CLINICAL VIGNETTE

Inferior Vena Cava Filter Fracture Mimicking a Myocardial Infarction

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Introduction

Acute venous thromboembolism has reported incidence ranging between 23 and 69 cases per 100,000 population per year. Overall about 1% of all patients admitted to the hospital die of a PE[1]. Inferior Vena Cava (IVC) filters have been used to prevent fatal pulmonary emboli. Many types of IVC filters have been developed, some requiring complex surgery and others simple interventional radiology deployment. The use of IVC filters has increased to about 30,000 to 40,000 filters deployed in 2004, according to the NHDS database[2]. IVC filter placement complications range from simple post procedure complications to fatal outcomes. We present a case of 43-year-old male with an IVC filter related complication

Case

43-year-old male with a history of Addisons disease, multiple PE's, DVT, s/p IVC filter placement two months ago presented to the ED with substernal, crushing chest pain. The pain increased in intensity with inspiration and was associated with shortness of breath. The pain started about 2 hours prior when he was exercising and did not go away with rest. He had developed malena a week earlier and stopped his warfarin. He takes prednisone chronically for his Addisons disease and had a strong family history of coronary artery disease. Physical examination included heart rate 106, BP 110/70, RR 26 with pulse ox 95% on 2L/M O_2 . He was diaphoretic and lethargic. Labs were remarkable for normal white count, but a hematocrit of 30.7 and platelets of 311. Sodium 137, potassium 4.7, chloride 108, CO2 19, glucose 144, BUN 22, creatinine 0.8. troponin I 0.26 ng/ml. EKG shows sinus rhythm with diffuse 1 mm ST elevations with PR depressions and PR elevation in AVR. A limited bedside echocardiogram revealed no wall motion abnormalities and the patient was taken for emergency cardiac catheterization for presumed acute coronary syndrome. His coronary arteries were found to be normal, however a metallic appearing foreign body was seen in his right ventricle, and the IVC filter was visualized to have 11 spikes instead of 12. It was hypothesized that one of the IVC filter struts had broken and migrated to the right ventricle. CT scan of the chest confirmed a metallic foreign object in the right ventricle along the diaphragmatic surface on the acute margin. There was minimal pericardial effusion. Pt was taken to interventional radiology were the filter strut along with the IVC filter were removed and a new IVC filter was placed. Pt did well post procedure and was discharged after 5 days.

Discussion

Inferior Vena-caval (VC) filters were first used in 1967. IVC filters can be permanent or temporary and retrievable. There are different VC filters available in the United States. A recent review of the medical literature reported 77 publications describing 98 intracardiac or intrapulmonary IVC filter dislodgements[3]. Complication of intracardiac IVC filter dislodgment range from asymptomatic patients[4] to serious cardiovascular abnormalities like cardiac tamponade , hemopericardim[5,6], ventricular and atrial arrhymthias[7], coronary artery dissection causing Myocardial infarction[8], and fatal outcomes[9,10]. Common symptoms were chest pain, SOB, arrhythmia, hypotension, shock[11-14]. Filters generally migrate to the Rt sided circulation system, with filters found in Rt atrium, Rt ventricle, Pul artery and Intracardiac[3]. Compared to complete filter dislodgement and migration, IVC filter strut fracture is relatively uncommon. The cause of fracture in our pt was thought to be 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 migration[15-17].

High index of suspicion is required in such patients with above presentations, as bedside echo may not always reveal the foreign body as in the case of our patient. Angiograpy and CT scan are recommended modalities of diagnosis. No data exist on superiority of surgical vs. percutaneous removal[3,18,19].

Emergency treatment is necessary in these cases due to the arrhythmogenic and perforation potential of a filter strut in the right ventricle. Limited visualization due to cardiac motion complicates transvenous procedures and we suggest the treatment modality should be chosen according to the acuity, along with a surgical backup.

Conclusion

Our patient is unique as his presentation mimicked a Myocardial infarction and a bedside echo missed the foreign body, which led to emergent cardiac catheterization for suspected acute coronary syndrome. IVC filter fracture and embolization can be fatal and high index of clinical suspicion along with the right imaging modality are required to correctly diagnose and treat this condition. Further studies are needed to elucidate the causes of such fractures in these devices.

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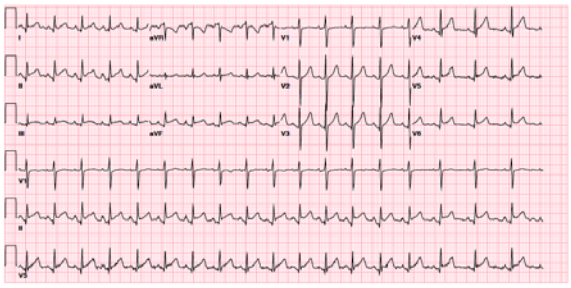
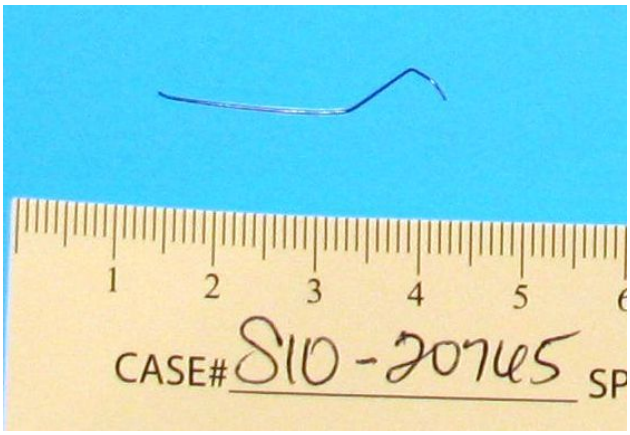
FIGURES



Patients EKG on admission mimicking an inferior myocardial infarction pattern (ST elevations in Leads II,III,aVF)



IVC filter strut after removal from the heart

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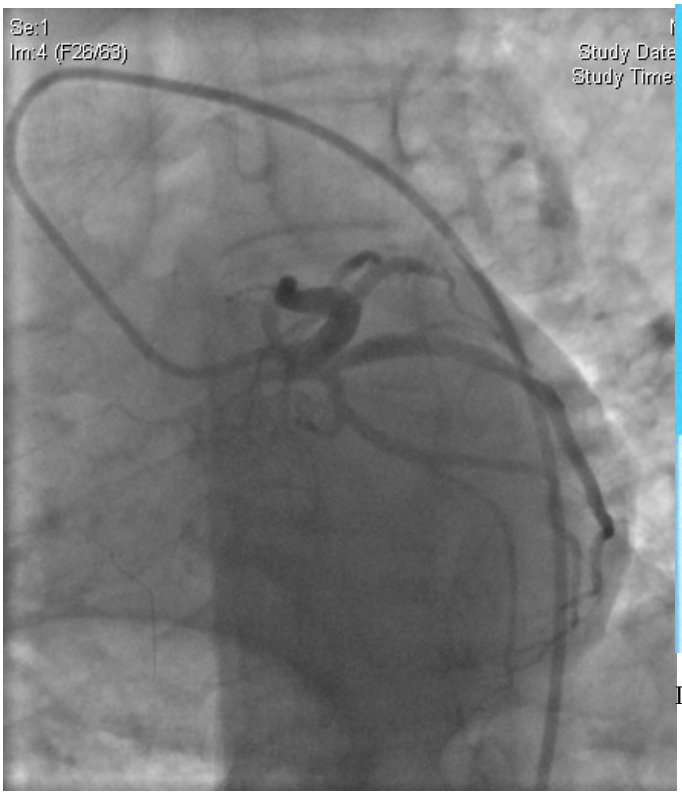
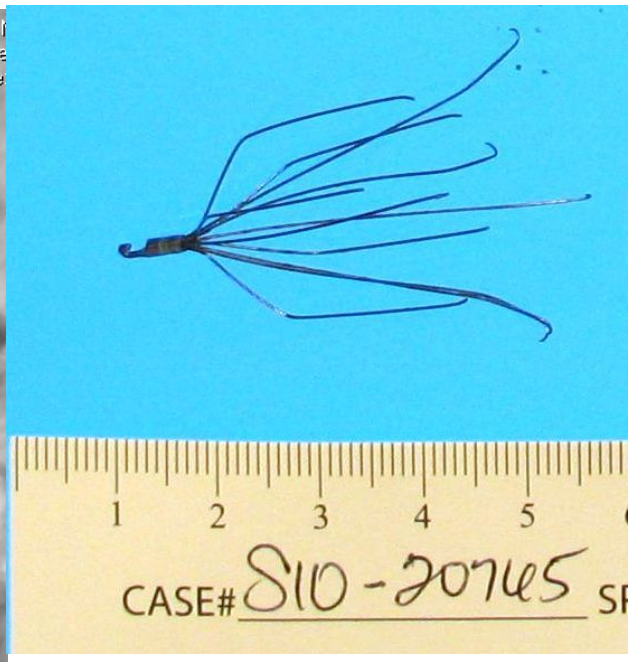
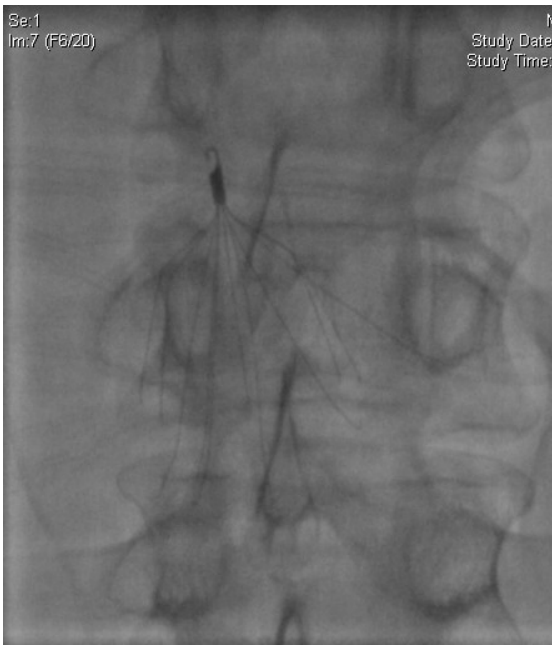


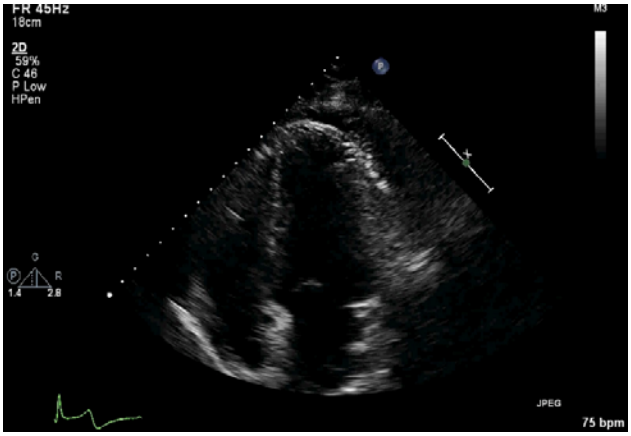
IVC Strut seen in the heart in the Lower left area of the image (Right Ventricle) on Angiogram.



IVC filter with the missing strut.



IVC filter with a missing strut seen in the IVC.



2D-Echo revealing the strut in the Right Ventricle.