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Anesthetic Management of a Patient with a Duodenocaval Fistula Caused by an IVC Filter

Dr. Jaime Ortiz, MD
Associate Professor of Anesthesiology, Baylor College of Medicine, USA.
Email: jaimeo@bcm.edu

Abstract

A 66 year-old male with history of deep venous thrombosis (DVT) and subsequent placement of inferior vena cava (IVC) filter placement 7 years prior to admission, presented to the emergency department with anemia and abdominal pain. Esophagogastroduodenoscopy(EGD) showed a sharp metal object in the 2nd portion of the duodenum. X-ray and CT scan showed the IVC filter to be inverted and perforating the duodenum. The patient underwent an exploratory laparotomy at which time the penetrating part of the IVC filter was resected and the omentum was placed between the IVC and duodenum. The perioperative management of this patient with duodenocaval fistula is discussed.

Keywords

Inferior vena cava filter; Duodenum; Deep venous thrombosis; Esophagogastroduodenoscopy; Anemia

Introduction

Inferior vena cava (IVC) filters provide protection to patients with deep vein thrombosis at risk for pulmonary embolism. They are indicated in patients that anticoagulation is contraindicated due to high risk of bleeding or due to lack of therapeutic effect of the anticoagulant agents [1].Their use has increased steadily over the years since the introduction of retrievable IVC filters in 2001 [2]. However, there is a real risk of complications which can be categorized into insertion-related, device failure, and late complications [3]. Migration of the filter or its parts, fracture of the struts, and protrusion into surrounding structures are late complications which have been reported in the literature[4-11].

This is a case report of a patient with duodenal perforation leading to anemia and abdominal pain in a patient who had an IVC filter placed 7 years prior to admission for prevention of pulmonary embolism.

Case Presentation

A 66 year-old male was admitted to the hospital with abdominal pain and symptomatic iron deficiency anemia over the previous two months with his hemoglobin dropping from 14 to 7g/dL. He had a past medical history significant for an unprovoked deep venous thrombosis (DVT) in his left lower leg in 2003. Due to an unknown contraindication to anticoagulation, he had an IVC filter placed in 2004. His other medical history was significant for a 25 pack-year history of smoking tobacco, prostatitis, and frequent urinary tract infections.

Because of a previous history of colonic polyp, the gastroenterology team was consulted and an esophagogastroduodenoscopy (EGD)and colonoscopy were performed. The EGD showed a sharp metal object found in the 2nd portion of the duodenum (Figure 1). The endoscopy team attempted to remove the piece expecting it to be a broken fragment but failed after several attempts. An abdominal x-ray (Figure 2) and CT scan were performed and they showed the IVC filter inverted and extending into the duodenum causing duodenal perforation and bleeding. The general and vascular surgery teams were consulted.

The patient was taken to the operating room for exploratory laparotomy and partial removal of the IVC filter. The vascular surgery team was immediately available if complications arose during attempted removal of the penetrating piece of the IVC filter. The patient underwent an uneventful induction and intubation. We proceeded to obtain multiple large bore peripheral intravenous lines, placed an arterial line and had two units of packed red blood cells ready for transfusion in the operating room. Removal of the IVC filter's perforating tine was done after mobilization of the right colon and deflection of the duodenum. The omentum was placed in two layers between the IVC and duodenum. There was no other damage visualized and no bleeding noted after closure. The vascular surgeons chose to leave the rest of the IVC filter in place, as the device was not one of the newer retrievable devices and manipulation of it was felt to be risky. The procedure was performed with minimal blood loss, and his vitals were stable throughout. At the end of the procedure, he was extubated and taken to the recovery room. He recovered uneventfully from surgery.

Discussion

Inferior vena cava filters are placed to help prevent the development of pulmonary embolism in patients at risk. They work by trapping thrombus while maintaining blood flow through the inferior vena cava. Ease of insertion and reportedly low complication rates have increased their use and widened current clinical indications for its use. Our patient presented with symptomatic anemia 7 years after insertion of an IVC filter. EGD and CT scan showed part of the filter had migrated through the vena cava into the duodenum. A review of the literature was done to find out how common this complication is.

There are several cases in the literature that report IVC filter perforation of the duodenum causing abdominal pain and bleeding[2-6]. A review of the literature by Malgor [5] described 21 case reports which involved symptomatic duodenal perforation by an IVC filter. The presentation involved abdominal pain in 11 patients and gastrointestinal bleed in 5 patients, similar to our patient. All but one patient required a laparotomy for removal and repair of the injuries. The other patient had endovascular retrieval of the filter without further complications [5].

The literature also shows how common perforation may be in long standing IVC filters. A retrospective study by Durack showed perforation of at least one filter component through the IVC in CT scans of 43 out of 50 patients which Gunther Tulip or Celect IVC filters in which the CT scans had been performed for reasons unrelated to the filter [12]. All filters which had been in place for more than 71 days showed some degree of vena caval perforation.

Another retrospective study by Oh evaluated CT scans performed before removal of IVC filters on 62 patients over a five-year period [13]. Filter struts outside of the IVC wall showing some degree of perforation were present in 86% of patients. Before removal, filter fracture was observed in 12.5% of cases.

In addition, Zhou examined CT scans of 265 patients with Celect IVC filters [14]. They found penetration of one leg in 39% of patients within 30 days, and in 80% of patients within 90 days. The review found penetration into adjacent organs in 13.2 % of patients. The sites most commonly involved were the duodenum in 22 patients and the aorta in 9 patients [14].

With an increasing number of these filters being placed, these complications are likely to arise more often. Careful follow-up, which may include radiographic exam, as well as placement of temporary filters which can be easily removed, may help in decreasing the rate of complications. This presentation

will become more common in the operating room as well as in the interventional radiology suite for attempted removal of parts of or the entire filter when complications arise. Therefore, a high degree of suspicion in patients with long standing IVC filters is prudent.

Figures

Figure 1. EGD image of filter in duodenum

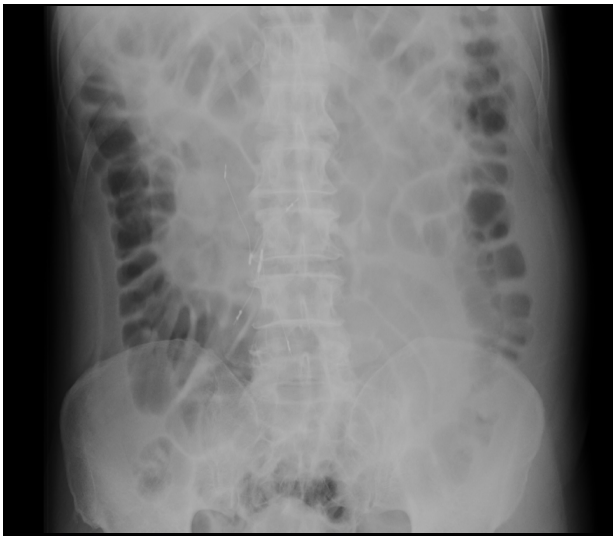

Figure 2: Xray of IVC filter in abdomen

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