

A Large Thrombus Trapped by Inferior Vena Cava Filter: Treatment with Another Filter Placement and Aspiration Thrombectomy

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Abstract : In the patients suffering from extensive deep vein thrombosis (DVT), the placement of inferior vena cava (IVC) filter in conjunction with anticoagulants has been used to prevent pulmonary embolisms. However, in the patients who anticoagulant is contraindicated or complicated, the use of IVC filter without concurrent anticoagulation is possible. In this situation, thrombi trapped in the IVC filter may occur significant clinical problems. We report one case of IVC filter thrombosis, who was successfully treated by an aspiration thrombectomy following the placing with another filter at the proximal to the previous filter.

Key Words : Inferior vena cava filter, Thrombectomy, Thrombosis

Introduction

Inferior vena cava (IVC) filter offered safe and effective means of preventing pulmonary emboli and further reduced the complications deep vein thrombosis (DVT) comparing with a classic technique such as caval interruption[1]. Even with the goal for preventing thrombus propagation, the thrombosis of filter insertion site, DVT, and vena caval occlusion have been potential complications of the filter insertion[1]. All currently available filters were considered to have similar caval thrombosis rates, but the rates have a wide range from one to twenty four percent in reported literatures [2,3]. Treatments for caval thrombosis include early infusion of

local thrombolytic agent, early thrombectomy, and long-term anticoagulation. However, if a patient has no clinical symptoms or has persisting contraindication to anticoagulation, he (or she) has been followed up without any specific treatment. Recent advances in interventional radiology give us another solution by aspiration thrombectomy under the protection of thrombus propagation by insertion another temporal filter. Herein, we report on a case of massively thrombosed filter-bearing IVC with pulmonary embolism, which was successfully treated with another filter replacement and aspiration thrombectomy.

Case report

A 77-year-old man presented dyspnea. His medical history included cerebral infarction, congestive heart failure, and atrial fibrillation.

Three years ago, he developed a swelling of the lower extremities. Doppler sonography and computed tomography (CT) confirmed the presence of DVT in the lower extremities (Fig. 1A&B). A Greenfield filter (Medi-Tech, Watertown, MA, USA) was inserted for the prevention of pulmonary embolism and anticoagulant therapy was done (Fig. 1C).

Three months after the anticoagulation therapy, he developed nausea. He was stopped medication and the symptom no more disgusted him. However he presented dyspnea two months before the next visit to hospital. In contrast-enhanced CT scan of the chest performed, he was found multiple thrombotic filling defects in the main pulmonary artery and a interlobar artery (Fig. 2). Venacavogram for the evaluation of IVC filter revealed a massive captured thrombus in the filter with the cranial extension beyond the level of the filter (Fig. 3A). Aspiration thrombectomy was performed with Desilet-Hoffman sheath (COOK, Bloomington, IN, USA) under the placement of another IVC filter (TrapEase, Cordis, USA) deployed cranial to the previous Greenfield filter (Fig. 3B). The reason of placing another filter based on the fact that the thrombus has already extended cranial to the original IVC filter. Repeated venacavograms after procedure showed the successful removal of the thrombus from the original IVC filter and restored IVC flow (Fig. 3C).

A CT scan taken 6 months later revealed the complete resolution of thrombus in the pulmonary artery (Fig. 4).

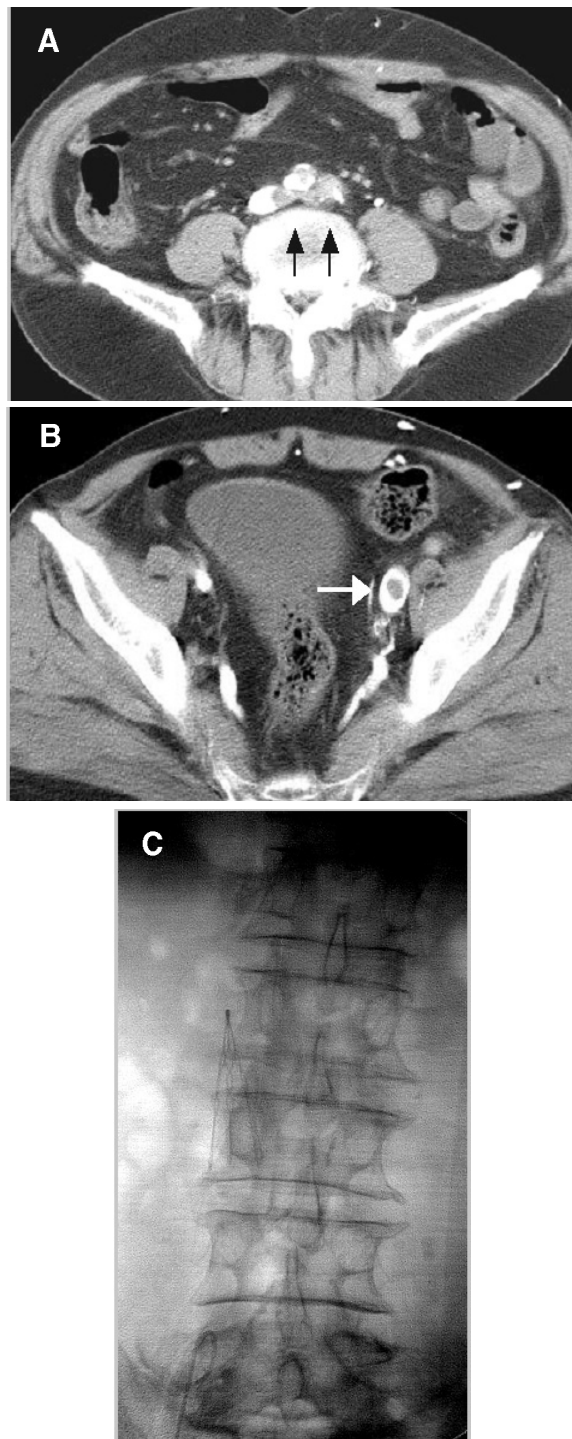


Fig. 1. Contrast-enhanced CT scans in the lower abdomen show thrombotic filling defects (arrows) in the iliofemoral vein (A&B). A Greenfield IVC filter was deployed at the infrarenal level via a right internal jugular approach (C).

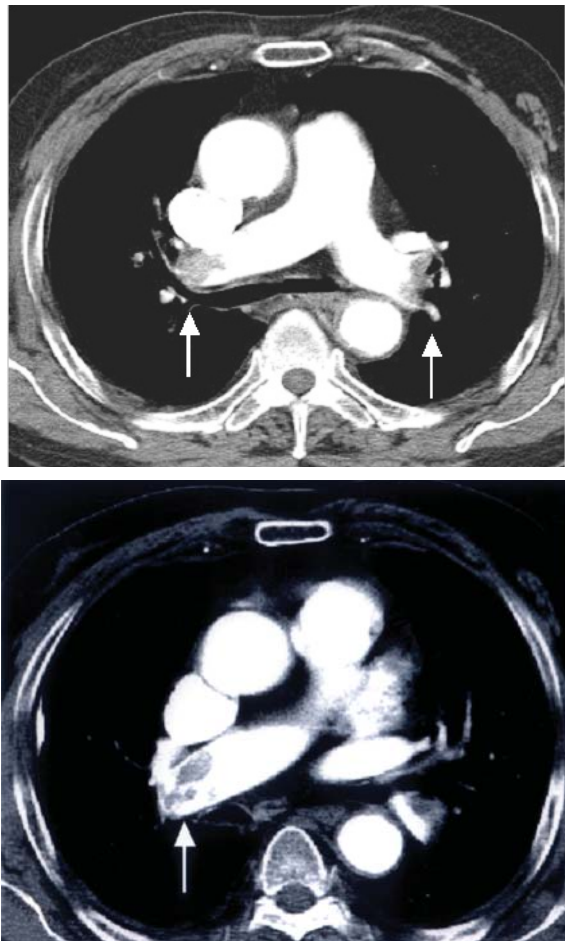


Fig. 2. Contrast-enhanced CT scans show thrombi in the main pulmonary artery and the interlobar artery (arrows).

incidence of IVC thrombosis, though uncommon after IVC filter insertion, will increase up to 15.3% if concurrent anticoagulation is not administered[6]. The development of IVC filter thrombosis markedly increased the incidence of pulmonary embolism as high as 33%[7].

There are many treatment options available for IVC and IVC filter thrombosis, including systemic anticoagulation, systemic thrombolytic therapy, surgical thrombectomy, catheter directed thrombolysis, and endovascular mechanical thrombectomy [8].

In this case, we performed an aspiration thrombectomy with a Desilet–Hoffman sheath. However, distal embolization during aspiration thrombectomy was one of our major concerns, as the shower of emboli might precipitate into a fatal pulmonary embolus during the procedure. Another IVC filter was deployed to prevent the thrombectomy–related pulmonary embolism, in which the thrombus extended cranial to the original filter before thrombectomy.

We were able to achieve technical success in recanalization of the thrombosed IVC filter and demonstrated clinical improvement of symptoms.

Discussion

Since late 1960s, IVC filters have been available for the prevention of pulmonary embolism in patients with DVT [4]. A recent clinical trial has documented the effectiveness of IVC filters in reducing initial symptomatic or asymptomatic pulmonary embolism without major complications [5]. However, repeated trapping of emboli by the IVC filter might cause thrombosis around the filter and IVC in about 5% of patients with Greenfield filters [5,6]. The

Summery

IVC thrombosis is a complication of IVC filter placement, occurring at 1–24% of treated patients, but this will increase if concurrent anticoagulation is not administered. In patients with contraindication to anticoagulant or thrombolytic therapy, mechanical thrombectomy had been shown to be a potentially safe and effective mean to reestablish venous patency and to reduce the thrombus load. Endovascular therapy was demonstrated short-term

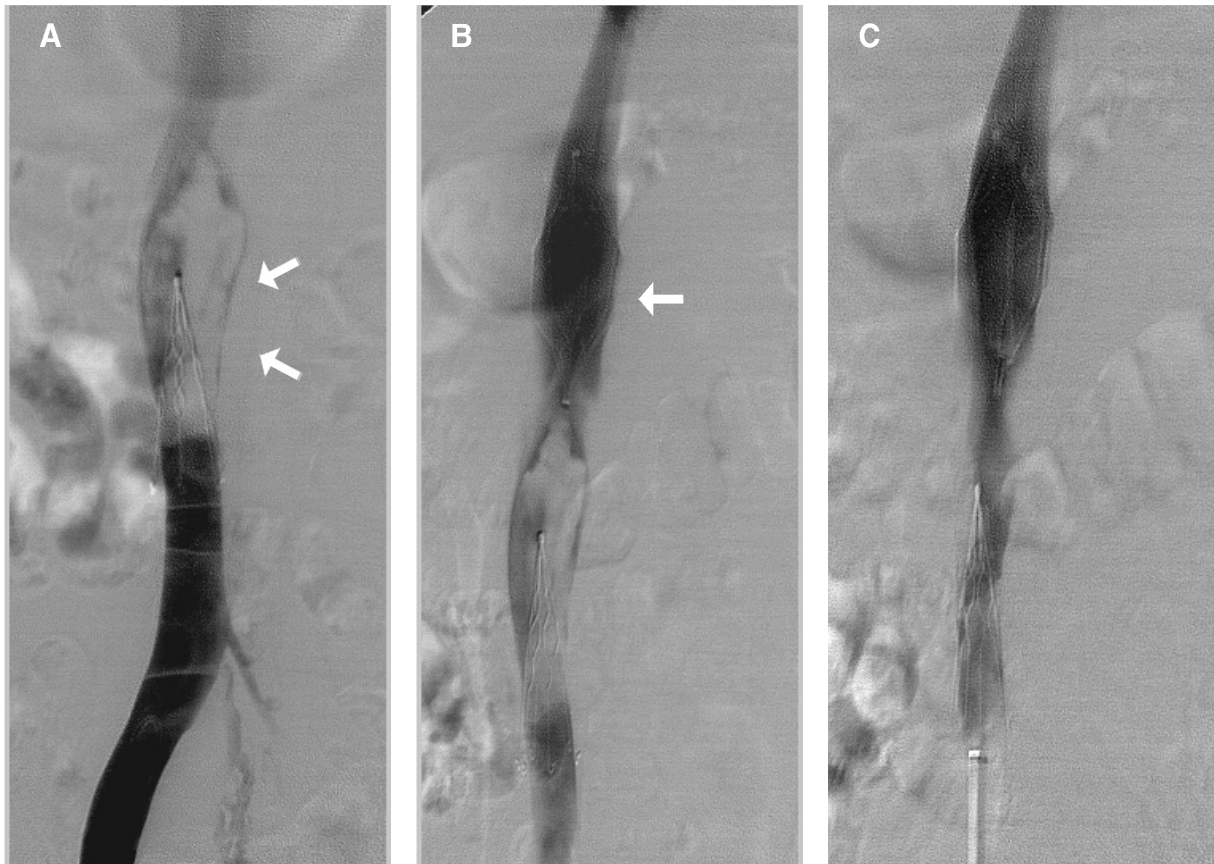


Fig. 3. The findings of digital subtraction venography. (A) It is demonstrated an extensive thrombosis of the Greenfield filter-bearing IVC (arrows) with cephalic extension to the level of the renal vein orifice. (B) Before aspiration thrombectomy, another IVC filter (arrow) was inserted at a suprarenal position via a right jugular approach to prevent pulmonary embolism. (C) The thrombus was cleared after aspiration thrombectomy with 8Fr Desilet-Hoffman sheath.

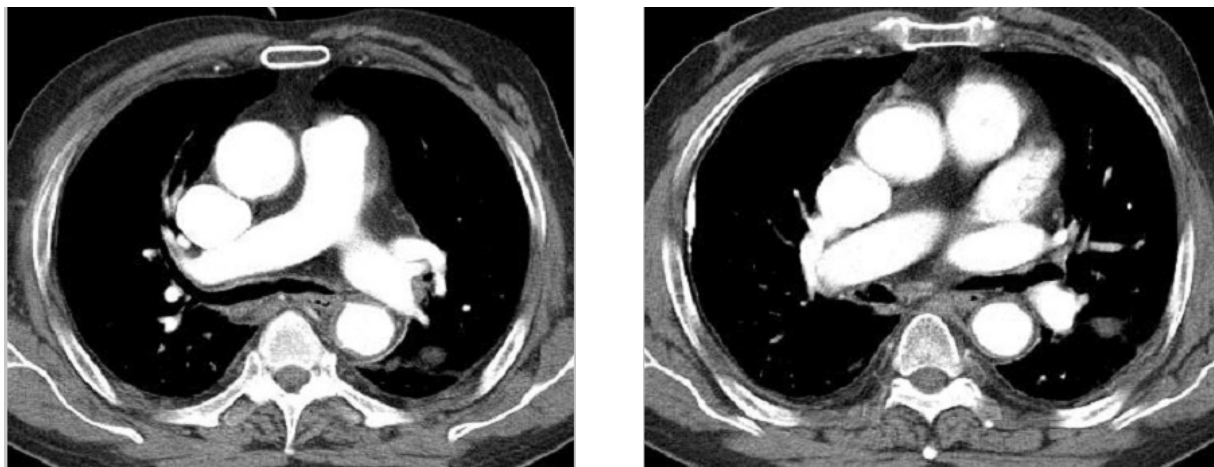


Fig. 4. CT scans of the chest show the complete resolution of thrombus in the pulmonary artery.

effectiveness in treating of the patients with iliofemoral deep vein thrombosis and IVC thrombosis. To prevent the recurrence of venous thrombus, anticoagulant therapy must be started as soon as clinical condition allows.

We were able to successfully treatment of massive filter-bearing thrombus with pulmonary embolism by aspiration thrombectomy under the protection of propagation of thrombus by insertion another filter.

References

1. Joels CJ, Sing RF, Todd HS. Complications of inferior vena cava filters. *American surgeon* 2003;**69**:654-9.
2. Millward SF, Peterson RA, Moher D, Lewandowski BJ, Burbridge BE, Aquino J, *et al.* LGM (vena Tech) vena caval filter: experience at a single institution. *J Vasc Interv Radiol* 1994;**5**:351-6.
3. Greenfield LJ, Proctor MC, Cho KJ, Cutler BS, Ferris EJ, McFarland D, *et al.* Extended evaluation of the titanium Greenfield vena cava filter. *J Vasc Surg* 1994;**20**:458-65.
4. Greenfield LJ, Michna BA. Twelve-year clinical experience with the Greenfield vena cava filter. *Surgery* 1988;**104**:706-12.
5. Decousus H, Leizoroviz A, Parent F, Page Y, Tardy B, Girard P, *et al.* A clinical trial of vena caval filters in the prevention of pulmonary embolism in patients with proximal deep vein thrombosis. *N Engl J Med* 1998;**338**:409-15.
6. Becker DM, Philbrick JT, Selby JB. Inferior vena cava filters: indications, safety, and effectiveness. *Arch Intern Med* 1992;**152**:1985-94.
7. Tardy B, Mismetti P, Page Y, Decousus H, Costa AD, Zeni F, *et al.* Symptomatic inferior vena cava filter thrombosis: clinical study of 30 consecutive cases. *Eur Respir J* 1996;**9**:2012-6.
8. Poon WL, Luk SH, Yam KY, Lee AC. Mechanical thrombectomy in inferior vena cava thrombosis after caval filter placement: a report of three cases. *Cardiovasc Intervent Radiol* 2002;**25**:440-3.