

LITERATURE HIGHLIGHTS

Association Between Sex and Clinician- and Patient-Reported Outcomes After Endovenous Ablation

In *Journal of Vascular Surgery: Venous and Lymphatic Disorders*, Cher et al published an analysis of the Vascular Quality Initiative Varicose Vein Registry (VQI VVR) that found a similar benefit and lower incidence of postprocedural complications after endovenous ablation in women as compared with men.¹

Investigators retrospectively reviewed data from the VQI VVR to evaluate a cohort of men and women undergoing endovenous ablation for superficial venous disease, focusing on the effect of sex on patient and disease characteristics as well as postablation outcomes.

One of 12 major vascular procedural registries within the VQI, the VVR prospectively collects patient demographic, diagnostic, preoperative, intraoperative, and postoperative data for superficial venous procedures. Importantly, the VVR includes both patient- and physician-reported outcomes. Follow-up, which included CEAP (clinical, etiologic, anatomic, and pathophysiologic) class and Venous Clinical Severity Score (VCSS) score, was recorded at both 0 to 3 months postprocedure and > 3 months postprocedure. A patient quality-of-life survey was completed preprocedure and at follow-up.

Patients were included if they underwent a radiofrequency or laser procedure in the lower extremity to ablate truncal veins between 2015 and 2019. A total of 9,743 patients met the inclusion criteria—3,090 (31.7%) were men and 6,653 (68.2%) were women. Average age, percent non-White race, and body mass index (BMI) were similar across men and women.

Pre-, post-, and periprocedural change in VCSS and total symptom score were reported and evaluated by sex, as was the rate of complications. Using multivariable analysis, linear and logistic regression models examined the relationship between sex and each of the included patient demographics and clinical character-

KEY FINDINGS

- Women and men benefit similarly from endovenous ablation regarding clinician-reported outcomes (VCSS score), but women benefit more in terms of patient-reported outcomes (symptom score).
- Incidence of complications from endovenous ablation is low overall and even lower for women.
- Female patients with high BMI, presence of deep reflux, and preoperative CEAP class 2 who undergo endovenous ablation have a greater periprocedural change in VCSS than the same groups of male patients.

istics, as well as change in VCSS score, change in total symptom score, and likelihood of incidence of complication by sex.

In terms of physician-reported outcomes, women and men had a similar benefit from endovenous ablation; however, women presented pretreatment and at follow-up with a lower average VCSS score (preoperative and postoperative VCSS scores, 7.54 and 3.50 for women vs 8.84 and 4.47 for men; $P < .001$ and $P < .0001$, respectively). Perioperative change in VCSS score was greater for men than women.

In terms of patient-reported outcomes, women presented with a higher average total symptom score (14.95 for women vs 14.10 for men; $P < .0001$), but women and men had similar average total postoperative symptom scores (4.36 for women vs 4.60 for men;

$P = .07$). Perioperative change in symptom score was greater for women than for men.

The incidence of complications was low overall, but women had a lesser incidence of most postprocedural complications.

Finally, the regression analyses revealed that among patients with high BMI, presence of deep venous reflux, or preoperative CEAP class 2, women benefited significantly more than men. Among men and women with a BMI > 40 kg/m², women had a 0.69-point-greater periprocedural improvement in VCSS score (95% CI, 0.32-1.05). Among those with deep reflux, women had a 0.25-point-greater periprocedural change in VCSS score (95% CI, 0.07-0.44). Finally, among those with preoperative CEAP class 2, women had a 0.32-point-greater periprocedural decrease in VCSS score (95% CI, 0.07-0.57).

Limitations of the study were mainly due to the nature of the VVR, which does not have data on presence of tributaries or location of deep reflux or postoperative ultrasound data. Additionally, there could be residual confounding by variables not captured because the study was observational.

Overall, women benefited similarly to men from endovenous ablation in terms of clinician-reported outcomes but had greater benefit in patient-reported outcomes. The findings from this study highlight the utility of patient sex in counseling and selection for endovenous ablation, particularly among patients with high BMI, presence of deep venous reflux, or preoperative CEAP class 2. ■

1. Cher BAY, Brown CS, Obi AT, et al. Women benefit from endovenous ablation with fewer complications: Analysis of the Vascular Quality Initiative Varicose Vein Registry. *J Vasc Surg Venous Lymphat Disord.* 2022;10:1229-1237. e2. doi: 10.1016/j.jvsv.2022.05.013

ENDOVASCULAR TODAY ASKS...

Investigators Benjamin Cher, MD, with UW Health in Madison, Wisconsin, and Andrea Obi, MD, with University of Michigan in Ann Arbor, Michigan, expanded on the study's findings and its real-world applications.

What was the thought process behind selecting the association between sex and clinician- and patient-reported outcomes as your area of study, and what led you to choose the VVR as your data source?

Dr. Cher: Thank you so much for your interest in our work! This study integrates two emerging ideas in clinical research that are fascinating to me. First, patients are sometimes better at understanding how they are affected by their disease than physicians are. Sometimes "objective" scales measured by physicians fail to encapsulate patients' complete experiences of their disease. Second, we are learning more about how biological sex can affect progression of many diseases, so we were interested in how sex affected patients' experiences with venous disease. Also, we are becoming more aware of how gender can shape patients' interactions with their physicians due to implicit bias and other structural aspects of our health care system.

One notable finding was that women presented with lower average VCSS and CEAP scores.

What are the potential reasons for differences in presentation? Is there a need for a change in approach to account for these differences, and if so, what might that look like?

Dr. Obi: I think this finding highlights the importance at looking at disease from all angles. CEAP and VCSS are generally considered to be complementary approaches to evaluating disease severity. However, the data from patient-reported outcomes suggest that for the same severity of disease, women experience more symptoms that lead to greater impact on the quality of their day-to-day life. This is a fascinating finding and really emphasizes the need to collect data from the patient's experience of the disease.

It is likely that the reason for this is multifactorial: We can hypothesize that hormonal changes may drive some of the differences, but we know that genetic, behavioral, physical, and environmental influences as well as economic and social conditions all contribute to disease pathophysiology and experience of disease. With a focus now from the National Institutes of Health and other research organizations on gender equity in research, I am hopeful we are now at the ideal time to start unraveling these factors.

In the meantime, these data are really important for advocacy. We know that, increasingly, third-party payers are restricting access to endovenous therapies by imposing waiting periods and tedious prior authorizations. This type of practice may disproportionately affect women, as they make up the majority (at least in this data set!) of individuals seeking therapy and have a worse patient-reported experience of the disease in the milder forms.

It was noted that patient sex can be useful for patient selection and counseling for endovenous ablation. What does that look like practically, and how would you personally advise patients regarding this procedure?

Dr. Obi: Generally speaking, these data confirm much of what those routinely performing these procedures already know: Women with symptomatic venous disease almost uniformly benefit from endovenous ablation. They are some of the happiest patients! What these data add to my daily practice is a bit of perspective on the subsets of patients in whom we have traditionally thought may not derive as much benefit, such as those with elevated BMI and deep venous insufficiency.

For example, data published in 2008 by the now-President of the American Venous Forum, Dr. Bill Marston and colleagues, tied endovenous ablation outcomes to degree of deep venous (particularly popliteal) reflux¹; a more recent study by Deol et al in 2020 suggested that venous outcomes were progressively worse with increase in BMI.²

So, what these data add is some context to the conversation. I can now approach a woman with these risk factors and tell her that while there are some anatomic reasons that may work against her, we know that in general, women of a similar profile to her tend to benefit in the contemporary real-world setting, with low risk of complications. It allows us to have some more nuance in these preoperative risk/benefit discussions.

How would you contextualize the relevance of these results for the specific patient groups that did not experience the highest benefit?

Dr. Obi: One aspect of superficial vein care that may not come across in this article, since it was so

focused on dissecting sex-related differences, was the overall exceptionally favorable outcomes from venous interventions. Although women seem to get the most “bang for the buck” in terms of symptom relief and fewer complications, men experience excellent results in terms of decreased disease severity with a relatively low-risk side effect profile.

What are the areas for future research, either expanding on the data uncovered here or in the broader context of superficial venous disease? What questions would you like to see addressed?

Dr. Obi: There are still so many questions to be answered in the field of superficial venous disease. As surgeons, we get really focused on the next better technology to treat the mechanical problem in a less invasive way, with fewer complications. But, one area that is really understudied and highlighted by this paper is a lack of understanding about the biology of the disease.

In 2018, Fukaya and colleagues published a large study evaluating the genetic and clinical determinants of varicose vein disease.³ This was one of the first steps toward understanding what is driving the pathobiology behind this disease. Many patients come back years after successful endovenous therapies with new disease in the anterior accessory saphenous vein or varicosities arising from a now-incompetent perforator. Why does this occur? How does the interplay between genetics, biology, and flow dynamics work to drive these changes? How are patient’s day-to-day activities and habits playing into the process? A better fundamental understanding of the disease will open the door for totally new and innovative therapies that go beyond simply closing off the offending veins. ■

1. Marston WA, Brabham VW, Mendes R, et al. The importance of deep venous reflux velocity as a determinant of outcome in patients with combined superficial and deep venous reflux treated with endovenous saphenous ablation. *J Vasc Surg*. 2008;48:400-405; discussion 405-406. doi: 10.1016/j.jvs.2008.03.039

2. Deol ZK, Lakhani S, Franzon G, Pappas PJ. Effect of obesity on chronic venous insufficiency treatment outcomes. *J Vasc Surg Venous Lymphat Disord*. 2020;8:617-628.e1. doi: 10.1016/j.jvsv.2020.04.006

3. Fukaya E, Flores AM, Lindholm D, et al. Clinical and genetic determinants of varicose veins. *Circulation*. 2018;138:2869-2880. doi: 10.1161/CIRCULATIONAHA.118.035584