

Recurrent SVC Syndrome Treatment

Endovascular intervention for venous occlusive disease in a patient with cystic fibrosis.

BY MIKE MALINOWSKI, MD, AND ROSS MILNER, MD

Although medical advances allow for extended lengths of care and survival for chronic disease pathologies, it seems to come at the expense of increasing chronic iatrogenic insults, such as central venous instrumentation. Benign causes are becoming increasingly more common when compared to oncologic etiologies for central venous stenosis. As the underlying etiology of venous occlusive disease evolves, it requires the same evolution in approaches to interventions of these complex patients.

CASE PRESENTATION

We present the case of a 19-year-old man with a history of facial redness and swelling over the past year that was noticeably worse in the supine position. The patient previously underwent bilateral lung transplantation for cystic fibrosis. He had multiple chest and neck central venous catheters related to chronic treatment regimens for his cystic fibrosis. An initial CT venogram was obtained with limited visualization of the patient's proximal superior vena cava (SVC); this was interpreted by his treating physicians as SVC occlusive thrombus around an indwelling right internal jugular central venous line. Concurrent venous duplex ultrasound revealed nonocclusive thrombus in the right brachiocephalic vein with poor visualization proximally (Figure 1).

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phalic vein with poor visualization proximally (Figure 1). He was treated with systemic anticoagulation with warfarin and line removal with partial resolution of his symptoms.

When the patient was referred to vascular surgery, we arranged for diagnostic venography to evaluate for central venous stenosis (Figure 2A). Dual access was achieved via a right internal jugular vein 5-F sheath and a right femoral vein 7-F sheath. A central venogram revealed a high-grade type II proximal SVC stenosis. With an open-heart team on standby, we proceeded with wire traversal from below, which was snared via our jugular vein access and exchanged for a thru-wire Lunderquist (Cook Medical, Bloomington, IN). The thru-wire extended from the femoral to the jugular sheath. A 7-F, 90-cm

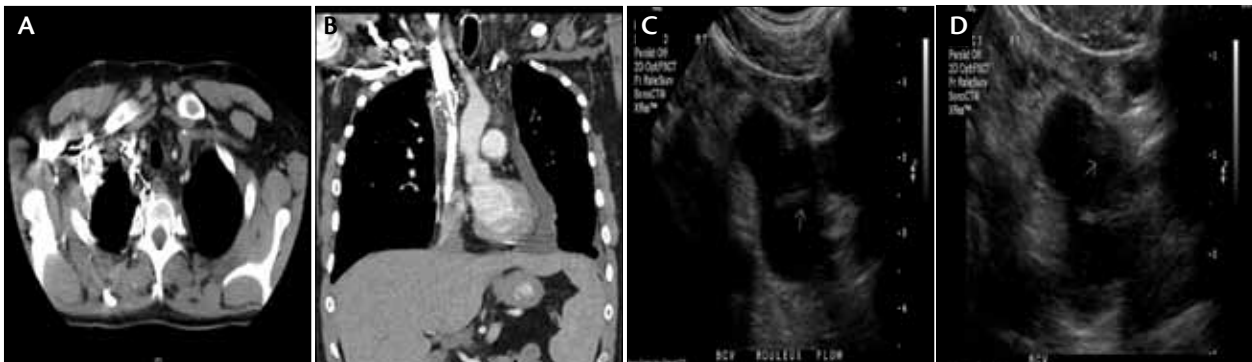


Figure 1. CT venogram showing collateral venous circulation from the azygos system (A). Indwelling central line with SVC luminal irregularity (B). Rouleux flow in the right brachiocephalic vein (C). Right brachiocephalic vein with nonoccluding thrombus (D).

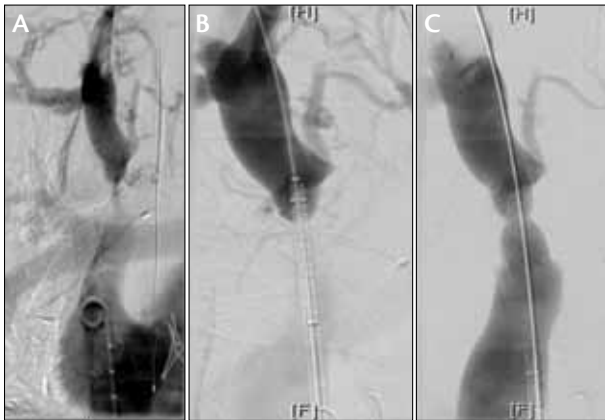


Figure 2. Initial central venogram with high-grade SVC stenosis (A). Stent positioning after predilation (B). Balloon-expandable stent placement (C).

Pinnacle Destination sheath (Terumo Interventional Systems, Somerset, NJ) was then advanced past the lesion, and predilation was performed with a 5-mm angioplasty balloon (Figure 2B).

In light of the reality of this patient's hostile intrathoracic anatomy from his previous bilateral lung transplantations, we proceeded with deployment of a 10- X 38-cm balloon-expandable iCast covered stent (Atrium Medical Corporation, Hudson, NH) with post-dilatation to 12 mm, leaving a small 6-mm residual waist without hemodynamically significant restriction in luminal flow (Figure 2C).

Approximately 4 months after the initial procedure, the patient presented with partial recurrence in symptoms. He was scheduled for repeat venography working solely through right femoral access with additional steep oblique views with no clear restenosis (Figure 3A). We wire traversed the lesion and performed more aggressive angioplasty to 12 mm with a residual 10-mm stenosis at the midportion of our treatment area. With this subsequent intervention, the patient's clinical symptoms resolved to his previous posttreatment level (Figure 3B).

DISCUSSION

From an era encompassing the development of spiral saphenous grafts in 1973 to repair and reconstruction for central venous stenosis and its durable results of almost 88% patency at a mean follow-up of 10.9 years reported by Doty et al, we now encounter a need for innovative maintenance endovascular interventions for high-risk open operative reconstructive patients.¹ Previous studies by the Rochester and Mayo groups have previously documented the long-term data in support for endovascular venous repair, albeit at the

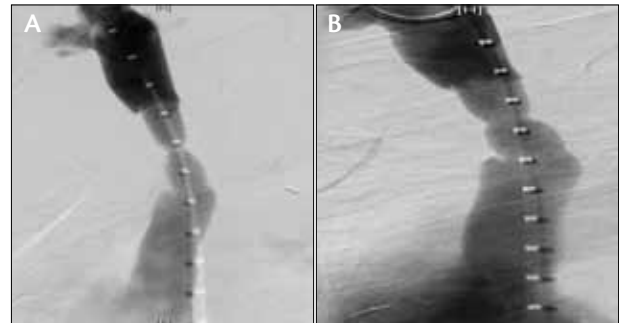


Figure 3. Subsequent reimaged SVC stent without in-stent restenosis (A). Larger luminal waist after interval-delayed postdilatation (B).

expense of repeated interventions.^{2,3} However, this case offers a novel approach for adept surgical control and deployment of balloon-expandable stents without concern for loss of wire access in light of potential caval perforation or atrial migration of maldeployed stents, especially for high-risk patient populations with the least reserve to tolerate these morbid complications.

CONCLUSION

With this case, we have presented a consistent and dependable technique with thru-wire access to treat central venous lesions in a controlled manner without concern for stent migration or lost wire access. Because of the long-term needs for subsequent interventions for patients with benign etiologies for central venous stenosis, this approach has the potential for substantially reduced morbidity across a single patient's lifetime. ■

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