

IVC Filter Thrombosis & Management: A Case Presentation

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Abstract

IVC filters have been widely used in selective patients with deep venous thrombosis to prevent pulmonary embolism. IVC thrombosis is the most common complication of IVC filters which carries higher morbidity and mortality and poses as a diagnostic challenge. With increasing incidence of IVC thrombosis, clinicians should be well versed with diagnostic tools and management options available for its diagnosis and management. In addition of systemic anticoagulation, endovascular techniques are important adjuvant therapies in management of IVC thrombosis. We present a case report of IVC filter thrombosis managed successfully with endovascular intervention.

Keywords: IVC filters, Pulmonary embolism, IVC thrombosis

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Abbreviations: IVC- Inferior Vena Cava; IVCFs- Inferior Vena Cava Filters; DVT- Deep Vein Thrombosis; VTE- Venous Thromboembolus; SIR- Society of Interventional Radiology; CDT- Catheter Directed Thrombolysis; PT- Prothrombin Time; INR- International Normalized Ratio; TLC- Total Leucocyte Count; ESR- Erythrocyte Sedimentation Rate.

Introduction

IVC thrombosis is commonly an extended clinical and pathological condition associated with DVT (deep vein thrombosis), with its own implications. It remain under diagnosed and less recognized and presents to the clinician as diagnostic and therapeutic challenge as no clear cut guidelines are present for its management. Causes of IVC thrombosis include congenital malformations of the IVC to acquired causes, where indwelling IVC filters have been implicated as a leading cause [1]. The use of Inferior vena cava filters (IVCFs) has been an important alternative treatment of deep vein thrombosis (DVT) when pharmacologic anticoagulation is contraindicated or ineffective, however, they are associated with long-term risks including increased risk of recurrent DVT and IVC thrombosis [2]. IVC filter thrombosis is reported in 2.7% of patients who have undergone IVC filter implantation post DVT and pulmonary embolism [3]. Current underestimation of IVC thrombosis following filter insertion is suggested by the PREPIC study, which quotes rates from 13% at 8 years' follow-up, with 30% demonstrated in longer-term studies [4]. Currently the role of inferior vena cava (IVC) filters in the management of venous thrombosis remains

controversial and in constant development due to the risk of significant complications and unclear long-term advantages [5]. IVC thrombosis treatment is determined by aetiology, timescale (acute vs chronic) and patient-specific factors. Similar to other types of venous thromboembolus (VTE), immediate treatment strategies for IVC thrombosis revolve around minimising the risk of pulmonary embolisation and reducing the local sequelae of lower limb swelling and pain. Various medical, endovascular and surgical options are available for management of IVC thrombosis [4]. The Society of Interventional Radiology (SIR) recommends CDT (catheter directed thrombolysis) for acute or subacute IVC thrombosis in addition to systemic anticoagulation [5].

Here we present a case of IVC FILTER THROMBOSIS along with management.

Case Presentation

A 27 year old male working at a BPO presented with complain of swelling bilateral lower limb, scrotal swelling, abdominal distention, pain while passing urine. Patient is a known case of deep vein thrombosis post IVC filter implantation on tab acitrom (acenocoumarol) for last 3 years. Patient had been managing PT and INR of 2.5. Since repeated testing for PT and INR had been cumbersome for the patient, he had stopped medication for last one week, following which he started developing bilateral lower leg swelling, scrotal swelling, abdominal distention and pain while passing urine. As patient is a known case of DVT and

had stopped medication, venous Doppler of bilateral lower limb was done which was suggestive of bilateral lower limb DVT. Patient was obese and his IVC and renal veins could not be seen properly. His CT peripheral venography was done which revealed hypodense filling defect with lack of contrast opacification in lower inferior vena cava extending approximately 3 cm distal to the level of IVC filter. Bilateral common and external iliac, common and superficial femoral and popliteal veins also showed hypodense filling defects with complete lack of contrast opacification (**Figure 1**). There was extension of thrombus into bilateral great saphenous veins. There was diffuse subcutaneous oedema in both lower limbs. His blood work up was suggestive of raised D-Dimer, normal PT/INR, raised ESR, TLC. The findings were discussed with the family and the patient and option of catheter directed thrombolysis and systemic oral anticoagulation was discussed.



Figure 1 Coronal image of CECT venography showing hypodense non-enhancing thrombus in IVC with filter *in situ*.

Management

After explaining the procedure, patient opted for catheter directed thrombolysis. Patient and his relatives were explained about the different thrombolytic drugs available like streptokinase, urokinase and alteplase. Under ultrasound guidance the right popliteal vein was punctured using seldinger technique and 7 Fr sheath was cannulated. Check venography was done which showed thrombus in common and external iliac, common and superficial femoral vein and popliteal veins. There was lack of contrast opacification in inferior vena cava and IVC filter extending up till upper border of IVC filter. There was also lack of contrast opacification on left common external iliac vein and common femoral vein. The findings were suggestive of IVC filter thrombosis with thrombus in inferior vena cava, common iliac, external iliac, femoral and popliteal veins. The findings were again discussed with the family and risk of pulmonary embolism despite IVC filter during thrombolysis due to presence of thrombus in IVC filter were explained.

A 135 centimetre perfusion catheter Craig McNamara was

then passed over the wire under fluoroscopy guidance, the tip of the catheter was passed beyond the IVC filter. Actilyse (ALTEPLASE) 50 mg/50 ml was given at the rate of 1.5 ml /hr through the perfusion catheter. The infusion was continued for 12 hours after which repeat check venography was done which showed resolution of the thrombus in IVC filter. The infusion was continued for 24 hours. During this haemoglobin, PT/INR, platelet count were monitored.

The main complication of catheter directed thrombolysis is bleeding which usually occurs at puncture site, intracranial bleed can occur which is rare. No complication was observed in this case.

After 48 hours of slow infusion of alteplase, check venography was done which revealed complete resolution of thrombus in IVC filter, IVC, right common and external iliac, right common and superficial femoral and popliteal veins as well as Left common and external iliac and proximal femoral vein.

Later peripheral venous Doppler of left lower limb was done which revealed thrombosis with mild peripheral recanalization of distal saphenous, popliteal and upper calf veins. Patient was further managed with low molecular weight heparin.

Discussion

IVC thrombosis is potentially serious complication. Depending on size of clot thrombus can remain confined to IVC or extend to lower limb. Patient with IVC thrombosis can be asymptomatic or present with lower limb oedema, claudication, painful micturition or stasis ulcer [6]. Patient may at times present with recurrent pulmonary embolism or renal failure secondary to thrombus migration into renal vessels [7]. IVC filter implantation after DVT and pulmonary embolism is very common after which the patient is on long term anticoagulation, however in case if the patient misses or quits taking drug there are chances of recurrence of DVT. IVC filter related thrombosis is one of the leading cause of IVC thrombosis. Rate of IVC thrombosis varies from 1.6% to 33% with permanent filters [8-10]. In the PREPIC study rate of IVC filter thrombosis after 8 year follow up was 13% [8].

Pharmacologic anticoagulation remains the first line of treatment for IVC thrombosis, but anticoagulation has little effect on regression of clot in IVC thrombosis and thus less effective in preventing pulmonary embolism. Catheter directed therapy (CDT) enables localised delivery of thrombolytic agents thus facilitating restoration of venous patency without increased risk of systemic bleeding. Catheter directed thrombolysis is a minimally invasive treatment that is used along with anticoagulation. It reduces the risk of post thrombotic syndrome and decreases thrombus burden, it also protects against valvular damage. Under ultrasound guidance popliteal vein is cannulated with 7 Fr Sheath and a catheter is advanced under fluoroscopy guidance to the site of thrombus through which a slow prolong infusion of thrombolytic drug is given. CDT has shown 80-85% clinical efficacy in restoring venous patency. Vedantham et al in their study addressing endovascular technique for IVC thrombosis reported the technique to be safe and effective in the short term with a success rate that was comparable to that reported for iliofemoral DVT therapy [10].

Catheter directed thrombolysis should be performed by skill practitioner who has training in intervention techniques and ultrasound. Common sites of assess includes popliteal vein, femoral vein and occasionally jugular vein. Under fluoroscopy guidance the entire thrombus is targeted with multiside hole catheter like perfusion catheter Craig McNamara through which slow continuous infusion of actylise is given under close monitoring [2].

Conclusion

The use of alteplase through McNamara catheter (catheter directed thrombolysis) is an effective minimally invasive percutaneous pharmacological solution allowing treatment of IVC filter thrombosis, however risk of bleeding remains but it should be considered at the earliest.

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