Abstract

Background: Varicose veins are considered a chronic venous disease. Delaying treatment might cause several late complications that contribute to a high burden on healthcare systems. It may be treated with endovenous laser ablation (EVLA) and stab avulsion as additional procedures. Varicose direct ablation has been promoted to replace stab avulsion in certain conditions. The purpose of this report is to describe a detailed procedure of the first successful direct varicose ablation with Utoh’s technique using EVLA without any surgical incision in a 71-year-old female presenting varicose vein.

Case report: A 71-year-old female came to the outpatient clinic with a large bulging vein in her leg. Duplex ultrasound showed that the great saphenous vein (GSV) was incompetent with a varicose vein in the medial part of proximal GSV below the knee. The patient underwent EVLA with direct varicose ablation using Utoh’s technique. Duplex sonography evaluation showed the right GSV was utterly obliterated, including the varicose vein. The patient was discharged two days after the procedure without significant complaints nor pain medication.

Conclusions: Direct varicose ablation was proposed as a better alternative than stab avulsion. The varicose vein can be managed with EVLA without a scalpel, incision, avulsion, or phlebectomy. In this case presentation, the endovascular therapeutical approach with Utoh’s ablation technique showed promising results, and no complication
was found in the patient.

**Keywords**

Varicose Vein, Endovenous Laser Ablation, Stab Avulsion, Utoh's Technique

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**Author roles:** Taofan T: Conceptualization, Writing – Original Draft Preparation; Utoh J: Conceptualization, Supervision; Dakota I: Writing – Review & Editing; Indriani S: Writing – Review & Editing; Abdillah C: Writing – Review & Editing; Kartamihardja AHA: Writing – Review & Editing; Adiarto S: Writing – Review & Editing; Sukmawan R: Writing – Review & Editing

**Competing interests:** No competing interests were disclosed.

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Introduction
Chronic vein insufficiency (CVI) is one of the most common cardiovascular pathologies. The reported prevalence showed significant variability depending on the study population, methodology, and classification. Its prevalence is still underestimated because many people affected by this disease don’t seek help as long as the signs and symptoms don’t bother them. The available results varied from 2-56% in the male population and 1-60% in the female population. CVI is more common with increasing age.1,2

Varicose veins are considered a chronic venous disease (CVD). It is characterized by enlargement and tortuous aspect of superficial veins in the subcutaneous tissue, including saphenous veins, saphenous tributaries, among others. In the United States, approximately 23% of adults between ages 40 and 80 years had varicose veins, which are generally more common in women and older adults. Delayed treatment might cause several late complications, including venous ulceration, contributing to a high burden on healthcare resources.3,4

Endovenous laser ablation (EVLA) is one of the non-surgical intervention options able to obliterate the affected veins. It uses heat to damage the vein wall, leading to fibrosis and the collapse of the vein.5 It usually targets lower extremity veins, including the great saphenous vein (GSV), small saphenous vein (SSV), and saphenofemoral junction. Varicosities originating from GSV and SSV can be treated with EVLA. However, large varicose veins require additional procedures such as ambulatory phlebectomy or stab avulsion.6 Direct varicose ablation is not common in general practice. A study by Park et al., published in 2007, suggested that direct laser ablation couldn’t replace classic methods for treating branch varicosities because of the high failure rate and risk of burned skin.7

Recently, a study by Utoh et al. showed that in more than 44 patients with varicose veins treated by direct laser ablation using a16 G needle to insert the fiber into the varicose lumen, 93% cases of varicose vein had been obliterated, and there were no adverse events were observed.8

The purpose of this report is to describe detailed procedure of the first successful direct varicose ablation with Utoh’s technique using EVLA without any surgical incision in a 71-year-old female presenting varicose vein at the National Cardiovascular Centre Harapan Kita, Jakarta, Indonesia.

Case report
A 71-year-old female came to the outpatient clinic with a history of swelling and numbness in her leg more than six months. These complaints were also accompanied by a large bulging vein. She was experiencing heaviness, tiredness, and throbbing in her lower leg. The patient had a history of EVLA with varicose vein stab avulsion on her left leg two months prior. After the first procedure, she had to take the medication in order to reduce her pain for several days.

Vital signs of the patient were: blood pressure 88/56 mmHg, heart rate 93 beats/min, respiratory rate 26 times/minute, and a temperature of 36.5°C. Her weight was 60 kg. Chest and abdominal physical examination were normal. Both lower limbs were warm. Peripheral edema was found in both legs, more prominent on the right side with visible varicose vein in right popliteal region. Laboratory examinations were within normal limits. Electrocardiography (ECG) showed left axis deviation. Chest X-ray revealed cardiomegaly with cardiothoracic ratio of 65%. Echocardiography showed normal left ventricular systolic function with ejection fraction of 61%, concentric left ventricular hypertrophy with grade I diastolic dysfunction. Lower extremity duplex ultrasound investigation revealed severe incompetence of the right GSV above and below the knee (reflux >500 ms), deep vein, and varicose vein in the mid part of the proximal GSV below the knee. Diameter of the right Sapheno-femoral junction (SFJ) was 8.0 mm, proximal above-the-knee (ATK) was 8.2 mm, mid ATK was 5.0 mm, distal ATK was 4.0 mm, proximal below-the-knee (BTK) was 4.0 mm, and distal BTK was 1.8 mm. Diameter of the varicose vein was approximately 4.5 mm. The left GSV was utterly obliterated. There was no DVT in both legs. The arterial flow was normal in both legs.

The patient was diagnosed with CVI with varicose veins. She was planned to undergo EVLA on her right leg, including direct ablation on the varicose vein.
The procedure was using 1470-nano meter wavelength laser device and ELVeS radial slim-type fiber (Biolitec, Bonn, Germany). Initial puncture was done with 6F Radiofocus introducer kit (Terumo Medical Corp., Piscataway, NJ, USA) at right distal BTK GSV and laser fiber was introduced until 2.5 cm distal from SFJ. Tumescent anesthesia was applied along the GSV. EVLA was done with laser power of 6 W linear endovenous energy density (LEED) 50 J/cm in proximal until distal ATK GSV, 5 W LEED 40 J/cm in distal ATK GSV until mid BTK GSV, and 2 W LEED 20 J/cm in mid until distal BTK. The laser fiber pullback speed was 0.14 cm/s. For the varicose vein, we used the same laser fiber and puncture was done with curved-like 16G IV catheter (Terumo Corp., Tokyo, Japan) (Figure 1). We punctured the varicose vein

![Figure 1. Bending Technique for Needle Puncture.](image1)

![Figure 2. IV Cath Insertion Guided with Ultrasound.](image2)
Figure 3. Pre and Post Procedural Clinical Condition.

Figure 4. Clinical Condition 1 Month After Treatment.
with the ultrasound-guided method and inserted the fiber into the lumen (Figure 2). Tumescent anesthesia was applied along the varicose vein. The laser power used for varicose ablation was 3 W LEED 20 J/cm. With a similar technique, the fiber was slowly withdrawn with the speed of 0.14 cm/s. Total ablated length was ± 40 cm with total tumescent anesthesia amount was 650 mL.

Duplex sonography evaluation showed right GSV was utterly obliterated, including the varicose vein. The epigastric vein was still patent, with no evidence of deep vein thrombosis. The patient was still hospitalized for one day in order to observe if there was an early complication. She felt better than the first procedure because the pain was more tolerant. No events such as skin burns or thrombophlebitis were observed (Figure 3). The patient was discharged from the hospital without any significant complaints nor any medication. One month after the treatment, there was no any recurrence or complaint that found in patient (Figure 4).

Discussion

CVD can present a wide clinical spectrum, ranging from asymptomatic with cosmetic problems only to severe manifestations such as reticular veins, edema, hyperpigmentation, eczema, varicose veins, and ulcers. Varicose veins are a common clinical manifestation of CVD. Varicose veins are veins that are enlarged and tortuous with a diameter greater than 3 mm. It might involve saphenous veins, tributaries, or non-saphenous superficial leg veins.

The primary risk factor was female, older age, multiparity, sedentary lifestyle, obesity, and history of venous thromboembolism. Works continually in a standing position are at high risk of developing varicose veins. Despite the multifactorial etiology of varicose veins, genetic and parental factors are understudied.

The varicose vein can be diagnosed by physical examination and further classified with a CEAP classification score to document the severity of the disease. It consists of clinical features of venous disease ranging from C0 (no visible signs of venous disease) to C6 (venous ulceration). The etiology of the venous condition should be determined, such as congenital, primary, or secondary. The anatomical classification depends on the location of the incompetence, including superficial, deep, or perforator. Lastly, the pathophysiology is classified into reflux, obstruction, or a combination of these conditions.

Clinical manifestations include leg discomfort, heaviness, and pressure sensation after prolonged standing and are relieved by leg elevation, compression stockings, walking, or any measure that lowers venous pressure. Some cases are often asymptomatic but still concerned about the cosmetic appearance. Our patient felt discomfort and throbbing in her leg and pressure sensation after prolonged standing. The symptoms were relieved by leg elevation. There was no pain when she used her muscle to walk, indicating the problem wasn’t artery obstruction. On the medial part of the distal femoral region, dilated and bulging superficial veins were clearly seen, especially when she was in a standing position. Because of that, she was classified into the C2 category.

Our patient had already used compression stockings on both legs for several weeks. She did not feel any difference. Then, she was suggested to undergo endovenous laser ablation on her right leg and planned to have direct varicose ablation. EVLA has been introduced as an alternative to classic surgical stripping in managing venous vein insufficiency of the GSV and SSV. Although surgical intervention was the gold standard for treatment after the procedure for more than a century, the days off work were very long, ranging from 18-28 days with a recurrence rate of 40% after five years of procedure. For that reason, developing minimally invasive techniques was necessary.

The purpose of endovenous ablation modalities is to obliterate the insufficient vein segment. It involves a heat generator that causes local thermal injury to induce thrombosis and fibrosis. It also requires ultrasound that may detect the location of the fiber and safely advance it into near Sapheno-Femoral Junction (SFJ). Tumescent anesthesia is essential for this procedure. It is a technique to give a high volume but low dose anesthesia under the skin. It contains a normal saline solution with lidocaine, sodium bicarbonate, and epinephrine. An injection pump helps this solution to infiltrate into the surrounding vein area. It reduces pain and prevents burn or nerve damage by creating a heat sink that compresses the vein so the thermal energy focuses on the target vein.

Diode laser is very common in EVLA procedures. It allows continuous light emission in parallel directions and is relatively cheap. The fiber is inserted through the great saphenous vein using a 1470 nm diode laser, an average LEED (Linear endovenous energy density) of 50-75 joule/cm is used to the vein wall. The energy is related to the diameter of the vessel. A larger vein needs more energy to be destroyed. After infiltrating tumescent local anesthesia, the fiber is withdrawn continuously at one millimeter per second until reaching the most proximal part of the targeted vein.
This procedure is indicated based on anatomical, clinical, and functional conditions. The anatomical indication of the procedure was based on Class 1A recommendation from the Guidelines of the First International Consensus Conference on Endovenous Thermal Ablation for Varicose Vein Disease, stating that endovenous thermal ablation is applicable in great saphenous vein and small saphenous vein. The functional indication is based on reflux time. A reflux time of more than 500 ms in the superficial vein is indicated for the procedure. Patients with clinical classification C2 and above are clinically indicated.14

On the other hand, the procedure is contraindicated if the patient has acute deep vein thrombosis, acute superficial phlebitis, obstruction of the deep vein, or acute infection at the puncture site. Several conditions should avoid undergoing EVLA, such as pregnancy, a significant peripheral arterial disease with a prominent decrease of ankle-brachial index, allergy to the tumescent solution, or immobilized patients caused by severe chronic disease.14

Our patient came to the outpatient clinic with symptoms of chronic venous disease, including swelling, numbness, heaviness, tiredness, and throbbing in the right lower leg. She also had a varicose vein in the medial part of the right tibial proximal. From her last duplex ultrasound examination, reflux time was 1020 ms. There was no evidence of deep vein thrombosis or occlusion. Her peripheral artery was good, without visible plaque seen. After this clear indication and without any contraindication, she was admitted to the procedure room.

The initial procedure was standard EVLA for the great saphenous vein as the primary target using a 1470 R diode laser. The fiber was inserted through GSV, and the tip was placed at a maximum of 2 cm from SFJ, confirmed using ultrasound and visualization of the red beam through the skin. The distance was related to the possibility of endothermal heat induced thrombosis (EHIT) and the recurrence rate due to the recanalization process that tip distance from SFJ > 2.5 cm correlated with a low prevalence of EHIT.15 On the other hand, minimal distance from the tip to SFJ was correlated with a more successful procedure and reduced recurrence rate.16

Utoh et al. introduced the technique to infiltrate a tumescent solution between SFJ and the distal tip of the fiber. The most proximal part of GSV was compressed because of the tumescent infiltration, so the fiber can be placed as near as 5-10 mm from the epigastric vein to maximize the chance of a successful procedure. At the same time, the EHIT complication still can be avoided17 based on anatomical consideration, and it is known that EVLA on the distal below the knee is at high risk of causing nerve damage in the saphenous region. The distance between the vein and the nerve is getting closer distally.17

Utoh et al. showed that enough tumescent local anesthesia surrounding the vein and keeping the distance between the nerve and vein effectively reduced post-procedural neurologic symptoms. This study also introduced modifications regarding the use of energy and LEED. The energy used on GSV above the knee was 7 watts with a LEED of 50-70 J/cm. When it reached bifurcation of the posterior arcuate vein, the ablation was temporarily stopped, and the energy was reduced to 5 watts with a target LEED was 20-25 J/cm. This method is known as two-step ablation, and the outcome was extraordinarily effective without any complication of nerve injury from 90 consecutive limbs.17

We used a similar method with two steps of ablation. We started using energy at 6 watts with LEED 50 J/cm from the proximal part of GSV above the knee until the distal above the knee. Then we continued with lower energy and LEED until the distal part of GSV below the knee. The speed of fiber traction was persistent at one centimeter every seven seconds.

After performing ablation of the incompetent saphenous vein, collateral varices resection by stab avulsion method is regularly performed. Although the stab avulsion method is widely accepted, it may cause many adverse events, such as postoperative bleeding, pain, neuropathy, and wound infection, even though it involves only a few millimeters of the incision. Conversely, sclerotherapy is one option for treating varicose without skin incision. However, it was related to significantly higher complication rate such as pain, persistent ecchymosis, pigmentation, and local induration.14 It is also yet to be available in our cases, she already had experience with stab avulsion, and she felt prolonged pain after the procedure, although the varicose was completely obliterated.

Myers and Clough have mentioned that major varicose tributaries can be treated by EVLA in 83% of cases without complications were found.18 Varicose vein ablation with Utoh’s ablation technique had recently been used as an alternative to the stab avulsion method, which did not require skin incision, had fewer adverse events, and could be done after EVLA treatment. 66% of a side branch varicose vein may collapse or spasm right after GSV main trunk ablation. Thus, they didn’t need an additional procedure. However, there are some uncertainties regarding whether the residual varicose will spontaneously be regressed. If left untreated, postoperative thrombophlebitis would be a risk, which could trigger long-term recurrence after the procedure. Therefore, EVLA on varicose veins was still recommended.8 Utoh
also has published a case series with total of 939 legs safely treated varicose vein with his technique without skin burn or nerve injury was found and 100% complete occlusion of the varicose vein after 1 month of procedure.20

For our patient, after the regular procedure, we punctured the varicose using Utoh’s ablation technique under ultrasound guidance with a 16 G needle; then the slim radial fiber was inserted without using any sheath. A tumescent solution was given to protect the surrounding tissue. Low energy was used to ablate the varicose because the diameter was 3 mm; the energy should be set based on diameter according to the latest study.17

The fiber was retracted with constant speed, similar to GSV ablation. The result was good, with the varicose vein completely obliterated, and she could walk not long after the procedure. No complications were observed; the next day, the patient underwent post-procedure evaluation using duplex ultrasound. The right GSV was completely obliterated from the proximal above the knee until the distal part below the knee without visualizing the varicose vein. There was no thrombus in the deep vein, as we were concerned about EHIT after the EVLA procedure.

This procedure showed that varicose ablation using the Utoh’s direct varix ablation technique was an ideal option and seriously challenged stab avulsion method with similar efficacy but more comfortable for the patient and fewer adverse event. The possible indication was (not limited to) a patient with a history of thrombophlebitis, varicose on the anterior tibial region, static dermatitis, and patients undergoing anticoagulant therapy in which stab avulsion was not recommended. At this early stage of clinical application, the selection of cases was appropriate regarding the complexity of varicose veins. However, we still believe there is room for improvement and expanding the indication of this procedure.

Based on previous experience with stab avulsion, skin incisions for varicose are often performed in patients with sizeable varicose, leading to postoperative bleeding, nerve damage, and risk of scar formation. However, surgical stab avulsion might not be avoided significantly in some conditions when the varicose lumen narrows due to spasm or collapse and is difficult to puncture.

Conclusions
A case of CVI with varicose veins as a clinical manifestation has been reported. The current therapeutic strategy was EVLA on GSV with additional stab avulsion or ambulatory phlebectomy. Utoh’s direct varicose ablation technique was proposed as a better alternative with an enormously successful rate and as effective as phlebectomy with reduced risk of bleeding, pain, neuropathy, or wound infection. It can be totally managed with EVLA without a scalpel, incision, avulsion, or phlebectomy.

Patient consent
Written informed consent has been obtained from the patient to publish the case report and accompanying images.

Data availability
Underlying data
All data underlying the results are available as part of the article and no additional source data are required.

Acknowledgements
We want to thank the patient for allowing us to have their case published.

References


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The authors present an endovenous technique of treatment of varicose veins on the basis of a case. More specifically, they address the issue of removal of side branches in the context of thermal treatment of truncal venous insufficiency. In this regard, the authors present a method of eliminating such varicose veins through tributaries of the great saphenous vein by means of cannulation and laser ablation with a radially emitting laser. This appears potentially gentler than open surgical removal by phlebectomies, which is often used in such situations.

The case description is detailed. Nevertheless, technical details are missing in important places. More importantly, it seems that existing evidence from other publications is not sufficiently mentioned or discussed. Also, observational studies with quite large cohorts have recently been published by one of the authors, fitting the particular case presented. Therefore, I have reservations about publishing this case report.

I have expanded upon my views below:

○ Is the background of the case's history and progression described in sufficient detail?
  Yes, the clinical history is well reported
○ Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?

Not complete. The diameter of the great saphenous vein and the varicose tributaries would be interesting. Also, it would be important to know exactly the level to which the venous valves are defective or the length to which the reflux of the great saphenous vein exists before it is then transmitted via the side branch, if applicable. It would also be valuable to know the total energy delivered. Was the same laser fiber used for the tributaries/varices also used to ablate the trunk? Also, to establish reproducibility of the method, the manufacturer of the lasers used here should be accurately stated. In the discussion section, the authors (correctly) mention the need for tumescent infusion. However, this step was not described in the case report. This should be clarified.
Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis, or treatment?
There are some deficits here. First of all, it is not sufficiently mentioned that there are indeed scientific studies and descriptions of the direct ablation of varicosities/tributaries by other working groups. As an example, we refer to the work of Wang et al. (DOI: 10.1016/j.jvir.2018.01.774) and Myers et al. (DOI: 10.1258/phleb.2011.011088). It is conceivable that there is additional literature on the topic.

It is also not clear what purpose this case report serves in relation to other previous work. On the one hand, reference is correctly made to the prior papers, which, however, were published in a Japanese-language journal by one of the authors (Junichi Utoh), who has apparently already treated hundreds of cases with the described technique. On the other hand, however, it is not mentioned that in early June 2023, two case series studies were published by the same author (Junichi Utoh) in the journal *Phlebology*, also involving hundreds of patients treated with the techniques described.

Is the case presented with sufficient detail to be useful for other practitioners?
Yes, it is. The Author report a good practice management.

I would like to express that there are deficiencies in this paper in terms of the scientific approach to the subject. Such a description of a technique, which is elsewhere thematized in large case series, may make sense, considering the detail with which this single case is described. However, the rationale for such a separate case description should also emerge from this; here, further arguments are needed.

**References**

Is the background of the case’s history and progression described in sufficient detail?
Yes

Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?
Partly

Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis or treatment?
No

Is the case presented with sufficient detail to be useful for other practitioners?
Yes

**Competing Interests:** No competing interests were disclosed.
Reviewer Expertise: General surgery, phlebology, endovenous thermal ablation, vein surgery, ultrasound

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 01 Jul 2023

Taofan Taofan

We would like to thank the reviewer for the brief review of our article. Here we mentioned some of the revisions we made to the article according to the reviewer’s points:

Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?

Not complete. The diameter of the great saphenous vein and the varicose tributaries would be interesting. Also, it would be important to know exactly the level to which the venous valves are defective or the length to which the reflux of the great saphenous vein exists before it is then transmitted via the side branch, if applicable. It would also be valuable to know the total energy delivered. Was the same laser fiber used for the tributaries/varices also used to ablate the trunk? Also, to establish reproducibility of the method, the manufacturer of the lasers used here should be accurately stated. In the discussion section, the authors (correctly) mention the need for tumescent infusion. However, this step was not described in the case report. This should be clarified.

We've added more detail about the examination, diagnostic test, and treatment given to the article:

Lower extremity duplex ultrasound investigation revealed severe incompetence of the right GSV above and below the knee (reflux >500 ms), deep vein, and varicose vein in the mid part of the proximal GSV below the knee. The diameter of the right Sapheno-femoral junction (SFJ) was 8.0 mm, proximal above-the-knee (ATK) was 8.2 mm, mid ATK was 5.0 mm, distal ATK was 4.0 mm, proximal below-the-knee (BTK) was 4.0 mm, and distal BTK was 1.8 mm. The diameter of the varicose vein was approximately 4.5 mm. The left GSV was utterly obliterated. There was no DVT in both legs. The arterial flow was normal in both legs.

The procedure was using 1470-nano meter wavelength laser device and ELVeS radial slim-type fiber (Biolitec, Bonn, Germany). The initial puncture was done with 6F Radiofocus introducer kit (Terumo Medical Corp., Piscataway, NJ, USA) at right distal BTK GSV and laser fiber was introduced until 2.5 cm distal from SFJ. Tumescent anesthesia was applied along the GSV. EVLA was done with laser power of 6 W linear endovenous energy density (LEED) 50 J/cm in proximal until distal ATK GSV, 5 W LEED 40 J/cm in distal ATK GSV until mid BTK GSV, and 2 W LEED 20 J/cm in mid until distal BTK. The laser fiber pullback speed was 0.14 cm/s. For the varicose vein, we used the same laser fiber, and puncture was done with a
curved-like 16G IV catheter (Terumo Corp., Tokyo, Japan). We punctured the varicose vein with the ultrasound-guided method and inserted the fiber into the lumen. Tumescent anesthesia was applied along the varicose vein. The laser power used for varicose ablation was 3 W with LEED 20 J/cm/joule. With a similar technique, the fiber was slowly withdrawn with the speed of 0.14 cm/s. The total ablated length was ± 40 cm with a total tumescent anesthesia amount was 650 mL.

Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis, or treatment? There are some deficits here. First of all, it is not sufficiently mentioned that there are indeed scientific studies and descriptions of the direct ablation of varicosities/tributaries by other working groups. As an example, we refer to the work of Wang et al. (DOI: 10.1016/j.jvir.2018.01.774) and Myers et al. (DOI: 10.1258/phleb.2011.011088). It is conceivable that there is additional literature on the topic.

It is also not clear what purpose this case report serves in relation to other previous work. On the one hand, reference is correctly made to the prior papers, which, however, were published in a Japanese-language journal by one of the authors (Junichi Utoh), who has apparently already treated hundreds of cases with the described technique. On the other hand, however, it is not mentioned that in early June 2023, two case series studies were published by the same author (Junichi Utoh) in the journal Phlebology, also involving hundreds of patients treated with the techniques described.

We've added more scientific studies to the discussion including article by Wang, et al., Myers, et al., and Utoh. The purpose of this case report is to describe the detailed procedure of the first successful direct varicose ablation with Utoh's technique using EVLA without any surgical incision in a 71-year-old female presenting varicose vein at the National Cardiovascular Centre Harapan Kita, Jakarta, Indonesia.

We hope that our revision can provide answers for the reviewer. Please let us know if further revision or detailed information according to our article is needed.

Once again, we would like to thank you for the opportunity given to publish our case. Hope that our article can give new insights about the direct varicose vein ablation using EVLA.

**Competing Interests:** No competing interests were disclosed.
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