The SIR TCVO Reporting Standards: Why You Should Care

How the new reporting standards on thoracic central vein obstruction can be applied to clinical practice.

BY BART L. DOLMATCH, MD, FSIR

Do your patients ever need central venous access devices such as temporary or tunneled catheters, ports, or peripherally inserted central catheter lines? Do any of them have cardiac rhythm devices? Have you ever seen a patient with thoracic venous obstruction that confounds the passage of catheters or causes swelling or other symptoms?

It would be unusual for a provider to answer "no" to all of these questions. Yet, the way most of us approach the use of the thoracic central veins and assessment of thoracic central vein obstruction (TCVO) has been mostly empiric. The literature regarding TCVO has been inconsistent, largely due to a lack of reporting standards. Published reports use different definitions and outcome measures. In short, we have needed a set of TCVO reporting standards for a long time. Now, with the recent publication of the Society of Interventional Radiology's (SIR) thoracic central vein reporting standards,[1] the first attempt to meet this need has been accomplished.

The goal in developing these reporting standards was to provide a context for describing TCVO that would prove useful in everyday practice, as well as to have an established structure for reporting clinical data. The Central Vein Work Group (CVWG), formed in 2015, included representatives from surgery, interventional radiology, cardiology, nephrology, hematology-oncology, and clinical anatomy. More than 20 members worked for 3 years to develop the SIR TCVO reporting standards.

Although most of us know that reporting standards serve an important purpose, it is not easy to adopt them. Most of us are comfortable doing things the way they have always been done, even though this mentality will not advance our understanding of TCVO. Recognizing this, the CVWG approached the development of TCVO reporting standards with the hope that "everything should be made as simple as possible, but not simpler" (Albert Einstein).

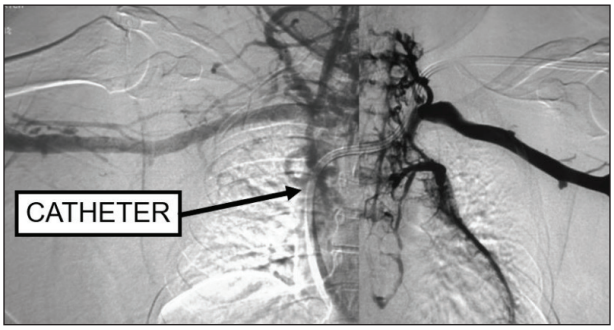

Figure 1. Obstruction of the thoracic central veins due to repeated use of hemodialysis catheters.

If you are not planning to submit a publication about TCVO, how do these reporting standards apply to everyday practice? First, the reporting standards will help organize a patient's clinical characteristics in a way that is clear and reproducible. In addition, with these reporting standards, TCVO can now be described in a way in which there will be continuity of care as patients pass among different providers. These standards should also prove useful when assessing results following endovascular or surgical treatment of TCVO and may also lead to strategies to prevent "deforestation" of the thoracic central veins, which is seen so often after repeated use of central venous devices, such as dialysis catheters (Figure 1).

SUMMARY OF THE SIR TCVO REPORTING STANDARDS

- **Anatomy:** The thoracic central veins are composed of the subclavian veins, the intrathoracic portion of the internal jugular veins, the brachiocephalic veins (not "innominate," please!), and the superior vena cava (SVC). The subclavian veins are defined as starting at the upper lateral border of the first rib. Although a short segment of the inferior vena cava is within the thorax, it was not included in the reporting standards.
- **Flow:** Blood flow leading up to a TCVO may be purely venous or arteriovenous (in the case of the patient with an ipsilateral arteriovenous access circuit). The type of blood flow should be noted. Obstruction may be due to narrowing of the lumen (stenosis) or complete blockage (occlusion).
- **Symptoms:** Patients with TCVO may be asymptomatic, or they may note any of the following four symptoms: swelling, pain, respiratory difficulties, or central nervous system complaints. Symptoms are either present or absent (Figure 2).
- **Duration of symptoms:** Categories mirror those used for lower extremity obstruction and are acute (1–14 days), subacute (15–28 days), or chronic (> 28 days). Duration of symptoms should be reported, when possible, in terms of days, not weeks or months.
- **Signs:** Swelling may be present, and if so, circumferential measurements should be made. This is the only quantitative measurement of TCVO, and measurements can be very useful when assessing the natural history of untreated TCVO or outcomes of TCVO after treatment. Other signs worth noting are venous collaterals, thrombosis, phlebitis, and various skin manifestations.
- **Performance status:** TCVO may be asymptomatic (grade 0), symptomatic without impairment (grade 1), symptomatic with impairment (grade 2), disabling (grade 3), or incapacitating (grade 4).
- **Anatomic patterns of TCVO:** In its simplest form, TCVO has been grouped into four types of anatomic obstructions (which are shown in diagrams depicted in the reporting standards[1]). Obstructions are classified as type 1A–D, type 2A–B, type 3, or type 4 based on whether the brachiocephalic veins and/or SVC are obstructed (Figure 3).

Figure 2. A hemodialysis patient with type 2 TCVO and an ipsilateral arteriovenous fistula of his left arm with advanced symptoms. The circumference of his left upper arm is 54 mm greater than his right arm, and it is painful, swollen, and plethoric to the degree that he cannot use his arm and is disabled (grade 3). He denies respiratory and central nervous system symptoms.

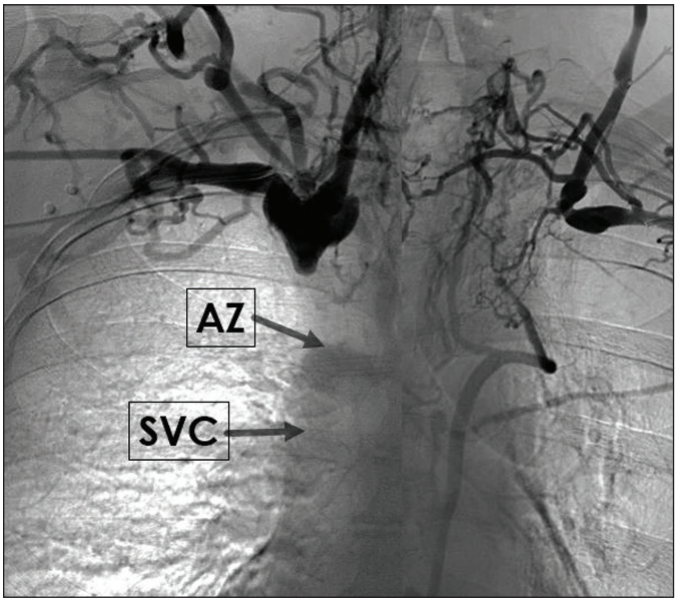

Figure 3. Type 3 TCVO in a patient without hemodialysis access (venous flow) presenting with swelling of the face, neck, and arms and impaired performance status (grade 2). The SVC is occluded above the level of the azygos vein (AZ), with collateral reconstitution of the most central portion of the SVC leading to the right atrium.

- **The impact of TCVO on the patient's care:** Can a central venous line be placed at the intended site? Does swelling prevent cannulation of a dialysis access arteriovenous fistula? Does TCVO require complex intervention? The presence of TCVO may impact clinical decision-making and the treatment approach.

The SIR TCVO reporting standards should be used when clinical data are submitted to *Journal of Vascular and Interventional Radiology*. Furthermore, there are seven other societies that have endorsed these standards, including the Vascular Access Society of the Americas, Heart Rhythm Society, and American Society of Diagnostic and Interventional Nephrology. Several international societies have given their endorsement as well.

IMPLICATIONS FOR PATIENT CARE

What does this mean when you see your next patient with TCVO? Although there is no requirement that a patient must be described using every element of the reporting standards, perhaps now an analysis of the your TCVO patient's condition can be formulated in a way that is more accurate and reproducible. In the past, you may have noticed that the right arm was swollen, and this would have been an adequate description. Now, for example, you can report that the patient complains of right arm swelling and pain, the right arm is 30 mm greater in circumference than the left with symptoms for 21 days (subacute), and there is a type 3 TCVO obstruction pattern. Noting that the patient's symptoms are disabling, treatment could reduce the degree of impairment. Follow-up 1 month later will show that the right arm is 8 mm larger than the left and that the patient remains symptomatic but without any impairment or disability. Quantifiable success! What has seemed so confusing in the past can now be made as simple as possible, but not too simple. ■

1. Dolmatch BL, Gurley JC, Baskin KM, et al. Society of Interventional Radiology. Reporting standards for thoracic central vein obstruction. J Vasc Interv Radiol. 2018;29:454-460.

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Disclosures: None.