Management of a Patient With Superior Vena Cava Syndrome and a Central Venous Catheter

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ABSTRACT: This paper discusses a novel treatment of superior vena cava syndrome whereby the operator may preserve the existing central venous catheter. This technique circumvents the need for two invasive procedures.

VASCULAR DISEASE MANAGEMENT 2017;14(7):E157-E159.

Key words: superior vena cava syndrome, new technique

A 56-year-old male patient was diagnosed with squamous cell carcinoma of the lung with a mediastinal mass encasing the right upper-lobe bronchus, superior vena cava (SVC), and right pulmonary artery. He required multiple hospitalizations for the management of postobstructive pneumonia, bilateral upper-extremity swelling, and facial swelling. He had undergone left-sided subclavian port-a-cath implantation 6 months before for chemotherapy as well as bronchial stent implantation. Because of persistent shortness of breath and tumor-related SVC compression, he was referred to the vascular team for SVC stenting.

TECHNIQUE

The right femoral vein was punctured and a 7 Fr introducer sheath was placed. Diagnostic venography was performed with a pigtail catheter, which revealed a severe stenosis of the SVC (Figure 1). Subsequently, a 6 Fr sheath was inserted in the right jugular vein using ultrasound guidance. The area of stenosis was crossed with a 0.014” Asahi Prowater wire (Abbott Vascular) via the right jugular vein. The patient was heparinized for an activated clotting time >250 sec. Intravascular ultrasound (Volcano, Eagle Eye platinum 3.5 x 150) was performed and demonstrated severe stenosis with reference vessel diameter of 8.0 mm (Figures 2A and 2B). The port-a-cath was located in the area of potential stenting. We used a 4-8 mm EnSnare (Merit Medical, Inc) (Video 1) from the right internal jugular vein to snare and then retract the tip of the port-a-cath cephalad. While the catheter was retracted, an 8 x 38 mm balloon-expandable iCAST covered stent (Atrium) was deployed at the site of stenosis through a right femoral vein access sheath (Figure 3). This stent was postdilated with a 10 x 40 mm Mustang balloon (Boston Scientific). Finally, the snared port-a-cath was repositioned within the lumen of the iCast stent in the SVC. Excellent angiographic results were obtained with no residual stenosis (Video 2). There were no complications. The symptoms markedly improved within 24 hours and he was discharged on anticoagulation therapy. The patient died 3 months following the procedure.

DISCUSSION

SVC syndrome is defined as swelling of the face, neck, and upper extremities in combination with dilated subcutaneous vessels, cyanosis, and dyspnea resulting from obstruction of the SVC. It is predominantly caused by malignant neoplasms, and primary bronchial carcinoma is the most common malignancy associated with this syndrome. Other benign causes include infections, as well as inflammatory and intracardiac devices and catheters. Currently, SVC obstruction caused by intravascular devices and catheters is on the rise and contributes to about 35% of SVC stenoses.
The management of SVC syndrome associated with malignant disease involves treatment of the cancer and alleviating the obstructive symptoms. Median life expectancy in such cases is approximately 6 months, with a range of 1.5 to 9.5 months. Treatment is guided by the severity of the symptoms and the underlying malignant disease. Options include systemic chemotherapy, radiotherapy, placement of an intravascular stent, and surgical bypass grafting, or a combination of one or more of these. Endovascular treatment is often considered a palliative measure in this patient population.

We present a case of combined stenting of the SVC with an in situ catheter in a patient with SVC stenosis due to bronchial cancer receiving chemotherapy via port-a-cath. To avoid removing the central venous catheter, we relocated the port-a-cath in the jugular vein before SVC balloon angioplasty and stent implantation. Stockx et al described a similar technique in 8 patients (6 dialysis and 2 oncology) who had SVC thrombosis related to Hickman and port-a-caths and used Wallstent (Boston Scientific) in the majority of the cases and Palmaz stent (Cordis) in 1 patient. Stockx et al described a similar technique in 8 patients (6 dialysis and 2 oncology) who had SVC thrombosis related to Hickman and port-a-caths and used Wallstent (Boston Scientific) in the majority of the cases and Palmaz stent (Cordis) in 1 patient.4 We chose to use the iCast covered stent due to its rigidity and radial strength. Isfort et al described a patient with malignant central venous stenosis where they performed SVC stenting and left brachiocephalic vein stenting while preserving central venous catheter using right and left jugular venous access.5

**CONCLUSION**

SVC stenting in a patient with SVC syndrome related to malignancy is feasible without removing the preexisting central venous catheter.

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**Figure 2.** (A and B) Intravascular ultrasound demonstrated severe stenosis with reference vessel diameter of 8.0 mm.

**Figure 3.** While the catheter was retracted, an 8 x 38 mm balloon-expandable iCast covered stent was deployed at the site of stenosis through a right femoral vein access sheath.
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Disclosure: The authors have completed and returned the ICMJE Form for Disclosure of Potential Conflicts of Interest. The authors report no financial relationships or conflicts of interest regarding the content herein.


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