



# Acute Sinister in Stent Thrombosis in Endovascular Stenting in SVC Syndrome Secondary to Fibrosing Mediastinitis: Emergent Catheter-Directed Thrombolysis and Outcome—A Case Report

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## Abstract

A 40-year-old woman presented with a 4-week history of headache, facial swelling, and dyspnea. Computed tomography (CT) scan of the chest showed marked narrowing of the superior vena cava (SVC) with surrounding hypodense soft tissue and prominent collateral circulation in mediastinum, and the diagnosis of fibrosing mediastinitis was made. Biopsy suggested active fungal infection and she was treated with oral antifungal therapy. She reported persistent symptoms even after medical management; hence, she was taken for endovascular treatment with placement of a 16 × 60 mm stent (Optimed sinus-XL) in SVC. The patient complained of aggravation in symptoms immediately the next day, and a diagnostic venogram revealed acute total in-stent thrombosis. On an emergency basis, the patient was taken for catheter-directed thrombolysis (CDT) with tissue plasminogen activator (tPA) infusion. She was followed up with CT after 1 year, which showed patent stent and no residual or recurrent thrombosis. She is on follow-up with marked relief in symptoms and improved quality of life. Catheter-directed thrombolysis is an emergent treatment modality with limited albeit growing evidence to treat acute in-stent thrombosis. CDT with tPA can be used to effectively treat acute thrombosis with promising results.

## Keywords

- SVC syndrome
- fibrosing mediastinitis
- endovascular treatment
- in-stent thrombosis
- CDT

## Introduction

Fibrosing mediastinitis is a benign proliferative disorder characterized by abnormal collagen and fibrous tissue deposition in the mediastinum secondary to various etiologies such as granulomatous infections (tuberculosis, histoplasmosis), autoimmune syndromes, drugs, and radiation. The affected individuals are usually young and present with

obstructive symptoms involving the superior vena cava (SVC), trachea or major bronchi, esophagus, and pulmonary arteries or veins. Two distinct types of fibrosing mediastinitis are described, namely, focal and diffuse. The focal type is characterized by stenosis at one site in the mediastinum with the presence of heterogenous enhancing soft tissue and calcified hilar lymphadenopathy. The diffuse type, on the other hand, affects multiple compartments of the

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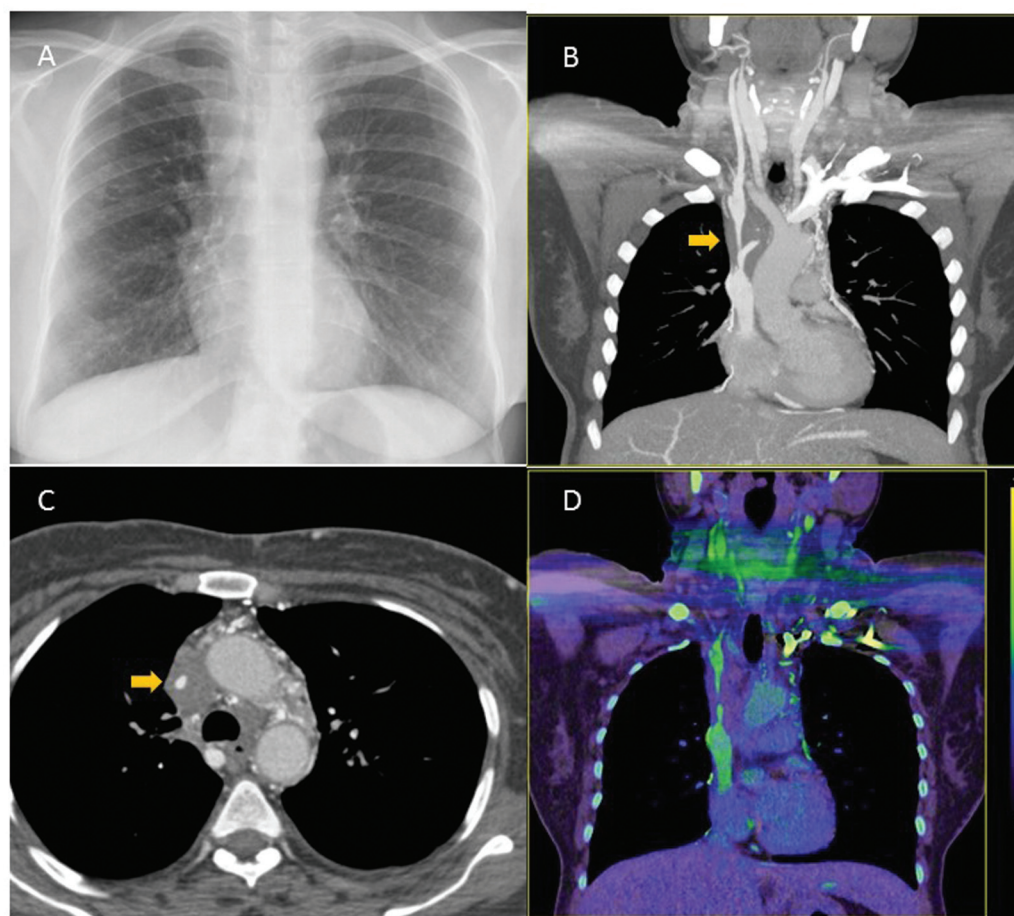
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mediastinum and presents in a more severe fashion with involvement of one or more mediastinal structures.<sup>1</sup> In cases of fibrosing mediastinitis leading to SVC obstruction, angioplasty and stenting is offered as endovascular management to relieve venous obstruction.<sup>2</sup> This case report highlights the role of endovascular SVC stenting in fibrosing mediastinitis with acute complication in the form of acute in-stent thrombosis, which was promptly managed using selective catheter-directed thrombolysis (CDT).

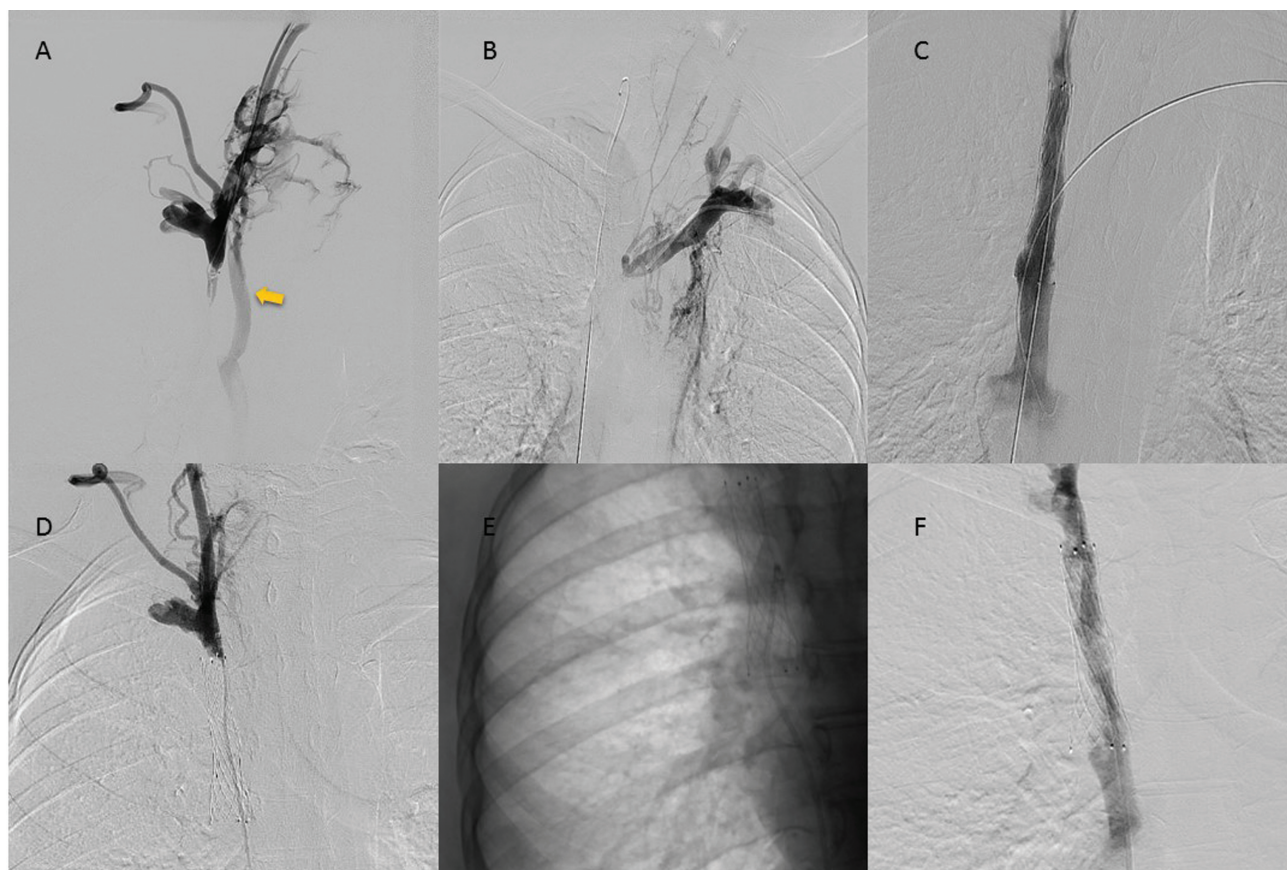
## Case Report

A 40-year-old woman presented with a 4-week history of headache, facial swelling, and dyspnea. Her vitals were within normal limits and general physical examination revealed edema and prominent venous distension over the neck and the anterior upper chest. Contrast-enhanced computed tomography (CT) scan of the chest showed marked narrowing of the SVC and proximal left brachiocephalic vein (LBCV) with surrounding hypodense soft tissue and prominent collateral circulation in the mediastinum (►Fig. 1). Endobronchial fine-needle aspiration was done, which yielded lymphoid tissue with necrotizing granulomatous inflammation and positive fungal stain and morphology consistent with histoplasma species. Since histopathology

suggested an active fungal infection, the patient was placed on oral antifungal therapy (itraconazole) and was advised to follow up after completion of a 6-week antifungal therapy course. The patient reported persistent symptoms even after medical management; hence, she was planned for an endovascular treatment (►Fig. 2). A catheter venogram through the right transjugular venous approach revealed significant occlusion of the SVC with retrograde opacification of the azygous vein. Subsequently, a right transfemoral venous access was taken, through which a guidewire was negotiated across the occluded segment of the SVC and secured in the right internal jugular vein (IJV). A left-sided transjugular access was also taken, which revealed long-segment stenosis of the LBCV extending till the SVC confluence. This stenotic segment was crossed with a guidewire and balloon angioplasty was done for SVC as well as LBCV stenosis using  $6 \times 60$  mm and  $10 \times 60$  mm balloons. Post-angioplasty, there was no significant residual stenosis in the LBCV; however, significant residual stenosis was seen in the SVC; thereafter, a  $16 \times 60$  mm bare metal stent (Optimed sinus-XL) was deployed across the stenotic segment of the SVC. After stent deployment, few filling defects were seen, and an in-stent angioplasty was done using a  $12 \times 60$  mm balloon, which demonstrated a free unobstructed flow across the stent without any significant residual stenosis. Postprocedure



**Fig. 1** (A) The chest radiograph shows no remarkable abnormality. (B–D) Contrast-enhanced computed tomography (CT) scan performed in dual energy mode shows circumferential heterogeneous enhancing soft-tissue encasing the superior vena cava (yellow arrow) for a length of approximately 5 cm causing significant stenosis.



**Fig. 2** (A) Contrast injection through the right jugular access shows complete occlusion of the superior vena cava (SVC) with retrograde filling of the azygous vein (yellow arrow). (B) Subsequently through the right transfemoral venous route, a guidewire was negotiated across the occlusion into the internal jugular vein (IJV) and contrast injection through the left IJV shows significant occlusion of the left brachiocephalic vein at its confluence with the SVC. (C) a 16 × 60 mm stent deployed in the SVC. (D) The next day, the diagnostic venogram reveals complete in-stent thrombosis of the stent. (E) Catheter-directed thrombolysis was done for 24 hours. (F) Post-thrombolysis shows patent stent with few hypodensities; however, an antegrade flow was established.

anticoagulation was started with unfractionated heparin with an intent to start tablet rivaroxaban on discharge. The patient complained of aggravation in symptoms immediately the next day, and the diagnostic venogram revealed



**Fig. 3** Follow-up computed tomography (CT) done after 1 year showing the patent stent in situ in the superior vena cava (SVC) with no residual or recurrent stenosis.

acute total in-stent thrombosis. On an emergency basis, the patient was taken for CDT with tissue plasminogen antigen (tPA) infusion (5 mg bolus followed by 0.75 mg per hour for 24 hours) and unfractionated heparin at a dose of 10 IU/kg/h via a 5-Fr multipurpose catheter left in situ. The diagnostic venogram the next day revealed significant resolution of stent patency and the patient was symptomatically relieved. Considering the high propensity of in-stent thrombosis, the patient was started on a 3-month course of single antiplatelet (ecospirin 75 mg) and tablet rivaroxaban indefinitely. She was followed up with CT after 6 months and 1 year (→ Fig. 3), which showed patent SVC stent and no residual or recurrent thrombosis. The LBCV also showed good caliber with normal contrast opacification. The patient is on follow-up with marked relief in symptoms and improved quality of life.

## Discussion

Fibrosing mediastinitis is a progressively occluding collagen proliferative disorder, leading to variable clinical presentation depending on the involvement of mediastinal structures. The SVC syndrome secondary to fibrosing mediastinitis has been managed endovascularly with excellent patient outcomes.<sup>3</sup>



Endovascular treatment involves angioplasty of the affected venous segment followed by a bare metal stent placement. In-stent balloon angioplasty is generally performed if there is greater than 30% residual stenosis after stent deployment and may be required in 70 to 80% patients if predilatation was not performed as inadequately expanded stent predisposes to higher chances of restenosis, often below 7- to 8-mm caliber post-stenting.<sup>4</sup> One of the major complications include acute in-stent thrombosis, which is a rare complication seen with placement of bare metal stents to treat venous stenotic lesions and is caused due to platelet adhesion, activation, and clot formation within 24 hours of stent placement. Antiplatelet therapy is mandatory initially after stent implantation. Gradually, stents are covered with endothelial cells that do not induce thrombus formation, and the need for platelet inhibition decreases. It is wise to start anticoagulation in the 3- to 12-month period post-stent placement, along with single-agent antiplatelet therapy (low-dose aspirin or clopidogrel) in patients undergoing venous stenting.<sup>5</sup> In cases of acute thrombosis, CDT is effective in achieving clot lysis and restoring stent patency after in-stent thrombosis.<sup>6</sup>

## Conclusion

CDT is an emergent treatment modality with limited albeit growing evidence to treat acute in-stent thrombosis. CDT with TPA can be used to effectively treat acute thrombosis with promising results.

### Informed Consent

Informed consent was taken from the concerned patient.

### Ethical Statement

All procedures performed in studies involving human participants were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

### Funding

None.

### Conflicting Interest

None declared.

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