

Cardiac Imaging

Embolic Stroke in a Patient with Metastatic Renal Cell Cancer

KATHLEEN STERGIOPOULOS¹, SUJETHRA VASU¹, THOMAS BILFINGER², MICHAEL POON^{1,3}

Departments of ¹Internal Medicine, ²Surgery, and ³Radiology, Stony Brook University Medical Center, SUNY Health Sciences Center, Stony Brook, New York, USA

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Address:
Kathleen Stergiopoulos

Stony Brook University
Medical Center
Health Sciences Center
T-16-080
Stony Brook, NY 11794-
8167, USA
e-mail: kathleen.stergopoulos@stonybrook.edu

Echocardiography has had a positive impact on the timely diagnosis of patients with cardiac tumors, which potentially can affect management. However, the American Heart Association guidelines suggest that in the evaluation of an embolic event, intracardiac masses should be suspected and appropriately pursued with echocardiography based on the clinical index of suspicion.¹ Notably, the current Echocardiography Appropriateness guidelines are uncertain as to the value of transesophageal echocardiography in the setting of cerebrovascular symptoms, in the setting of a normal transthoracic echocardiogram.² However, the literature demonstrates that a potential cardiac etiology can be identified in a portion of patients with embolic stroke.³ We present an unusual cause of embolism of cardiac source—a metastatic renal cell carcinoma invading the pulmonary veins—which has not previously been described as a source of tumor embolism and stroke.

A 54-year-old man with past medical history of hypertension, hyperlipidemia, and bilateral renal cell carcinoma complained of new-onset speech difficulties. He had a history of complete resection of renal cell carcinoma with a right radical nephrectomy and partial left nephrectomy with negative margins six months prior to admission. The electrocardiogram showed sinus rhythm, with no other significant abnormalities. Magnetic resonance

imaging of the brain noted acute infarctions in the bilateral frontal lobes, left anterior insula and left inferior basal ganglia region, suggestive of an embolic etiology. Transesophageal echocardiography (TEE) was performed to elucidate the source of embolic stroke and demonstrated a large, mobile echodense mass attached to the right atrial free wall (Figure 1), originating from the inferior *vena cava* (Figure 2), most consistent with a tumor probably originating from the renal vein. In addition, a mobile echodense mass was noted originating from the right lower pulmonary vein, extending into the left atrium (Figure 3), identified by TEE and confirmed by chest computed tomography as metastatic disease extending from the lungs into the pulmonary veins (Figure 4). In addition, a small secundum atrial septal defect was also noted (not shown). The patient was referred for resection of cardiac masses, inferior *vena cava* mass (Figure 5), and closure of atrial septal defect. The pathology was consistent with renal cell carcinoma. The patient's short term outcome was favorable.

This case demonstrates an unusual cardiac source of embolism, with metastatic renal cell carcinoma invading the pulmonary veins as the most likely etiology of this patient's stroke. This source of tumor embolism has not previously been described as an etiology of embolic stroke. Tumor embolism is a well recognized phenomenon, in which left atrial and aortic

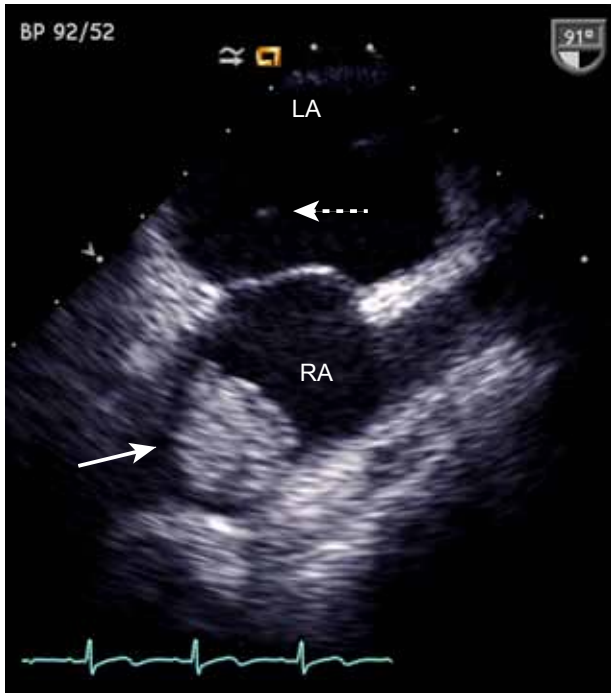


Figure 1. Transesophageal bicaval view demonstrating right atrial mass (RA, solid arrow) and left atrial mass (LA, dashed arrow).

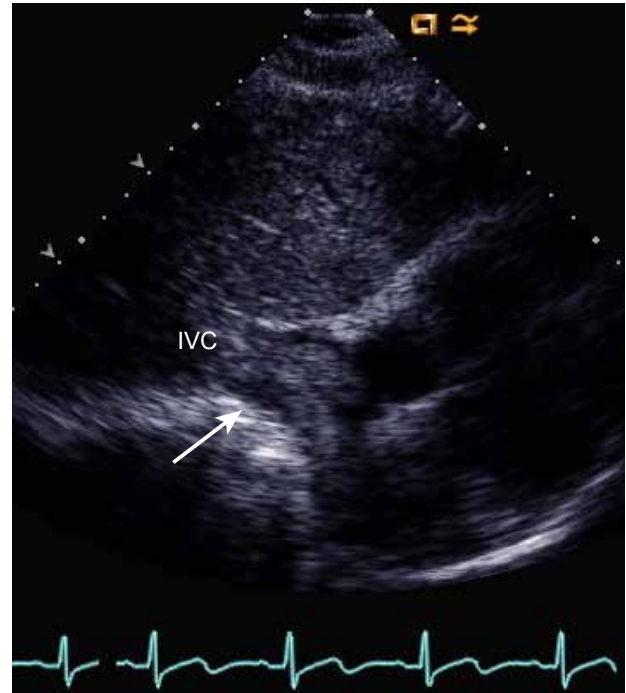


Figure 2. Transthoracic subcostal view demonstrating a mass invading the heart through the inferior vena cava (IVC).



Figure 3. Transesophageal echocardiography showing a mass invading the heart through the right lower pulmonary vein (RLPV).



Figure 4. Computed tomography demonstrating metastatic disease invading the heart through the right lower pulmonary vein (arrow).

valve tumors have the highest risk of embolic potential.⁴ Evaluation of patients with echocardiography is recommended in patients who present with a recent systemic ischemic event that has no obvious source.

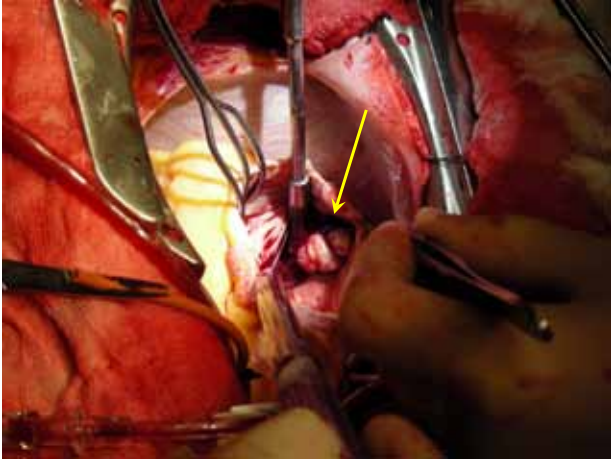


Figure 5. Intraoperative findings of a right atrial mass (arrow).

According to a large case series, surgical resection in the context of a recent embolic event appears to be safe, with good short- and long-term outcomes in all patients except those with malignant cardiac tumors.

References

1. Cheitlin MD, Alpert JS, Armstrong WF, et al. ACC/AHA Guidelines for the Clinical Application of Echocardiography. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Clinical Application of Echocardiography). Developed in collaboration with the American Society of Echocardiography. *Circulation*. 1997; 95: 1686-1744.
2. Douglas PS, Khandheria B, Stainback RF, et al. ACCF/AHA/ACEP/ASNC/SCAI/SCCT/SCMR 2007 appropriateness criteria for transthoracic and transesophageal echocardiography. *J Am Coll Cardiol*. 2007; 50: 187-204.
3. Knebel F, Masuhr F, von Hausen W, et al. Transesophageal echocardiography in patients with cryptogenic cerebral ischemia. *Cardiovasc Ultrasound*. 2009; 7: 15.
4. Elbardissi AW, Dearani JA, Daly RC, et al. Embolic potential of cardiac tumors and outcome after resection: a case-control study. *Stroke*. 2009; 40: 156-162.