Evaluating Options to Treat Superficial Venous Disease in 2018

An overview of current thermal tumescent, nonthermal nontumescent, and nonthermal tumescent treatment options for superficial venous disease.

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Basic premise—everything works.[1-3] Today, we know that a closed superficial axial vein improves quality of life and that all closure rates are about the same. No choice would necessarily be the wrong choice. However, this article attempts to provide information with which to make the best choice for both patient and physician.

The options for treating superficial axial disease (ie, great saphenous vein, small saphenous vein, anterior accessory saphenous vein, etc) in 2018 do not really differ from those of 2014, when the terms *thermal tumescent* (TT) and *nonthermal nontumescent* (NTNT) were first introduced.[4] What does differ is that there is a better understanding of the strengths and relative weaknesses of the current technologies and techniques. At meetings or conferences, attendees often ask, "Which one should I use?" or "What technology is best?" or "Which one do you use?" The answer isn't a binary one; decisions are informed by many elements.

The currently available treatment choices are shown in Table 1. When considering these choices, be aware of a number of factors that have been learned that will yield the best results. These can be thought of as the "rules to live by" for treating superficial disease:

1. Treat to the lowest point of incompetence.
2. Use whatever option is safest to achieve the first point.
3. Consider cost to the patient and health care system.
4. Assume that all interventions are reimbursed.

A vein specialist may treat vein disease, but more importantly, a vein specialist treats patients with vein disease. The recommendation for the "best" option for treatment is multifactorial. In each patient, the particular clinical and anatomic situation dictates what may be the one or two best options. Factors to be cognizant of when making a treatment decision include:

- Vein size
- Vein length
- Tortuosity
- Location (eg, above/below the knee, suprafascial)
- Concerns regarding neighboring anatomy such as nerves or skin
- Disease state (CEAP [clinical, etiology, anatomy, pathophysiology] classification)

TREATMENT DECISION POINTS

Vein Size

The size of the target superficial axial vein is the first factor to consider. Vein size can be divided into three subsets: small, medium, and large. Large-diameter veins are > 12 mm, median-diameter veins (the most commonly seen) are between 5 and 11 mm, and small-diameter veins are < 5 mm. For treatment of large veins, TT or the newer nonthermal tumescent (NTT; inversion stripping with tumescence) technologies are probably best because these options can deliver more energy, or in the case of inversion stripping, remove the large axial vein, in treating larger veins. Medium and small size veins, especially those above the knee, can safely be treated in the above-the-knee intrafascial position with either TT or NTNT methods. Some studies indicate that the patient experience, both during and after treatment, is less painful with some NTNT techniques.[5,6] The choice becomes more narrowed in the below-the-knee and extrafascial position.

TABLE 1. CURRENT TT, NTNT, AND NTT TECHNOLOGIES		
TT	**NTNT**	**NTT**
▪ Radiofrequency ablation ▪ Laser ablation	▪ Mechanical occlusion chemically assisted ablation ▪ Cyanoacrylate closure ▪ Polidocanol endovenous microfoam	▪ Inversion stripping with tumescence
Abbreviations: NTNT, nonthermal nontumescent; NTT, nonthermal tumescent; TT, thermal tumescent.		

Vein Length

For longer veins, any technology is appropriate, and cost is not a factor. For shorter vein segments, cyanoacrylate closure (CAC; VenaSeal, Medtronic) is more expensive than most options and should be reserved for longer segments or multiple veins in one patient. All other factors being equal, the other treatment options for short segments are probably best.

Tortuosity

Tortuosity of superficial axial veins is relatively rare, but when present, can pose some challenges. Polidocanol endovenous microfoam (PEM; Varithena, BTG International) is the obvious choice because it can flow around corners and curves. The mechanical occlusion chemically assisted (MOCA) device (ClariVein, Vascular Insights) is the next choice, because it is a steerable wire with a better occlusion rate than foam. All other devices can be attempted, but if they could not be passed, it would require the addition of a steerable guidewire to the procedure, which adds cost and procedural steps.

Vein Location

Suprafascial incompetent axial veins tend to be closer to the skin. Concerns when treating these veins are skin damage, cord of the treated vein, sensory nerve damage, and phlebitic reaction. TT techniques can safely be used with adequate placement of tumescence to move the target vein away from the skin. However, once tumescence is absorbed, a cord of the treated vein may remain for 6 months to 1 year, which can be felt by the patient. CAC has been reported to have the highest percentage of phlebitic reactions among the NTNT techniques. MOCA causes a significant spasm of the target vein that prevents the vein from remaining distended, causing a lower phlebitic reaction. PEM also causes spasm. MOCA and PEM are probably better choices for veins in the suprafascial position.

Neighboring Anatomy

Below-the-knee superficial axial incompetence is the clinical and anatomic scenario in which the NTNT technologies are the better choice. In the above-the-knee position, the axial veins are relatively distant from the surrounding structures of nerves and skin, but nerves are either very close or right next to the vein in the below-the-knee position. The nerves of concern are the saphenous nerve, sural nerve, tibial nerve, and common peroneal nerve and branches. When this situation is best treated by ablation of the below-the-knee segment, either in continuity with the above-the-knee segment or as a separate segment after a previous above-the-knee ablation or small saphenous incompetence, NTNT technologies are the better choice. There has been virtually a 0% reported incidence of nerve injury with these technologies, and although TT treatment has a very low nerve damage rate, it is not 0%.

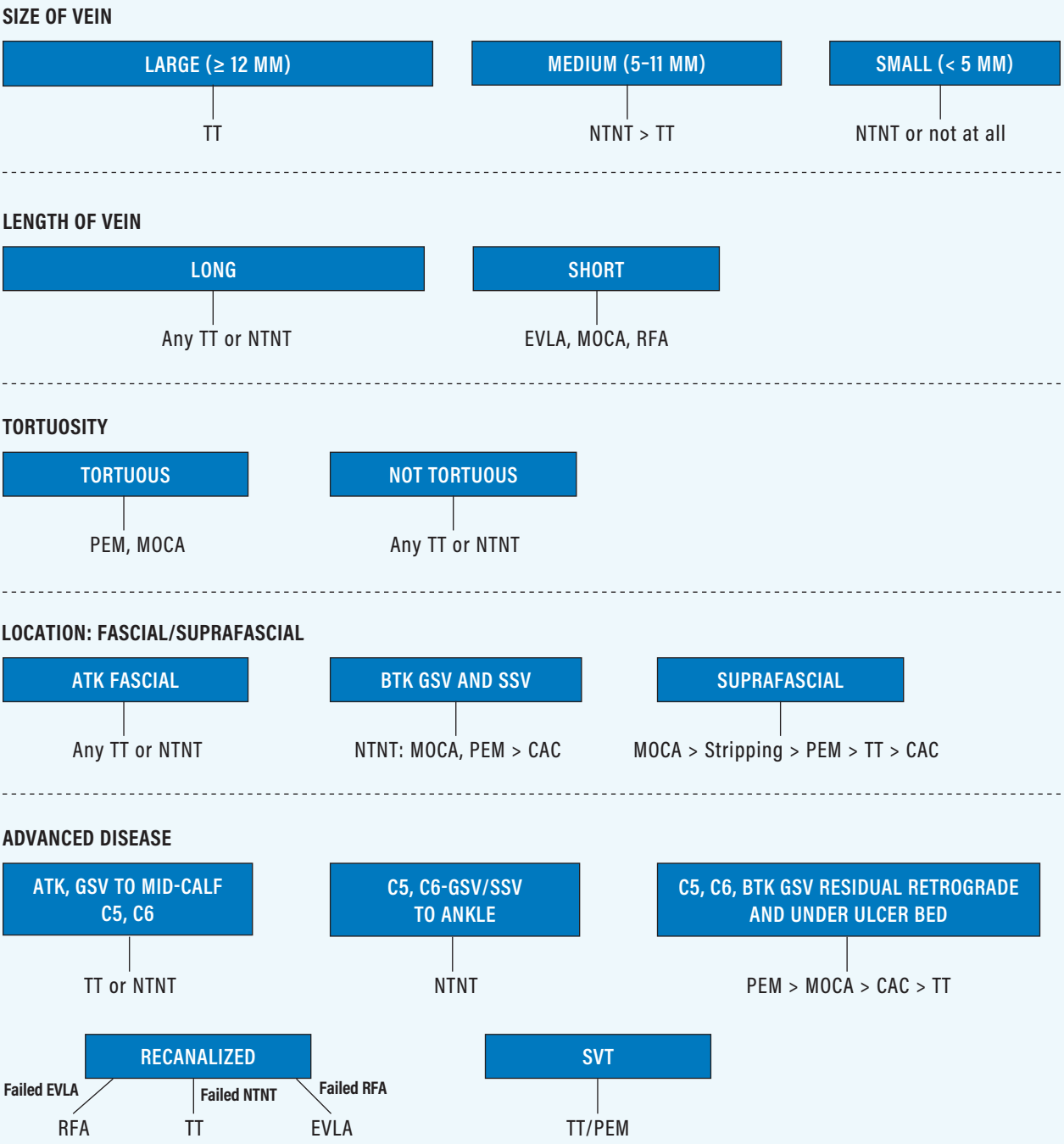
Disease State

The CEAP C4–6 patients have significant skin damage, lipodermatosclerosis, or active ulcers. It is difficult to place tumescence under these areas if ablation to this level is necessary. The NTNT devices can treat under these areas either from an ankle or a retrograde approach. One of the "rules to live by" in 2018 is to treat to the lowest point of incompetence, especially with advanced disease, which can safely be accomplished with these technologies.

TREATMENT ALGORITHM

The algorithm in Figure 1[7] goes through the treatment decisions discussed herein. As previously mentioned, the use of only one technology would not necessarily be wrong, but that technology may not be the best choice for a particular clinical and anatomic situation. This article aims to outline the "better" or "best" choice for a particular circumstance and should serve as a guideline for treating superficial axial venous disease.

FIGURE 1. SUPERFICIAL VENOUS DISEASE TREATMENT ALGORITHM



Abbreviations: ATK, above the knee; BTK, below the knee; EVLA, endovenous laser ablation; GSV, great saphenous vein; RFA, radiofrequency ablation; SSV, small saphenous vein.

Adapted from Elias S. Differences between great, small, accessory saphenous and intersaphenous veins in terms of technique for treating venous reflux. Presented at Charing Cross Symposium; April 26–29, 2016; London, United Kingdom.

These recommendations are based upon three assumptions: (1) all technologies have equal closure rates and improvements in a patient's quality of life, (2) all technologies are reimbursed, and (3) the treating vein specialist is familiar with the use of all options.

SUMMARY

With the previously discussed assumptions, 80% to 85% of patients can safely and effectively be treated with the NTNT techniques. The TT technologies will never be completely replaced and still have indications for above-the-knee axial reflux in large veins within the fascia and veins that have had previous superficial thrombophlebitis. As more information and experience are collected with more real-world users, the treatment algorithm may change. Thus far, most of these recommendations are made from the currently available literature. The future of endovenous ablation is the future of NTNT endovenous ablation. ■

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