# Who Are Your "Never Stent" Patients, and Why?

Perspectives on the anatomic concerns, patient characteristics, and procedural factors that warrant avoiding venous stenting.

**With Kathleen Gibson, MD; Gerard O'Sullivan, MD; Suresh Vedantham, MD; and Rick de Graaf, MD, PhD**

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Enthusiasm among interventionalists for iliac venous stenting to treat venous outflow obstruction is increasing, and the number of stents being placed for this indication has been skyrocketing in many countries. As with most interventions we perform on patients, judgment for choosing the proper patients in whom to offer a stent is of paramount importance to ensure good results to improve patient quality of life (QOL). There are many reasons not to place an iliac stent in a patient, but to generalize these reasons, my three "never stent" patients would be: (1) those with an improper indication for stenting, (2) those with improper anatomy, and (3) those unwilling to comply with prescribed aftercare.

Candidates for venous stents should have symptoms in the affected limb that have a significant impact on their QOL, whether they have a nonthrombotic iliac vein lesion (NIVL) or postthrombotic lesion (postthrombotic syndrome [PTS]). Many PTS patients can develop robust collaterals despite outflow obstruction, and compressions of the iliac veins, particularly on the left, are commonly found on imaging and are of little clinical relevance in many cases. The clearest indications for venous stenting (NIVL or PTS) are nonhealing venous ulcers (CEAP [clinical, etiologic, anatomic, pathophysiologic] class 6), particularly if there is either no significant superficial reflux or the superficial reflux has already been addressed. Patients with outflow obstruction and venous claudication with or without edema are good candidates for venous stenting if their symptoms (typically a bursting pain or fullness in the calf with exercise) have an impact on their ability to work, exercise, or care for themselves or their families. In most cases, edema alone in the absence of either ulceration or pain is an improper indication for stenting. Improvement in edema after venous stenting is not guaranteed, and if the edema does not have a significant impact on QOL, placement of a permanent implant is not appropriate.

A venous stent should not be placed if the chance of the stent thrombosing/failing is high. For a stent to remain patent or achieve patency to begin with, three elements are crucial: adequate venous inflow, adequate venous outflow, and, critically for PTS patients, proper anticoagulation. Prestent planning includes diagnostic imaging to determine the likelihood of adequate inflow and outflow to support a stent. The adage "stenting from healthy to healthy" is frequently used and is correct. The status of the inflow femoral vein and profunda vein (at least one, and ideally both, must be patent to ensure good inflow) and outflow via the inferior vena cava must be assessed. Depending on available resources, prestent diagnostic imaging may include duplex ultrasound, cross-sectional imaging with CT or MRI, or both. Diagnostic imaging helps predict anatomic suitability for stent placement, as well as appropriate access sites, which might include the popliteal vein, mid thigh femoral vein, internal jugular vein, or a combination thereof. A final determination of anatomic suitability should be made at

the time of the procedure to place the stent, ideally with a combination of multiplanar venography and intravascular ultrasound (IVUS). Prior to the procedure, all patients should be counseled that stent placement will not proceed if proper anatomy is not present; it is a much greater error to place a stent fated to fail then to abort a planned intervention.

Finally, I would never place a stent in a patient who would not comply with either a follow-up surveillance protocol or planned anticoagulation. The need for anticoagulation after stenting for NIVLs is questionable, but the use of anticoagulation after stenting for PTS patients is routine standard of care. Patients who are chronically anticoagulated after an iliac vein occlusion or other thrombotic event should be counseled that stenting will not take away their need for long-term anticoagulation and that failure to comply with an anticoagulation regimen might lead to stent failure, with return of or perhaps even worsening of their previous symptoms. All patients need short- and long-term follow-up poststenting, with both clinical examination and imaging. Prior to proceeding with stenting, the needed follow-up schedule should be shared with the patient, who must agree with this treatment plan. Although my "never stent" list as outlined is brief and lacks nuance, I believe general adherence to these principles has led to a successful venous stenting practice.

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Venous stenting has exploded in recent years, and there are now several dedicated venous stents on the market. The amount of patients receiving stents is a bit concerning from my point of view, and I have doubts that these are all required. Which patients will I "never" stent?

**1.** It sounds obvious, but if a patient has no symptoms, I find it difficult to justify placing a stent. Sometimes patients have symptoms that are difficult to associate with a stenosis (eg, pelvic vein congestion and a typical left common iliac vein lesion), but I can get my head around these easy enough, and I'm prepared to stent if I truly believe their pelvic varices are related to the venous lesion.

**2.** Patients referred with swollen legs may have been told that they have lymphedema or a NIVL lesion, but in truth, they are simply grossly overweight. As such, you can call it lipidema or whatever you want, but if there isn't a definite venous lesion on imaging or IVUS in particular, I will not stent.

**3.** Patients with no lesions should not receive a stent! I was shocked to discover that almost all recent stent migrations have been documented in patients with purported NIVLs. It is disheartening to think that a patient with often relatively mild symptoms and a questionable lesion on IVUS or other imaging modality could receive a stent—that stent could migrate and the patient would need a thoracotomy!

**4.** In postthrombotic patients, if the inflow is not well defined, I do not stent. This can also occur in patients with theoretically acute symptoms who turn out to have acute-on-chronic symptoms. My rules are simple: If I see more than four veins in and around the groin, and one is not larger than any of the others, I will not stent. This is based on previous experience that if you try to place a stent, the inflow will not be sufficiently well defined to keep that stent open, and it will thrombose. You're then in a situation where you have a thrombosed stent, the patient is no better, and the patient is much more difficult to open. I learned many years ago from experts on both sides of the pond to leave that patient alone for 6 months to 1 or even 2 years, get them walking, keep them anticoagulated, and make sure they wear their stockings; over time, the inflow will define itself better.

Ultimately, either the femoral or profunda should become the dominant vein. If neither becomes a dominant vein and there's no defined inflow, do not stent!

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In my clinical practice, I see a wide range of patients who have been referred to me by other providers or are self-referred for the management of venous conditions. My clinical perspective, undoubtedly influenced by the pioneers and early adopters of stent technology under whom I trained many years ago, has generally favored the notion that stents are valuable tools in restoring iliac vein flow and reducing symptoms and disability from venous disease. I still believe that is the case, but as the years have passed, I have become increasingly concerned about the "stent first, ask questions later" posture we sometimes see that seems to ignore both the value of nonendovascular therapies and the limitations, costs, and unknowns of stent therapy. Although I am not blind to the financial incentives in United States health care, I believe this is largely a problem of education that can be amended with focused effort from knowledgeable providers.

First and foremost, I don't place stents in patients who have not undergone thorough clinical evaluation of their self-reported symptoms; their objective clinical signs of venous disease; and the impact of their symptoms on ambulation, life activities, and QOL. In patients with chronic symptoms, I don't consider stent placement until (1) I understand if and how other conditions (eg, arterial, lymphedema, musculoskeletal, neurologic, superficial venous) may be contributing to my patient's leg swelling and pain and (2) those factors have been (or are being) addressed. Only very infrequently do I place stents before giving noninvasive therapies sufficient time to improve symptoms. As I learned only years after completing my training, when delivered with close follow-up intended to optimize their use, various types of compression therapy and venoactive agents do help some patients with their venous symptoms. I don't stent patients with only mild symptoms, especially if they are relatively young, because time-dependent natural healing and other therapies can produce clinical improvement and patency rates for currently available stents may be limited, especially in the population of patients with PTS. If a patient with a thrombosis history cannot or will not receive long-term anticoagulation, stenting has a low chance of durable success, so I would almost always recommend against it.

Anatomically speaking, I avoid stent placement in patients who lack good inflow to the common femoral vein from either a femoral vein or deep femoral vein of good caliber. I don't stent the femoral vein, except for rare cases when slight caudal extension of iliac and common femoral vein stents into a tributary (eg, into the femoral vein at or above the lesser trochanter level) is needed to ensure adequate inflow. Extreme care is needed in interpreting venous imaging to identify stenosis. In particular, IVUS is a helpful tool, but the examiner must take the time to carefully examine the vein throughout the cardiorespiratory cycle, during the Valsalva maneuver, and during changes of patient position. This will help avoid stenting some patients whose "stenosis" is an artifact of low-volume status and position.

Finally, I don't place stents in patients with moderate or severe PTS before asking if they meet the criteria and are willing to be enrolled in the ongoing National Institutes of Health–sponsored C-TRACT clinical trial. I have made the same clinical observations as have many readers here—like them, what I see suggests that stents are a promising treatment modality for venous patients. But, we shouldn't just dive ahead. Only by staying humble and working hard to document patient outcomes can we ensure that patients are truly receiving beneficial therapy that outweighs risks and costs. Let's all do the same! If we complete this study and it finds benefits for stents, then in a few years, we will be writing "Who Are Your 'Always Remember to Stent' Patients?" articles for journals and magazines that serve audiences in hematology, vascular medicine, and general medicine. That's the future we need!

*(Continued on page 54)*

*(Continued from page 50)*

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Naturally, the usual suspects are patients with a deemed lack of inflow. However, there the challenge has already risen. What is insufficient inflow? In fact, nobody knows. Yes, there are some theories based on imaging. These can be used for the majority of patients with acceptable consistency. However, there are always patients who don't fit the picture. By following these "rules" of adequate inflow, these patients will be denied a treatment that could end years of intense suffering. There is no way to tell if a single patient will have blocked stents or benefit lifelong from open stents. I, for one, am not willing to make a definite decision based on imaging only. To approach the "truth" as much as possible, I take a holistic view and relate this to imaging results. I always search for the optimal balance between the awaited clinical benefit and the risks for the patient. These risks should also include the disappointment of a failed procedure (eg, reocclusion of stents) because QOL is also dependent on this. For example, for patients with limited symptoms and profound venous pathology, a conservative interventional strategy may be advisable. On the other hand, an incapacitated patient with nonhealing venous ulcers may still be a candidate for a venous stent procedure, regardless of extensive postthrombotic scarring of all inflow veins (ie, deemed insufficient inflow).

Therefore, an unambiguous answer to the question of which patients I would never stent is barely possible. However, a noncompliant, immobile, morbidly obese patient with occluded femoral and deep femoral veins and antiphospholipid syndrome is one for whom I would probably advise against deep venous recanalization. ■