

Reporting the Impact of Inferior Vena Cava Perforation By Filters

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Background: Perforation of the inferior vena cava (IVC) and its surrounding structures by filter struts is a known complication. The goal of our review is to gauge the impact of IVC perforation by filters based on a 'real world' open database provided by users, facilities and manufacturers.

Methods: We reviewed 3,123 adverse events of IVC filters reported in the Food and Drug Administration MAUDE (Manufacturer and User Facility Device Experience) database from January 2000 to June 2011. Outcomes of interest were incidence of IVC perforation, type of filter, clinical presentation, and management of the perforation, including irretrievability rates.

Results: Three hundred sixty-seven cases of IVC perforation (12%) were reported. The annual distribution of IVC perforation was 32 (11%) cases, varying from 7 (6%) to 70 (17%). A three-fold increase in the number of adverse events related to IVC filters has been noted since 2004; however, the accrual numbers of IVC perforation have not significantly changed over the years (Graph 1). The most common IVC filter involved in IVC perforation was the Bard G2 Filter Platform System (225, 61%), followed by the Cook Celect in 38 cases (10%). Vein wall perforation as an incidental finding was the most common presentation described in 171 (47%) patients. Surrounding organ involvement was found in 121 (33%) cases, with the aorta involved in 40 (33%) and the duodenum in 26 (21%) cases. The filter retrieval rate was 84% regardless of vein wall perforation. Forty (11%) cases required an open procedure to remove the filter due to either multi-organ involvement or a failed attempt at retrieval. Neither major bleeding requiring further intervention nor mortality was reported secondary to filter retrieval.

Conclusions: IVC perforations by filters remain stable over the past decade despite increasing numbers of adverse events reported. The majority of filters involved in perforation were retrievable and had a multi-prong design for better attachment to the vein wall. Endovascular filter retrieval, regardless of IVC wall perforation, is feasible and must be attempted as it is associated with a higher success rate, and no mortality or major bleeding events have been reported.

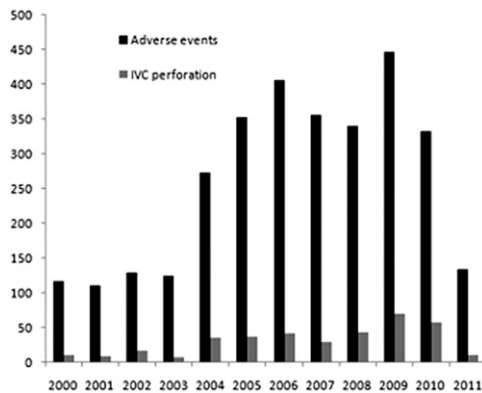


Fig.

Factors Increasing Risk of Venous Thromboembolism After Arterial Reconstructive Procedures

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Background: Although the incidence of venous thromboembolic events (VTE) after common vascular surgical procedures repair is low, we hypothesize that the risk of VTE may be higher in an identifiable subset of patients. These patients may benefit from appropriate measures to prevent VTE. To date, no study has examined and/or elucidated this issue.

Methods: The National Inpatient Survey (NIS) database from years 2000-2009 was reviewed. Records of patients who underwent open repair of an intact abdominal aortic aneurysm (AAA), carotid endarterectomy (CEA) aortobifemoral bypass for occlusive disease (ABF) and infrainguinal bypass (BPG) were crossed with appropriate diagnoses for those operations. The outcome variable evaluated was the development of VTE (deep vein thrombosis (DVT) or pulmonary embolism (PE)) as specified by the International Classification of Diseases, 9th revision (ICD-9; DVT 453.4 and PE acute and postoperative 415.19 and 415.11, respectively). Perioperative and hospital complications were grouped into five families (intestinal, pulmonary, urinary, infectious and cardiac). Prior patient histories of VTE and a history of coagulopathy were also examined. Multivariate analysis of common

complications and the association of these complications with the frequency of VTE were conducted. Chi-squared statistics were calculated. For all analyses, $p < .05$ was considered significant.

Results: The total number of discharges containing one of the procedures of interest was 750,659. Table I details the number of discharges and the incidence of VTE for each of the procedures. All the complications we assessed, except for cardiac, were more associated with patients who developed VTE. For all procedures, the combined end point of VTE was statistically more likely in patients with pulmonary, urinary, infectious complications or had a history of VTE or a history of coagulopathy. For all procedures, cardiac complication did not show an association with the development of VTE. Intestinal complications were associated with VTE development in patients undergoing AAA or fem-distal bypasses, but not CEA or ABF.

Conclusions: The overall rate of VTE in patients undergoing common vascular surgical procedures is quite low. We have a difference in VTE risk based on complications that occur during the hospital stay. The observation of the low incidence of VTE in patients with cardiac complications may be due to anticoagulation of patients with cardiac complications. This data suggests we should consider anticoagulation in patients with multiple peri-operative complications.

Table I. Frequency of procedures and percentage with VTE

Diagnosis	n	%VTE
AAA	73,545	0.34
CEA	373,465	0.06
ABF	50,415	0.27
BPG	253,234	0.31

Strategy of Thrombus Removal For Extensive DVT of Pregnancy

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Background: Extensive deep vein thrombosis (DVT) is associated with severe postthrombotic morbidity when treated with anticoagulation alone. Extensive DVT during pregnancy is usually treated with anticoagulation alone, risking significant postthrombotic morbidity. Thrombolytic therapy and operative venous thrombectomy have been safely and effectively used in selected pregnant patients. The purpose of this report is to review the short and long-term outcomes of eleven patients with extensive DVT of pregnancy treated with a strategy of thrombus removal.

Methods: From 1999-2011, eleven patients were referred for management of extensive DVT during pregnancy, ten patients with iliofemoral/caval DVT and one with acute superior vena caval syndrome. Gestational age ranged from 8 to 36 weeks. All patients were offered a strategy of thrombus removal including catheter-directed thrombolysis, pharmacomechanical thrombolysis (PMT), and/or operative venous thrombectomy. Fetal monitoring was performed throughout hospitalization. Radiation exposure was minimized by using pelvic lead shields, limiting fluoroscopy, using small visual fields, hand held contrast injections and avoiding magnified views. Following intervention, leg compression was applied, patients were anticoagulated with heparin and ambulated. Patients were converted to vitamin K antagonists after delivery. Follow up included objective evaluation using venous duplex and the Villalta scale.

Results: Catheter-directed thrombolysis and PMT were used in nine patients. Two patients declined thrombolytic therapy but agreed to venous thrombectomy, and one patient had operative thrombectomy as an adjunct to PMT. Each patient had complete or near complete thrombus resolution and rapid improvement in clinical symptoms. Eight patients delivered healthy infants at term; two are currently in their third trimester, one suffered an in-utero death 5 days post lysis due to her antiphospholipid antibody syndrome. One patient developed two major complications, gross hematuria requiring blood transfusion and a left popliteal artery pseudoaneurysm that resolved with compression ultrasound. Mean follow up was 2 years, without evidence of recurrence. Three patients had uneventful subsequent pregnancies. Venous duplex ultrasonography demonstrated patent veins and normal valve function in 8 patients. Of the 10 patients with iliofemoral DVT, 9 had Villalta scores <4 , and one patient had a score of 5, consistent with mild postthrombotic syndrome.

Conclusions: Extensive DVT of pregnancy can be effectively and safely treated with a strategy of thrombus removal, resulting in a patent venous system with normal valve function, prevention of postthrombotic morbidity, and reduction in recurrence. Operative and catheter-based techniques can be tailored to the patient.

Value of Postoperative Compression After Surgical Treatment of Varicose Veins

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