Filter Or No Filter During Percutaneous Endovenous Intervention For Deep Venous Thrombosis?
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Percutaneous endovenous intervention (PEVI) has emerged as a very effective approach in the treatment of lower extremity deep venous thrombosis (DVT). Instrumentation of large amounts of thrombus can potentially lead to iatrogenic pulmonary embolism (PE). To reduce this complication, prophylactic placement of a retrievable inferior vena cava filter has been proposed (1). There are however diametrically opposed opinions about the necessity of this approach. The proponents of prophylactic filter placement cite a potential prevalence of iatrogenic PE which can be as high as 54.1% (1). On the other side of the spectrum are the opponents of this approach which cite a 0% frequency rate (2). In the TORPEDO trial all patients undergoing PEVI received a filter. Thrombus entrapment by the IVC filter immediately post-PEVI was found in 11% of the 91 patients (3). Until recently, there were no randomized trials specifically addressing this issue.

The Filter Implantation to Lower ThromboEmbolic Risk during Percutaneous Endovenous Intervention (FILTER-PEVI) trial, randomized 141 patient undergoing PEVI for lower extremity DVT to receive a filter or no filter (4). There were 70 patients in the Filter Group (=FG) and 71 in the Control Group (=CG). The anticoagulation regimen between the 2 groups was similar. For most patients, enoxaparin was given at 1 mg/kg twice daily administered subcutaneously. Patients with renal insufficiency (creatinine clearance <30 ml/min) or concomitant massive PE, received unfractionated heparin at 80 IU/kg intravenously as loading dose, followed by 18 IU/kg/h. Adjustments were subsequently made to keep the activated partial thromboplastin time between 1.5 and 2 times baseline. Warfarin and aspirin were initiated at admission for all patients.

All patients underwent PEVI at 1–38 h (mean ± standard deviation, 24 ± 4 h) after presentation. For patients with signs and symptoms suggestive of PE at admission or at follow-up, objective testing for PE was performed with a CT angiogram (CTA) or a ventilation–perfusion (V/Q) scan. At admission, 20 patients of the FG and 21 patients of the CG underwent testing for PE (FG: 15 CTA, 5 V/Q; CG:14 CTA, 7 V/Q). PE was diagnosed in 16 patients (23%) in the FG and 14 patients (20%) in the CG.

All interventions were performed through the popliteal vein. The filters implanted consisted of 8 Celect, 14 Tulip, 42 Optease, and 6 Eclipse filters. In most patients, after filter placement, the patients were placed in the prone position, and access to the popliteal vein was obtained by a micropuncture needle with ultrasound guidance. Subsequently, a 6–8F sheath was placed through which venography and intervention were performed. In 18 patients, the filter was placed using the same popliteal access site, thereby eliminating the need for repositioning the patient. The objective of PEVI was to restore streamline flow from the popliteal vein into the unobstructed portion of inferior vena cava and to lyse or extract as much thrombus as possible.

Initial venography would dictate the approach to PEVI. For acute DVT with otherwise preserved venous architecture, thrombectomy was performed with the Trellis device or the AngioJet DVXcatheter which were followed with manual aspiration of the residual clot with a guide
catheter. For severely distorted venous anatomy with residual diameter stenosis of >80% and calcification, which we called venosclerotic disease, a venous conduit was reconstructed by using balloon venoplasty and stents.

The primary end point of this study was development of iatrogenic PE by objective testing in patients who developed suggestive signs and symptoms during the first 24 h after PEVI. The secondary end points were recurrent venous thromboembolism and filter integrity at mean ± SD follow-up of 15 ± 2 months. Fourteen patients of the FG and 22 patients of the CG underwent objective testing for PE, in whom new PE was detected in 1 and 8, respectively (1.4% vs. 11.3% of the total population, P = 0.048). CTA and V/Q scans were performed in 11 and 3 patients of the FG and 17 and 5 patients of the CG, respectively. Filter removal was done in 24 patients (34%) at a mean ± SD time of 180 ± 42 days after implantation. No complication developed as a result of filter removal or its retention at follow-up. There were 2 patients in each group who developed DVT at follow up. Macroscopic thrombi were identified in 10 (42%) of 24 of the filters removed. All patients in the FG underwent venography inside the filter immediately after the procedure. Venographically identifiable thrombus was noted in 6 (8.6%) of 70 patients. This finding was observed only in patients with predictors of iatrogenic PE. Specifically, it was not observed in chronically venosclerotic segments wherein the lesser thrombus load and narrowed vessel diameter and uneven endoluminal surface (with consequent higher resistance to free flow of debris) may have reduced the embolization risk. Additionally, it was not observed with any patient receiving an infusion catheter without further instrumentation. Predictors of iatrogenic PE were found to be PE at admission; involvement of two or more adjacent venous segments with acute thrombus; inflammatory form of DVT (severe erythema, edema, pain, and induration); and vein diameter of >7 mm with preserved architecture. Profound hypotension and bradycardia requiring resuscitory measures occurred in 3 patients of the CG during the procedure as a result of PE. These were transient events, and the patients recovered without any sequela.

In conclusion, placement of an IVC filter lead to an eightfold reduction in the development of symptomatic iatrogenic PE without mortality benefit. Development of hemodynamic instability requiring resuscitory measures developed in 4.2% of patients with predictors of PE not receiving a filter. A selective approach may thus be exercised in the implantation of IVC filters during PEVI.

References:

