Case Reports

Multiple Instances of Peripheral Artery Emboli

from Occult Primary Small Cell Lung Cancer

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Most peripheral artery emboli originate in the heart, and systemic neoplastic emboli are infrequently associated with bronchogenic carcinoma. To our knowledge, there have been no reports of pulmonary vein infiltration by small cell lung cancer.

We describe a highly unusual case of multiple instances of peripheral embolism as the first overt sign of occult primary small cell lung cancer. Tumor emboli infiltrated the pulmonary veins of a 62-year-old man who presented first with a transient ischemic attack and then with other ischemic symptoms. The uncommonly wide distribution of tumor emboli over a short time resulted in death.

Improvements in diagnostic imaging have led to the early identification of relatively isolated small cell lung cancers. This patient's case underscores the importance of transesophageal echocardiography in detecting cardiac emboli when the cause of cerebral ischemic attack is unknown or if there might be multiple instances of arterial embolism. Computed tomography also has a role in the investigation of possible sources of emboli and unrecognized, asymptomatic embolization. ***(Tex Heart Inst J 2012;39(3):420-3)***

Key words: *Carcinoma, bronchogenic/complications/pathology; carcinoma, small cell; embolism/complications/diagnosis/pathology; ischemic attack, transient/etiology; lung neoplasms/complications; neoplasm invasiveness; neoplastic cells, circulating; pulmonary veins/pathology/ultrasonography*

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Direct mediastinal infiltration by non-small cell lung cancer is a rare event, with an estimated prevalence of 4.4% and an extremely poor prognosis.[1] Systemic tumor embolism is also uncommon. Most malignant systemic embolism has reportedly originated from bronchogenic carcinoma.[2-5] Embolism to the mesenteric circulation and the cerebral, coronary, and extremity vessels typically occurs either intraoperatively or in the immediate postoperative period.[4,6] There have been reports of multiple peripheral artery embolism with a malignant tumor as the sole source of emboli.[7-9]

We report a case of multiple instances of peripheral artery embolism arising from small cell lung cancer (SCLC) in a patient who presented with a transient ischemic attack that was followed by renal, intestinal, and bilateral lower-limb ischemia.

Case Report

In December 2010, a 62-year-old man, a former smoker whose hypertension and diabetes mellitus were controlled with oral medication, presented with a transient ischemic attack. He had experienced transient right hemiparesis 3 months before. The clinical manifestations of the current attack were flaccid left hemiplegia, right lower facial paresis, and left-sided hyperreflexia on toe extension-to-plantar stimulation. All the symptoms disappeared 3 hours later. Magnetic resonance imaging of the brain revealed acute ischemic lesions in the right middle cerebral artery distribution area, and no intracranial bleeding, cerebral metastasis, or midline shift. A carotid computed tomographic (CT) angiogram and lower-extremity venous ultrasonogram yielded normal results. Results of laboratory tests for a hypercoagulable state were normal. No source of emboli was found on transthoracic echocardiography (TTE).

The day after the onset of these symptoms, the patient developed signs of left-lower-limb ischemia due to femoral artery embolism. An embolectomy was performed immediately. The specimen was sent for histologic analysis, and the patient was started on full-dose heparin therapy. Six hours later, he had new acute bilateral lower-limb ischemia with concomitant abdominal pain. A femoral embolectomy was performed immediately. Transesophageal echocardiography (TEE) showed an echogenic mass invading the right lower PV but not the left atrium (Fig. 1). A CT angiogram revealed a 3 × 2-cm right-lower-lobe lung mass that adhered to the right pulmonary artery and infiltrated the right lower PV (Fig. 2). Also detected was segmental obstruction of the

superior mesenteric artery (Figs. 3A and 4A) and left renal artery, with subsequent renal infarction (Figs. 3B and 4B). Left nephrectomy and superior mesenteric artery embolectomy were performed, and good backflow was restored. The emboli were sent for histologic examination.

The histologic specimens revealed SCLC metastases. By means of a transbronchial biopsy, the diagnosis of SCLC was confirmed.

Because of the high risk of embolization, the patient was not a candidate for systemic neoadjuvant treatment. He was initially considered for en bloc right lower lo-

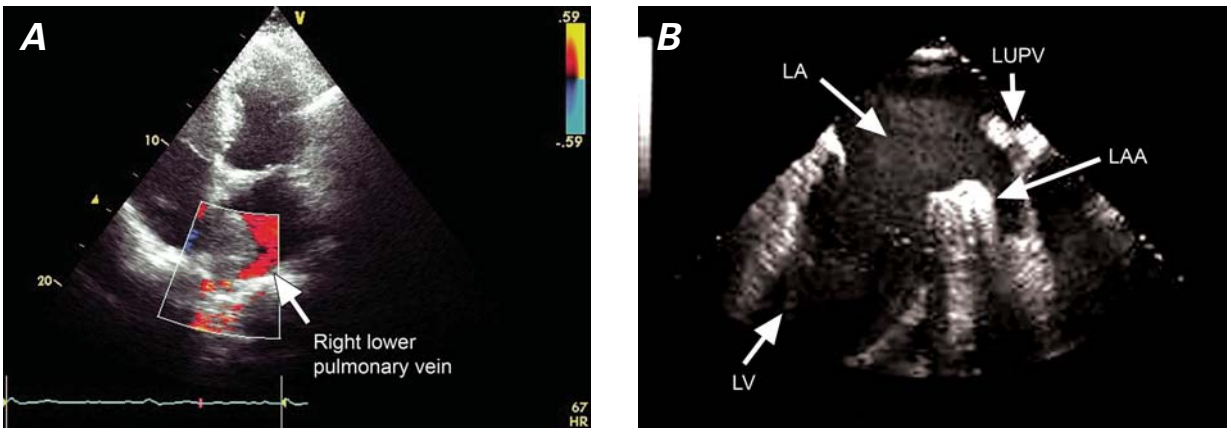

Fig. 1 *Transesophageal echocardiograms (apical 4-chamber views) show* ***A****) the right lower pulmonary vein with patency evaluation by color-flow duplex scan, and* ***B****) the left pulmonary veins in B-mode scan.*

LA = left atrium; LAA = left atrial appendage; LUPV = left upper pulmonary vein; LV = left ventricle

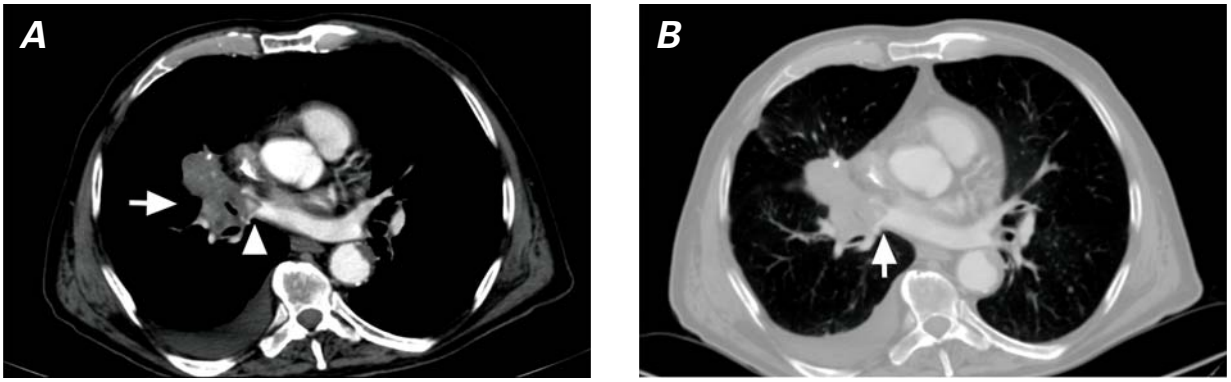

Fig. 2 *Computed tomographic angiography shows* ***A****) a lung mass (arrow) adhering to the right pulmonary artery and infiltrating the right lower pulmonary vein (arrowhead), and* ***B****) a 3 × 2-cm right-lower-lobe lung mass (arrow) (lung parenchymal window settings).*

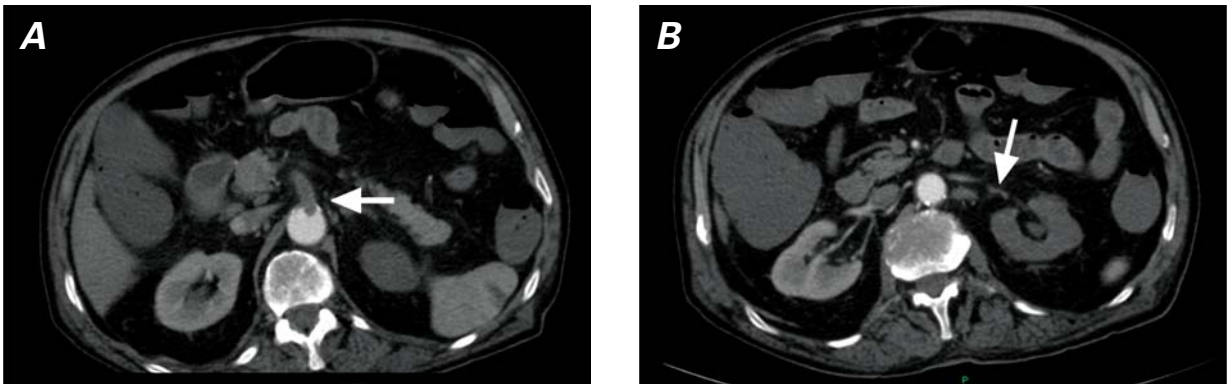

Fig. 3 *Computed tomograms (axial views) show* ***A****) segmental obstruction of the superior mesenteric artery (arrow) and* ***B****) obstruction of the left renal artery (arrow).*

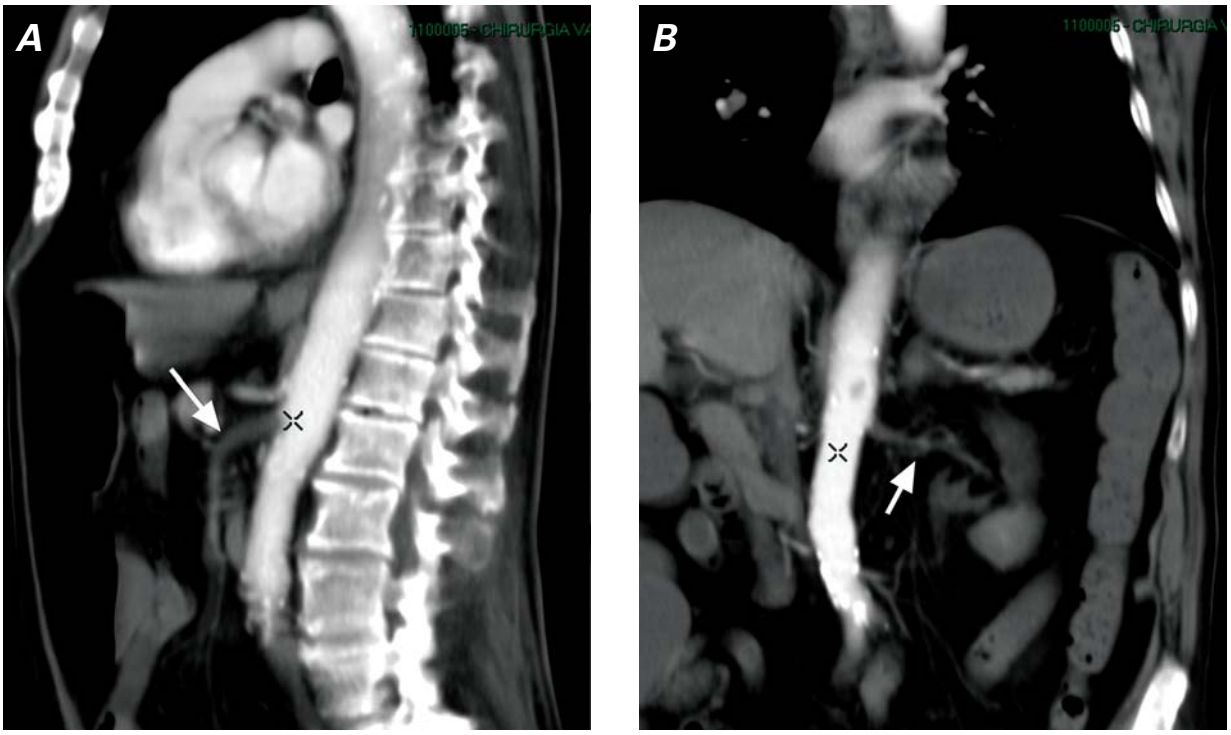

Fig. 4 *Computed tomograms with maximum intensity projection reconstruction show* ***A****) segmental obstruction of the superior mesenteric artery (arrow) in sagittal view, and* ***B****) obstruction of the left renal artery (arrow) in coronal view.*

bectomy with right-PV resection under cardiopulmonary bypass (CPB). However, his rapidly deteriorating condition did not permit further staging or therapeutic evaluation. He developed recurrent dysphasia, ataxia, aphasia, and finally respiratory arrest, mainly due to diffuse cerebral embolic events. For these reasons, on the next day he was declared to be inoperable. Four days later, he died.

Autopsy revealed 3- and 9-mm-long tumor emboli in the right and left middle cerebral arteries, respectively; tumor emboli in the splenic and hepatic arteries; and a large tumor embolus in the left femoral artery. No clots were detected in the heart. Results of postmortem lung histologic examination confirmed that the SCLC extended from the primary pulmonary carcinoma and infiltrated the lower right PV. Tumor emboli were not found elsewhere in the body.

Discussion

Most peripheral artery embolism has an underlying cardiac cause. Cranley[7] found the heart to be the source of 90% of peripheral emboli, and proximal arterial disease to be present in 1% of those patients. The underlying cause often remains unknown. Fewer than 200 cases of arterial embolism from malignant tumor tissue have been reported.[10-12]

The most frequently reported sites of tumor emboli are the aortic bifurcation, the femoral vessels, and the cerebral circulation.[4,13] In the few cases of spontaneous systemic tumor embolism from tumor burden into the PVs, embolism was a sequela of an evident clinical feature.[8,10] In only one other reported case has a cerebral cardioembolic episode been the first clinical sign of the onset of cancer.[14] In our patient, multiple embolism-related symptoms preceded the diagnosis of SCLC, which otherwise remained asymptomatic. To our knowledge, this is the first such report involving SCLC.

By virtue of improvements in diagnostic imaging, relatively isolated SCLC can be identified earlier than ever before. Our patient presented without pulmonary symptoms, and TTE showed no cardiac source of emboli. The chest CT scan showed a thrombus-like lesion in the left PV, and TEE confirmed the invasion of the PV by the lung tumor. The spontaneous embolism from the lung cancer could have been due to tumor fragmentation in the PV.

Evaluation by TTE is recommended for younger patients who present with neurologic events and for older patients who have no evident cerebrovascular disease.[13] Meticulous examination of all 4 PVs by TTE is recommended. Most often, TEE is chosen for the detection of left atrial and left atrial appendage thrombi, left atrial spontaneous echo contrast, atrial septal aneurysm, patent foramen ovale, aortic atheroma, and involvement of the PVs by lung tumors.[9,16]

Invasion of the PVs by lung cancer, albeit rare, should be considered among the possible causes of systemic em-

bolism. Embolism can result from intraoperative manipulation of the PVs during pulmonary surgery,[9] which is why early preventive PV ligation has long been recommended.[17] The use of CPB makes radical resection possible but also increases surgical risk; CPB is indicated if an atriotomy is necessary to remove an intra-atrial tumor. Some authors have described this surgical procedure.[18,19]

Clinical silence can hamper the detection of tumorous vascular spread at its outset.[17] Our patient's case reaffirms the importance of using echocardiography to detect cardiac embolic sources in patients who have no cardiac disease. The importance of TEE is heightened when the cause of cerebral ischemic attack is unknown or when there may be multiple instances of arterial embolism. In addition, we consider CT scanning to be crucial in the evaluation of other possible sources of emboli and unrecognized asymptomatic embolization.

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