Probing the Unknowns of Deep Venous Obstruction in 2021

The three main areas for progress in chronic venous obstruction management.

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Significant progress has been made in the diagnosis and treatment of patients with chronic venous obstruction (CVO). The diagnosis of obstructive disease is easier and faster, and treatment can be performed by a variety of specialists and in a timelier fashion. More patients are now treated due to this progress, but there are still several areas to be addressed to optimize the management of patients with CVO.[1] This article discusses three of the main areas where progress can be made.

EVALUATION OF INFLOW

One of the most common modes of treatment failure after stent placement is inadequate inflow. With stents being placed from the inferior vena cava (IVC) to the distal part of the common femoral vein, the femoral vein (FV) and deep femoral vein (DFV) define the inflow.[1,2] The great saphenous vein can be included in select patients because it does not usually carry a significant amount of blood.[3] In patients with CVO with or without acute vein thrombosis, the DFV is typically patent and seems to have adequate inflow to support a more proximal intervention on its own. Typically, the FV or DFV must be patent. A good number of patients have a previous deep vein thrombosis that affects both the FV and DFV. If both veins are occluded, then inflow needs to be established first. If recanalization of these veins cannot be achieved, a small arteriovenous fistula at the groin can be created to provide enough flow.

In patients with partial recanalization, various types of flow are seen. An anatomic classification of the obstruction has been proposed that is based on the most commonly encountered patterns of inflow.[4] This classification describes the patterns of obstruction in the iliofemoral veins but does not include the IVC. Given the lack of data on evaluating outcomes based on this classification and the type of inflow, more work is needed to evaluate its use in clinical practice.

Flow patterns and blood flow estimation with ultrasound have been suggested, as well as the use of contrast flow rate during venography alone or in combination with ultrasound findings. Venography is empirical and not standardized and, as such, is very subjective. Currently, there are no robust techniques to quantify the inflow, and therefore, no cutoff values are available to dictate when a procedure can be safely or predictably performed.

Further issues arise with the fact that almost all measurements are done in the supine position, but the obtained values may not be indicative of what will happen when the patient stands up. Research in this area is needed to understand how to accurately evaluate the inflow and determine the values that would permit stent deployment with a low failure rate and a reduction in reintervention to preserve stent patency.

DIAGNOSIS OF SIGNIFICANT OBSTRUCTION

In routine clinical practice, CVO is diagnosed with direct morphologic evaluation by determining the location, extent, and diameter reduction. Indirect hemodynamic assessment is based on identifying the presence of collateral veins and denoting their number, size, and flow patterns.[1,3,5,6] Such hemodynamic assessment is empirical and not easy to apply in decision-making for managing CVO. Methods for diagnosing CVO include duplex ultrasound, intravascular ultrasound (IVUS), venography, CT venography (CTV), MR venography (MRV), and pressure measurements. Some centers also use plethysmography.[5,6] Most patients have symptoms during standing or physical activity. Unfortunately, nearly all of the daily testing for CVO is morphologic evaluation performed in the supine position. Although this position is convenient for both the patient and examiner, it cannot reproduce the hemodynamic conditions during standing or walking and can

be misleading.[1,5-7] There is less controversy regarding intervening in patients with postthrombotic disease and clear signs and symptoms, such as venous claudication, extensive swelling, or skin damage. However, even these patients may have other factors that contribute to the development of signs and symptoms, such as reflux in the lower limb veins, obesity, lack of physical activity, foot static disorders, joint issues, or right heart failure. These factors can be equally bad and sometimes may contribute more in the disease severity than the CVO. In patients with nonthrombotic CVO, determining the significance of the stenosis is controversial, particularly as we gather more evidence toward positional stenosis.[1,7,8] As previously mentioned, in most patients, the symptoms are more evident during standing or walking; however, nonthrombotic stenosis is found in the supine position and reduces or disappears in the standing position or when the patient is placed on the left side.[8] Clearly, we need to improve our diagnosis by performing more dynamic testing to define which patients are likely to benefit from interventions.

POSTINTERVENTION FOLLOW-UP AND EVALUATION

Some experience has been gained recently in following-up patients with interventions for CVO. Early detection of obstruction, issues with stent fracture, migration, malapposition, or not covering all the affecting area are important.[2,9] Duplex ultrasound has been shown to be a good postintervention method, but there are only a few studies, and none are robust regarding determining the diagnostic accuracy.[10-12] CTV or MRV should be used selectively because they are not appropriate to routinely use at follow-up. Venography and IVUS are more likely to be used when there is intention to treat. Currently, an imaging test is done within the first month from intervention; at 3, 6, and 12 months; and then yearly thereafter. Patients with changes in signs and symptoms are examined promptly. This surveillance program parallels the experience from the arterial interventions because there are no robust data on the venous side.

Another issue is how to manage different findings. On many occasions, experience and common sense guide the management because more definitive work needs to be done in this area. The findings also must be placed in context with the patient risk factors, type and number of interventions, material used, location and extent of the disease, and remaining disease that was not addressed by choice or was missed. Disease progression can occur without failure of the intervention due to existing problems such as reflux and obstruction in the limb, development of varicose veins, weight gain, or development of organ failure. Understanding the pathophysiology behind the development of in-stent stenosis is also needed to help guide both preventive and interventional strategies. Current options to manage in-stent stenosis are crude and prone to failure, leading to repeated reintervention. ■

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