

CLINICAL VIGNETTE

An Unusual Case of Pericarditis

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A 43-year-old male with a history of Addison's disease, deep venous thrombosis (DVT), and pulmonary embolism (PE) presented to the Emergency room with the sudden onset of chest discomfort following a workout at the gym. He described the pain as substernal and sharp with radiation to his neck. The pain was worse with deep inspiration and was associated with palpitations, diaphoresis, and nausea. A week ago prior to this, he had several days of melena and was found to have a hemoglobin of 7.3 mg/dL. Subsequent gastrointestinal endoscopy revealed erosions and therefore his warfarin was discontinued.

Additional history revealed that the patient presented with chest pressure and shortness of breath approximately 4 months prior and was found to have a DVT in the right lower extremity and multiple pulmonary emboli. He was started on warfarin and had an IVC filter placed. Hypercoagulable work-up was reportedly normal. The patient subsequently presented again two months following the IVC filter placement for positional chest discomfort, shortness of breath, and palpitations at another facility, with an unremarkable work-up.

Vital signs upon arrival to the emergency room revealed a blood pressure of 104/67, a pulse of 124, respiratory rate of 22, and oxygen saturation of 94% on room air. Physical exam revealed an obese male in moderate physical distress with right lower extremity swelling, which the patient stated was chronic. The remainder of the examination was normal.

A chest X-ray was unremarkable. Electrocardiogram revealed diffuse mild ST-T wave elevations. The ECG findings were consistent with pericarditis. However, a troponin level was elevated and the patient looked quite ill. He was therefore taken urgently to the Cardiac Catheterization Laboratory.

Coronary angiogram did not reveal any significant atherosclerotic disease, but a foreign object was noted to in the right ventricle by multiple radiologic views. Further radiographic imaging of the G2 Vena Cava filter (BARD Peripheral Vascular, Tempe, Arizona) revealed that one of the filter struts was

missing and had likely embolized to the right ventricle. This was confirmed by computerized tomography (CT) of the chest and an echocardiogram.

The patient underwent percutaneous removal of the IVC filter strut from the right ventricle with a 35 mm Amplatz GooseNeck snare (ev3 Endovascular Inc, Plymouth, Minnesota). The G2 IVC filter was removed and a new IVC filter was placed. At the time of the procedure, a non-occlusive thrombus was noted at the confluence of the IVC.

Discussion

IVC filters first came into practice in 1967 with the introduction of the Mobin-Uddin Filter¹. However due to a high incidence of IVC occlusion with the Mobin-Uddin device it was replaced with the Kimray-Greenfield filter². Since then a number of different filters have come on the market. These include retrievable filters, such as the Bard G2 device used in our patient. The typical indication for using an IVC filter has been for the treatment of venous thromboembolic disease in patients who are not candidates for anticoagulant therapy, or have failed anticoagulant therapy. They can also be considered in patients with acute massive pulmonary embolus with hemodynamic instability or chronic thromboembolic pulmonary hypertension for the theoretically improved short-term benefit over anticoagulation alone. However, of note there are currently no good trials showing a proven reduction in the adverse outcome of death from pulmonary embolus with the use of IVC filters³.

Complications from IVC filter placement include acute insertion site thrombosis⁴, chronic thrombosis⁵, hematoma, filter migration⁶, filter erosion through the IVC wall, and filter embolization⁷. IVC filter strut fracture and migration, as occurred in our patient, is an important, yet rarely reported phenomenon. One recent literature review discovered 98 cases of intracardiac or intrapulmonary migration of IVC filters in 77 publications⁸. In one single center retrospective study looking specifically at the Bard Recovery and Bard G2 filters it was found that 13 of 80 patients had at least 1 strut fracture (16%). At least

1 strut in 7 of the 28 Bard Recovery filters fractured and embolized (25%). Six of 52 Bard G2 filters fractured (12%). Resulting events in these patients included asymptomatic end-organ fragment embolization, ventricular tachycardia, tamponade, and sudden death⁹. Other case reports on IVC filter embolization have demonstrated similar adverse outcomes as well as coronary artery dissection resulting in myocardial infarction¹⁰. Relative to complete filter dislodgement and migration, IVC filter strut fracture seems to be uncommonly reported. The cause of fracture in our patient may have been strenuous physical activity. It has been reported that strenuous physical activity along with increased intraabdominal pressure and obesity are associated with IVC strut fracture and migration¹¹.

As illustrated above, reports in the literature involving IVC filter strut fracture and migration are rare. However, the potential sequela from such events carries a high morbidity and mortality. Imaging studies can easily miss indentifying an embolized IVC strut. Therefore, there needs to be a high index of suspicion in patients with a history of IVC filter placement presenting with symptoms such as shortness of breath, chest pain, arrhythmia, or hypotension. Early invasive treatment in these patients with removal of the strut is critical to prevent possible death.

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Figures

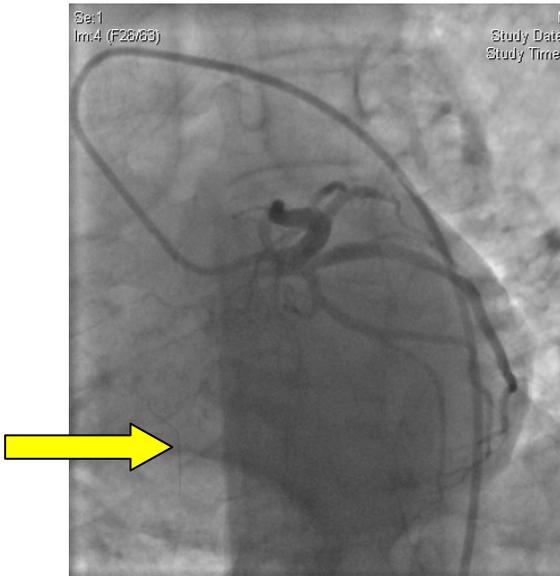


Image 1. Fluoroscopy of the chest demonstrating an IVC strut within the right ventricle at the time of cardiac catheterization



Image 2. IVC filter within the inferior vena cava visualized at the time of the patient's cardiac catheterization. Upon close inspection only 11 out of 12 struts were visualized, supporting the notion that one strut had embolized to the heart

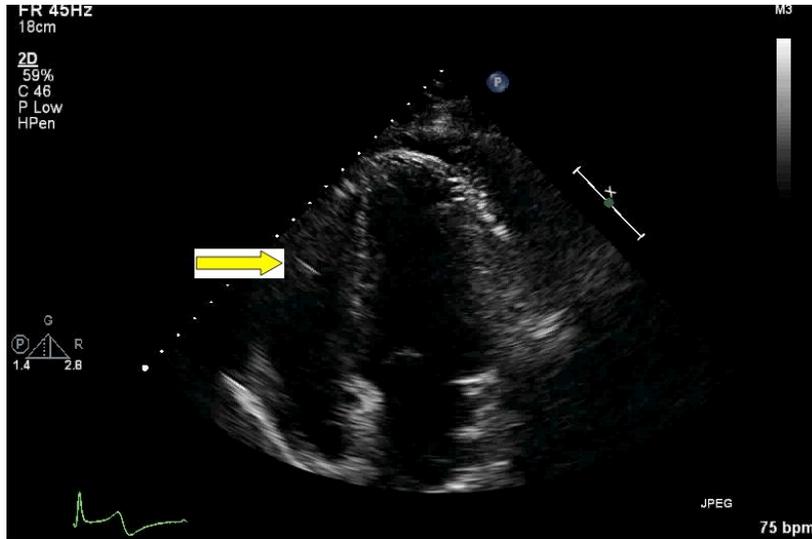


Image 3. Echocardiogram demonstrating a foreign object within the right ventricle

