underwent SMA thromboembolectomy and resection of a minor segment of necrotic jejunum. The thromboembolic material appeared pale in color, suggestive of a more chronic source, presumably cardiac. The specimen was sent for pathologic examination, which was routinely completed at our institution. Given the patient's preoperative electrocardiographic findings, elevated troponin level, hemodynamic instability requiring full vasopressor support, and slightly peculiar thromboembolic material, intraoperative transesophageal echocardiography (TEE) was completed. TEE demonstrated thrombus in the pulmonary veins and left atrium and significant biventricular dysfunction (Fig 2). Postoperatively, she was taken to the intensive care unit for close monitoring and vasopressor support and

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Fig 1. Sagittal computed tomography angiographic image of the abdomen showing a new distal superior mesenteric artery thrombosis.

subsequently underwent urgent postoperative cardiac catheterization. Cardiac catheterization demonstrated stenosis of the right coronary artery and great saphenous vein bypass graft. However, the level of stenosis was not thought to correlate with the preoperative cardiac concern. She subsequently underwent three additional abdominal surgeries with further bowel resection during the next week.

Pathologic examination confirmed that the thrombus was consistent with the findings of spindle cell carcinoma of the lung. Initial chest imaging revealed a mass in the right upper lobe measuring $41 \times 49 \times 37$ mm (Fig 3). This was an entirely new finding compared with most recent chest imaging studies 14 months earlier. Computed tomography studies reinforced the presence of significant intraluminal thrombus burden in the right superior pulmonary vein and left atrium, extending from the right upper lobe mass (Fig 4). These findings validated those from the intraoperative TEE study that the thrombus had likely originated from the pulmonary vasculature. Two weeks after her diagnosis of spindle cell carcinoma, in addition to significant postoperative complications that had developed in the intensive care unit, palliative measures were pursued.

DISCUSSION

The embolization of a cardiac clot, atherosclerotic debris, or thrombus from aneurysmal disease is a well-

recognized cause of acute ischemic events. The embolization of tumor fragments significant enough to cause ischemia, however, is a rare event.¹⁻⁷ The first case was described in 1981 by Starr et al.¹ Compared with ischemic events that occur from unknown malignant sources, those from known malignant sources have been more widely recognized for two main reasons. First, knowing that a patient has a malignancy, which can lead to a hypercoagulable state, predisposing to clot formation, will increase suspicion. Second, mechanisms have been recognized in which known cardiac and respiratory malignancies can invade the pulmonary vasculature and enter the systemic circulation. Nearly all reports of systemic arterial embolization in patients with any primary malignancy have discussed the mechanism by which pulmonary metastases, pulmonary primary tumors, or cardiac malignancies invade the pulmonary veins (PVs), fragment within the left atrium or within the PVs and subsequently enter the systemic circulation.¹⁻⁹ Another recognized mechanism is when the heart or aorta has been directly invaded by the tumor owing to proximity, achieving direct access to the arterial circulatory system.⁴⁻⁹ Finally, in patients with known invasive lung cancer undergoing surgery, it has been reported that surgical manipulation of the PVs can result in arterial embolization.⁷⁻⁹

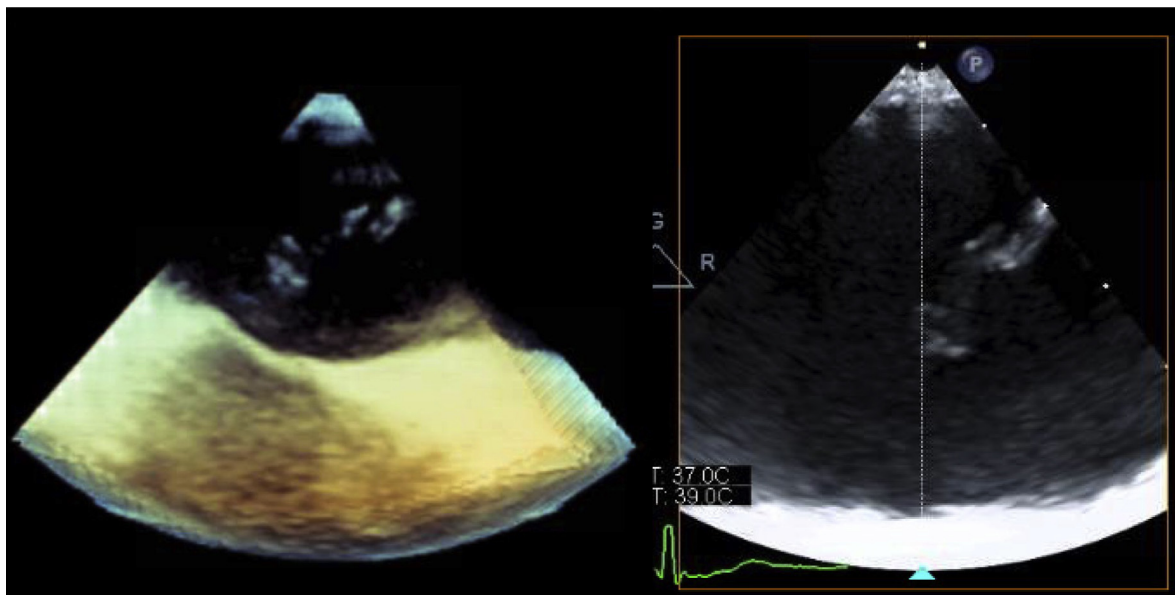


Fig 2. Transesophageal echocardiogram illustrating the clot burden within the pulmonary veins.



Fig 3. Initial chest radiograph identifying a new mass in the right upper lobe of the lung, not present on the chest radiograph 14 months earlier. The mass measured 41 × 49 × 37 mm.

The situation of an acute arterial ischemic event leading to the diagnosis of a primary malignancy is uncommon. When this occurs, the approach has often been to categorize the potential sources into myxomatous and non-myxomatous.^{1-4,7,9} It has been reported that 30% to 45% of unresected left atrial myxomas can fragment and embolize.^{3,7} In those with no known history of myxoma or malignancy, it appears that the primary diagnosis of pulmonary malignancy has been most common.^{1,3,5,7,8} Anatomically, this makes sense in terms of the mechanism of PV invasion.

Diagnosing a respiratory malignancy after an acute arterial embolic event has been exceptionally rare.^{3,5,8}

Cases of primary adenocarcinoma, epithelioid carcinoma, small cell carcinoma, bronchogenic carcinoma, and metastatic sarcoma have all been reported.¹⁻⁸ Spindle cell carcinoma is a rare subclassification of sarcomatoid carcinoma.¹⁰ Moreover, sarcomatoid carcinoma only accounts for ~0.1% to 0.4% of all non-small-cell lung cancer cases.¹⁰ In a thorough review of the reported data, we did not find any recent reports of a diagnosis of spindle cell lung carcinoma after an acute mesenteric ischemic event.

Our patient's case was notable, not only because of the spontaneous embolic event and type of cancer identified, but also because of the location of embolization. In the studies that had reported peripheral arterial embolism from malignancy, the most common sites of embolization were the aortic bifurcation, lower limbs, or cerebral vasculature.^{2,4-9} Our review identified only five other cases of primary lung cancer embolizing to the SMA.¹¹⁻¹⁵ However, of these cases, the present case was the only case in which the acute ischemic event had preceded the diagnosis of lung cancer. In each of the other five cases, the patients had either previously undergone treatment of unresectable lung cancer or had experienced embolic events perioperatively from the tumor or lung resection.¹¹⁻¹⁵

The findings from the present case have highlighted the importance of always maintaining a broad differential diagnosis, remembering that malignancy can present unexpectedly and the importance of sending embolic specimens for pathologic evaluation. The investigation and exclusion of malignancy, specifically cardiac or respiratory malignancy, should be included in the care plan of any acute ischemic event.

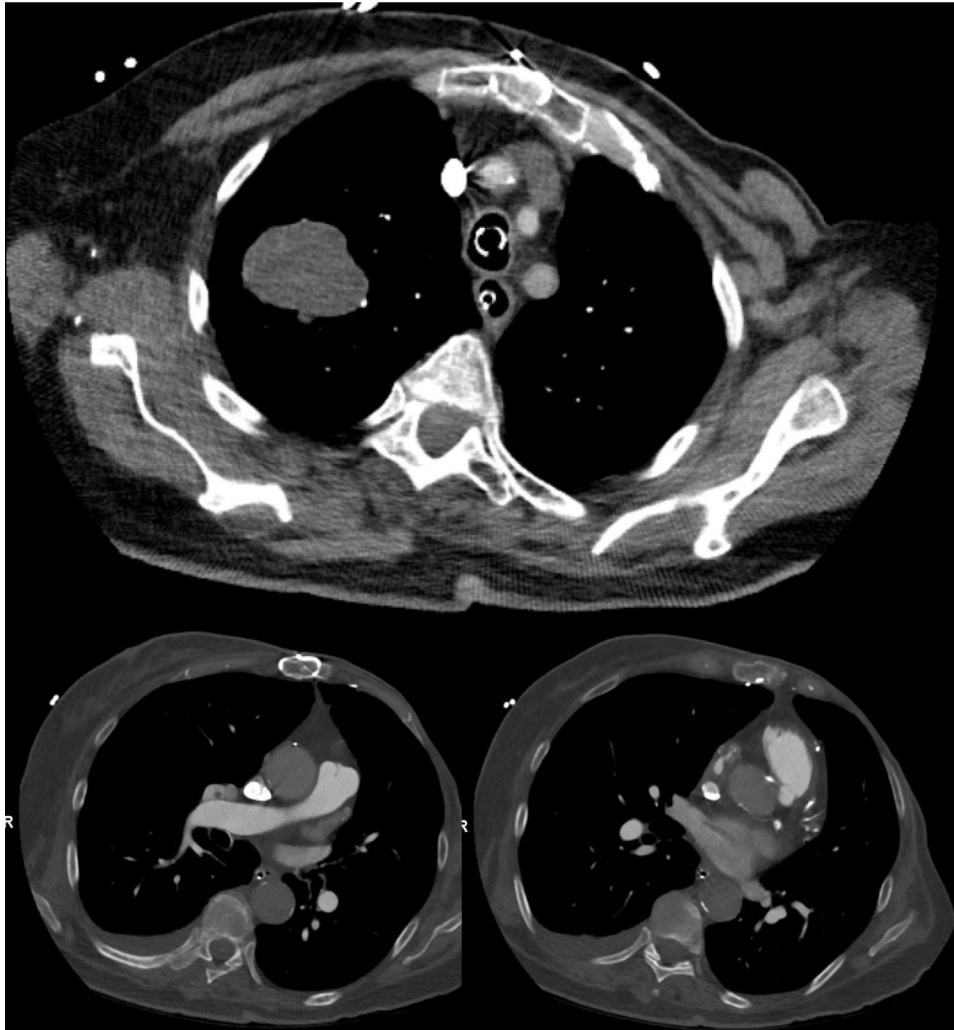


Fig 4. Computed tomography scan of the chest characterizing the right upper lobe mass and extension of the mass into the pulmonary veins.

CONCLUSION

Despite being common presentations, the management of acute ischemic events should routinely include investigation for the presence of any cardiac or respiratory malignancy. For patients with no known malignancy history or cardiac disease, the performance of intraoperative TEE should be considered to have specific imaging studies available of the PVs and left cardiac chambers to rule out unsuspecting sources of embolic material.

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