

Outcomes of Stent Placement for Chronic Occlusion of a Filter-bearing Inferior Vena Cava in Patients with Severe Post-thrombotic Syndrome

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WHAT THIS PAPER ADDS

Occlusion of the inferior vena cava is one of the most serious complications of filter implantation. However, to date, few effective methods have been reported for management of chronic occlusion of a filter-bearing inferior vena cava. This study adds to existing information regarding the technical aspects and clinical effects of endovascular stenting in patients with severe post-thrombotic syndrome with chronic occlusion of a filter-bearing inferior vena cava.

Objective: To evaluate the technical aspects and short-term clinical results of stent placement for chronic occlusion of a filter-bearing inferior vena cava (IVC) in patients with severe post-thrombotic syndrome (PTS).

Methods: A retrospective analysis of 24 patients with severe PTS associated with occlusion of a filter-bearing IVC treated by stent placement was conducted at a single institution from January 2010 to December 2014. Patient-reported quality of life and limb Villalta scores were evaluated before and after treatment by questionnaire and clinical examination, respectively. Stent patency was evaluated by duplex Doppler ultrasound, venography, or venous computed tomographic (CT) angiography.

Results: All patients tolerated the procedure well. Nineteen patients with filter-bearing IVC and bilateral iliofemoral occlusions were treated with “double-barrel” stents, two were treated with fenestrated stents, and the remaining three patients were treated by unilateral stent placement of the iliofemoral vein and filter-bearing IVC. Quality of life and Villalta scores were significantly improved ($p < .001$) after the procedure. The 1-year, and 2-year cumulative primary and secondary stent patency rates were 67% and 91%, and 45% and 77%, respectively. During a median follow-up period of 27 months (range 3–55 months), the cumulative rates of complete relief of pain (visual analog scale >5) and swelling (grade 3) were 77% (13 of 17 limbs at risk) and 75% (24 of 32 limbs at risk), respectively. There were 23 limbs with active ulcers and the cumulative rate of ulcer healing at 2 years was 73%. There were no cases of clinical bleeding, symptomatic pulmonary embolism, or mortality.

Conclusions: Recanalization of an occluded IVC filter and stent placement through the filter is a feasible and safe method for management of PTS associated with filter-bearing IVC occlusions, with acceptable short-term stent patency and clinical results. However, close follow-up after procedure is necessary because of a relatively high re-occlusion rate.

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INTRODUCTION

Inferior vena cava (IVC) filters are commonly used for prevention of pulmonary embolism (PE) in patients with acute deep venous thrombosis (DVT) who cannot be treated with anticoagulation because of an unacceptable risk of bleeding.^{1,2} However, occlusion of a filter-bearing IVC can

occur because of primary thrombosis of the filters or physical capture of large emboli.^{3,4} The occlusion of filter-bearing IVC can result in severe limb pain, severe lower extremity swelling, venous claudication, and even refractory venous ulceration. Open venous femorocaval bypass with expanded polytetrafluoroethylene (ePTFE) grafts, previously the only option for symptomatic IVC occlusion, is challenging, has a relatively low graft patency, and is only considered in patients with unsuccessful or failed endovenous treatment.⁵ No reports have been published of the use of a venous bypass for a filter-bearing IVC occlusion. Although stent placement of chronic occlusion of a

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iliofemoral vein and IVC is a minimally invasive intervention that has proven effective and safe over the last decade,^{6,7} stent placement for chronic occlusion of a filter-bearing IVC has been thoroughly described only by Neglén et al.,⁸ in addition to a few case reports.^{9–12} The safety and feasibility of stent placement for chronic occlusion of a filter-bearing IVC has not been fully ascertained. In 2010, endovascular treatment for chronic occlusion of a filter-bearing IVC was implemented at the study institution, and this alternative approach has gradually become the single treatment of choice in patients with failed conservative therapy. This study reports experience with stent placement to manage chronic occlusion of a filter-bearing IVC in patients with severe symptomatic post-thrombotic syndrome (PTS), including clinical characteristics, technical details, clinical effects, short-term stent patency, and complications.

METHODS

Patient selection

This retrospective study included consecutive patients who underwent attempted stent placement for chronic occlusion of a filter-bearing IVC at a single institution from January 2010 to December 2014. Duplex ultrasound and venous computed tomographic (CT) angiography were performed in PTS patients with previous IVC filter implantation to identify potential occlusion of the filter-bearing IVC (Fig. 1). Venography and duplex ultrasound were also conducted to map the patency of the femoral vein and popliteal vein to determine the puncture sites. All limbs were classified using the CEAP (clinical, etiological, anatomic, pathophysiological) classification based on duplex ultrasound scanning and

clinical symptoms.¹³ Patients with mild or moderate PTS (Villalta score <15) were treated with conservative therapy such as compression stockings or venoactive drugs,¹⁴ and only in those patients with severe PTS (Villalta score \geq 15) were attempts made at recanalization and stent placement. This indication was also applied to patients with in-stent re-occlusions. All patients provided written informed consent, and approval was obtained from the hospital ethics committee.

Stent placement procedure

An ipsilateral femoral vein or common femoral vein was selected as the first puncture site if it was not occluded; otherwise, a popliteal vein could be used as the puncture site. After vein puncture was successfully achieved, heparin sodium (80 IU/kg) was administered to achieve an activated clotting time of 250–300 s in all patients. Details of the balloon angioplasty and stent placement procedure have been described in detail before.^{6–8} Briefly, a straight stiff 0.035-inch hydrophilic guide wire (Terumo Medical Corporation, Somerset, NJ, USA) was directed through the occlusion of the iliofemoral vein under the guidance of a matched multipurpose catheter or angled-tip catheter (MP A1; Cordis Corporation, Miami Lakes, FL, USA; TrailBlazer; ev3 Endovascular, Inc., Plymouth, MN, USA). Then, the guide wire was used to track along the IVC centrally until the occlusion of the filter-bearing IVC had been crossed. The progress of recanalization by guide wire and catheter was checked by intermittent oblique images and venography to ensure that the guide wire followed the ilio caval vein anatomically through the pelvis (Fig. 2A–D).

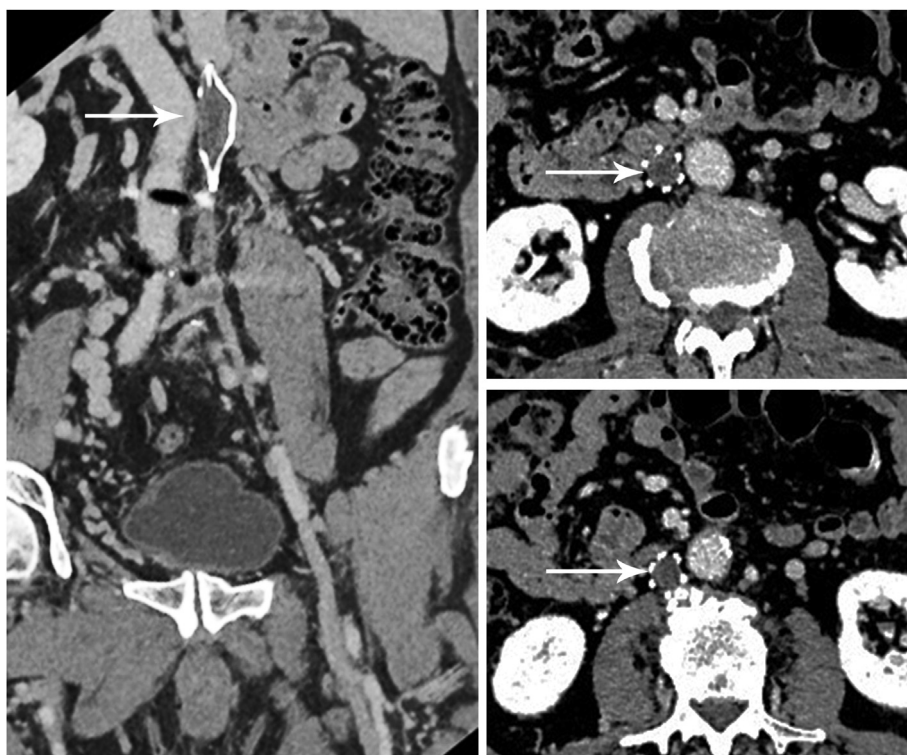


Figure 1. Venous CT angiography showing the chronically occluded filter-bearing IVC (arrow).

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