CASE REPORT

Intentional placement of vena cava filters in both iliac veins: case report and literature review

Implante intencional de filtros de veia cava em ambas as veias ilíacas comuns: relato de caso e revisão da literatura

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Abstract

Vena cava filters are used to prevent the passage of emboli from the lower limbs to the pulmonary arteries and normally are placed immediately below the renal veins. In some cases however there are unusual technical difficulties that must be overcome to properly treat some patients. We report a case of a patient in whose common iliac veins vena cava filters were deployed, due to the lower implantation of renal veins and a short inferior vena cava.

Keywords: Venous thrombosis; vena cava inferior; vena cava filters.

Introduction

In the present report, we describe vena cava filter placement in both common iliac veins, because of low insertion in the renal veins in a patient with recurrent venous thrombosis resulting from phospholipid antibody syndrome (PPAS) and failure of anticoagulation therapy. This technical variant may be a safe and effective option in cases where access or filter placement in the inferior vena cava is deemed hazardous or impossible.

Case report

In 2000, a 53-year-old female patient presented with left leg edema, associated with pain in the left calf and ankle. Duplex scan of the lower limbs showed femoropopliteal deep venous thrombosis (DVT). She was admitted for anticoagulation therapy and was discharged 20 days later using warfarin (Marevan®). The medication was continuously administered, and routine coagulation exams were requested every three months. It was difficult to achieve an adequate International Normalized Ratio (INR). Despite anticoagulation therapy, she had nine episodes of DVT through 2008 and suspected pulmonary embolism. The diagnosis of antiphospholipid syndrome (APS) (IgG 31.2 and IgM 28.2) was made after a thorough investigation.

In July 2009, the patient was seen at the Rheumatology outpatient clinic of Hospital Universitário Antônio Pedro, with an INR of 6.5 and pain in the left lower limb, associated with paresis, cyanosis and limb hypothermia. She was admitted...
for treatment and further investigation. Duplex scan of the lower limbs showed acute partial thrombosis of the right femoral vein and of the deep femoral veins bilaterally.

The patient was referred to the Vascular Surgery Service and placement of inferior vena cava filters was indicated, due to failure of anticoagulation therapy. Warfarin was discontinued. Enoxaparin (Clexane®) was started five days before filter placement and suspended 12 hours before the procedure in order to avoid hemorrhagic complications.

A Günter-Tulip™ conical retrievable filter measuring 30 mm in diameter with an 8.5Fr introduction sheath was used. The filter is made of Conichrome®, a paramagnetic alloy compatible with magnetic resonance imaging (Figure 1).

It was decided to place the filter through a transjugular approach, due to the diagnosis of right femoral DVT confirmed by Doppler ultrasound in July 2009. This access seemed to be safe because it did not require the passage of guidewire and catheters through any vein with thrombi that could be dislodged. Intraoperative venography showed a short inferior vena cava, with insertion of renal veins near the bifurcation of common iliac veins, which precluded the placement of the infrarenal filter. We decided to place one filter in each common iliac vein: in the right iliac vein it was placed via transjugular approach, for the right side presented more symptoms and more evident thrombus at Doppler ultrasound. In the left iliac vein, the insertion was via transfemoral approach to avoid entanglement of guidewires and catheters with the implanted filter and consequent dislodgement, besides the unfavorable angulation of this vessel in relation to the inferior vena cava that makes transjugular insertion more difficult. The insertion was made by Seldinger technique via transfemoral access (Figures 2 and 3).
The patient resumed anticoagulation with warfarin and stayed in the hospital for two days. She has been followed as an outpatient and remains asymptomatic after six months, without complications related to the procedure. A Duplex ultrasound performed in December 2009 showed patent iliac veins and vena cava with no sign of thrombosis.

Discussion

Vena cava filters basically impede the passage of larger emboli from the lower limbs without totally occluding the vein, thus preventing pulmonary embolism. The infrarenal portion of the inferior vena cava is the ideal location for filter deployment because, despite the fact that it is implanted to prevent preventing embolic events, it is still a foreign body inside the vessel; therefore, it exerts thrombogenic stimuli that may lead to thrombosis at and distal to the site of deployment. Therefore, filter placement in the suprarenal portion implies the risk of vena cava thrombosis with involvement of renal veins and all possible clinical consequences. Nowadays, vena cava filters have well-defined indications, such as failure of anticoagulant therapy, characterized by recurrent thrombosis during anticoagulant use, or contraindications to the use of anticoagulants.

Filters are divided into three categories: permanent, temporary and retrievable or optional.

Regarding anticoagulant therapy, 10 to 15% of the patients have contraindications or are not responsive to it, developing reembolization during treatment. Zifman et al. indicated vena cava filter placement in ten patients out of a group of 110 individuals with APS, who continued to present thrombosis in spite of adequate anticoagulant therapy, with INR between 2 and 3. In that study, the authors concluded that the use of vena cava filters for pulmonary embolism prophylaxis is efficient. That is the case for the patient described in the present report, for she continued to develop recurrent DVT while on full anticoagulant therapy, with a high risk of pulmonary embolism.

The retrievable conical paramagnetic filter was chosen because it is compatible with magnetic resonance imaging, has little metal in its composition and less contact with the vein wall when compared with polyedric and Bird’s nest filters. It reduces the thrombogenic effects and causes few endothelial reactions. Despite the fact that it was in the retrievable or optional category, the vena cava filter was left permanently in this case, because the thrombogenic stimuli exerted by the APS itself could not be removed.

Anticoagulation was maintained after the procedure as an attempt to minimize recurrence or aggravation of DVT, because the filter itself is a thrombogenic agent, and the patient was prone to develop thrombi in different sites because of her underlying disease. No studies have demonstrated the efficacy of chronic anticoagulation in patients with inferior vena cava filter, and this conduct should be evaluated regarding risks and benefits for each patient.

No case reports are available in literature addressing the deployment of bilateral iliac vein filters because of insertion in the renal veins close to the common iliac vein junctions, with a resultant short infrarenal vena cava. The most frequent reports relate deployment of bilateral iliac vein filters to the presence of megacava. The low insertion of the renal veins made it impossible to deploy the filter in the infrarenal portion of the inferior vena cava, which was quite short in this patient. We chose bilateral iliac deployment rather than the suprarenal due to the high risk of vena cava thrombosis with involvement of renal veins.

It is possible to place the vena cava filter in the suprarenal segment of the inferior vena cava, but some studies report cases of renal veins’ thrombosis associated with renal failure in patients with suprarenal filter placement, relating Virchow’s triad (venous stasis, endothelial lesion and hypercoagulability) to the genesis of this process. Suprarenal filter placement was still an option, but in this case – with a history of nine thrombotic events while on anticoagulant therapy – our team found it prudent to avoid the involvement of renal veins due to a possible thrombosis of the vena cava, thus choosing to place the filters in the iliac veins. This therapeutic option did not decrease the risk of thrombosis caused by the filter, but in case it happened, the damage would be less.

The patient, after nine months of follow-up, remains asymptomatic. Such result suggests that the placement of filters in common iliac veins may be a safe and effective option in cases of short infrarenal vena cava and other situations in which deployment of the filter in the inferior vena cava is contraindicated.

Conclusion

It is possible to conclude that the vena cava filter is a very useful therapeutic device when well indicated, especially in cases in which anticoagulant therapy is ineffective, such as the present case. In addition, it is concluded that deployment in the common iliac veins is a safe and effective alternative in selected cases, in which the deployment in the inferior vena cava is not possible, due to its short extension.
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References