

Minimally invasive treatment of recurrent varicose veins with thrombotic complications using EVLA: A case report

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ABSTRACT

We present a clinical case of a 59-year-old male who complained of varicose veins and a burning sensation in the right lower limb. His medical history included bilateral great saphenous vein (GSV) removal (2003), type 2 diabetes mellitus, stage 4 chronic kidney disease, gout, and arterial hypertension. Duplex ultrasound revealed varicothrombophlebitis of the small saphenous vein (SSV) and a floating thrombus in the popliteal vein. Initial treatment consisted of oral anticoagulation with rivaroxaban, followed by EVLA of the SSV and ultrasound-guided sclerotherapy of tributaries. After anticoagulant therapy, partial recanalization of the SSV and thrombus lysis in the popliteal vein were observed. EVLA of the SSV was performed without complications. Anticoagulant therapy was continued in coordination with a hematologist. At 6-month follow-up, duplex ultrasound showed the SSV as a fibrotic cord (diameter 3–4 mm), with regression of symptoms of chronic venous insufficiency. Despite the patient's high-risk profile, individualized management and careful monitoring allowed for the successful performance of a minimally invasive procedure. In selected high-risk patients with recurrent varicose disease complicated by thrombosis, EVLA may be considered following appropriate anticoagulant preparation. This case highlights the potential feasibility of an individualized and staged treatment approach in complex clinical settings.

KEYWORDS: recurrence, varicose veins, EVLA, varicothrombophlebitis, floating thrombus, popliteal vein

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INTRODUCTION

Varicose veins of the lower extremities are an extremely common condition, affecting a substantial proportion of the adult population worldwide. It is estimated that the prevalence of primary varicose veins in adults ranges up to 40% [1]. According to recent systematic reviews, the global prevalence of chronic venous disease (CVD) among adults ranges between 25 % and 60 %, depending on diagnostic criteria and population characteristics [2,3].

Recurrent varicose disease is associated with a deterioration in patients' quality of life and often necessitates repeated treatment, frequently under more complex clinical conditions than at the initial presentation. Despite advances in surgical management, including standard procedures such as crossectomy and vein stripping, recurrence of varicose disease remains a significant clinical issue. Recent meta-analyses report recurrence rates of varicose veins after endovenous thermal ablation ranging from 10 % to 25 % within five years, which remains significantly lower than after

conventional surgery [4,5]. This variability is attributed to differences in surgical techniques, patient characteristics, and postoperative monitoring protocols [6].

In Europe, the prevalence of varicose veins is estimated to be 30–40% among the adult population, with recurrence rates after great saphenous vein stripping reaching 20–40% over 5–10 years [6]. In the United States, the prevalence of chronic venous insufficiency (CVI), including varicose veins, also remains high. Recurrence following surgical treatment has been reported in 20–60% of cases within 10 years. Even with the use of modern minimally invasive procedures such as endovenous thermal ablation, recurrence occurs in 10–20% of cases within 5 years, which is significantly lower than after open surgery [7].

Precise epidemiological data regarding the prevalence of recurrent varicose vein disease in Ukraine remain limited, underscoring the need for further research in this area.

The main causes and types of recurrence are classified according to their anatomical origin and etiology:

- Recurrence at the saphenofemoral or saphenopopliteal junction due to incomplete ligation, neovascularization, or missed tributaries [4,6].
- Recurrence caused by incompetent perforating veins that remained untreated during the initial surgery [5].
- Progression of the underlying disease, with the development of new reflux zones due to the natural course of CVI and genetic predisposition [6].
- Recurrence from new sources or in anatomical areas not addressed during the initial treatment [4].
- Technical errors during the primary procedure, such as incomplete ligation or failure to remove varicose tributaries [5].

Among the most serious complications of varicose vein disease is varicothrombophlebitis, which may progress to deep vein thrombosis (DVT) or lead to pulmonary embolism (PE). According to a Ukrainian study by Chernukha and Shchukin, DVT was identified in 16% of patients with advanced varicose disease, and PE occurred in nearly 4% of cases [8]. Floating thrombi in the small saphenous and popliteal vein systems pose a particular threat and require urgent diagnosis and a structured, staged treatment strategy [8,9].

In modern vascular surgery, minimally invasive techniques are becoming increasingly prioritized, EVLA now regarded as the “gold standard” for the treatment of varicose vein disease, including recurrent cases [10]. EVLA provides effective elimination of pathological venous reflux with minimal trauma and a short recovery period. This method is especially valuable in patients with significant comorbidities, including diabetes, renal insufficiency, obesity, or cardiovascular disease. According to recent international consensus reports, including the UIP 2023 guidelines, modern minimally invasive techniques such as EVLA are considered safe and effective for the treatment of varicose veins, with significantly fewer complications compared with conventional surgery [11].

In clinical practice, EVLA is being increasingly considered in complex scenarios where varicose disease is accompanied by thrombosis and the procedural risk is elevated. In this context, the purpose of this publication is to present a clinical case demonstrating the successful application of EVLA in a patient with recurrent varicose veins of the lower extremities, complicated by a floating thrombus in the popliteal vein, in the presence of multiple comorbidities.

CASE REPORT

PATIENT INFORMATION AND CLINICAL FINDINGS

Patient Ihor S., born in 1964, presented to the our Medical Center on February 19, 2022, with complaints of varicose veins and burning pain in the right lower limb.

Medical history: In 2003, the patient underwent bilateral GSV stripping. Approximately 10 years ago, new varicose veins developed on the right calf, accompanied by swelling and skin hyperpigmentation in the lower third of the leg. One week prior to the visit, he began experiencing burning pain along the varicose veins of the right calf.

Past medical history: In 2000, the patient underwent surgery for a carbuncle of the right kidney. In 2016, he was diagnosed with type 2 diabetes mellitus.

Ultrasound duplex scan (February 19, 2022): Signs of varicose vein disease; status post bilateral GSV stripping. Recurrent varicose disease with sapheno-popliteal reflux in the right lower limb. Varicothrombophlebitis of the right SSV.

Primary diagnosis: Varicose vein disease of the lower limbs.

CEAP classification: C4b, Ep, As, Ap, Pr (recurrent varicose veins after previous GSV surgery).

Status post crosssection and stripping of both great saphenous veins (2003).

Recurrent varicose veins, varicothrombophlebitis of the right SSV.

Comorbid diagnoses: Stage 4 chronic kidney disease. Mixed nephropathy (gouty and diabetic). Gout. Type 2 diabetes mellitus, severe form, subcompensated stage. Grade III arterial hypertension, risk level 4.

The patient was prescribed phlebotonics, rivaroxaban, and laboratory tests. Due to the onset of the full-scale invasion, the patient returned for consultation one year later.

Duplex ultrasound findings (January 23, 2023): Recanalization of the SSV was observed. EVLA was planned, and a preoperative examination was scheduled.

February 1, 2023: The patient presented with examination results for surgical planning. Duplex ultrasound findings: The GSV had been removed entirely; the stump was not visualized. In the proximal segment of the SSV, the diameter was 12 mm; distally — 9 mm. The SSV walls were thickened, with incomplete compressibility of the lumen. Echogenic masses were visible within the lumen; blood flow was parietal. Fig 1. A protrusion of parietal thrombotic material into the popliteal vein measuring 4 cm was observed. Fig 2. The thrombus in the popliteal vein was bathed in blood flow and floating. Fig 3. An incompetent upper Cockett perforator (4 mm) was also identified.

DISCUSSION

Signs of varicose vein disease; status post bilateral GSV stripping. Recurrent varicose vein disease with sapheno-popliteal reflux in the right lower limb. Varicothrombophlebitis of the SSV. Floating thrombus in the popliteal vein.



Fig. 1. Thrombosis of the SSV
Picture taken by the authors



Fig. 2. Thrombosis of the sapheno-popliteal junction with spread to the popliteal vein
Picture taken by the authors

Rivaroxaban was prescribed at a dose of 15 mg, one tablet twice daily for 3 weeks, followed by 20 mg once daily for 3 months. After 20 days, recanalization of the SSV and thrombus lysis in the popliteal vein were observed. Fig 4.

On February 21, 2023, EVLA of the SSV was performed. In the early postoperative period, ultrasound-guided foam sclerotherapy of the SSV tributaries was carried out. Rivaroxaban therapy was continued at 20 mg daily for up to 2

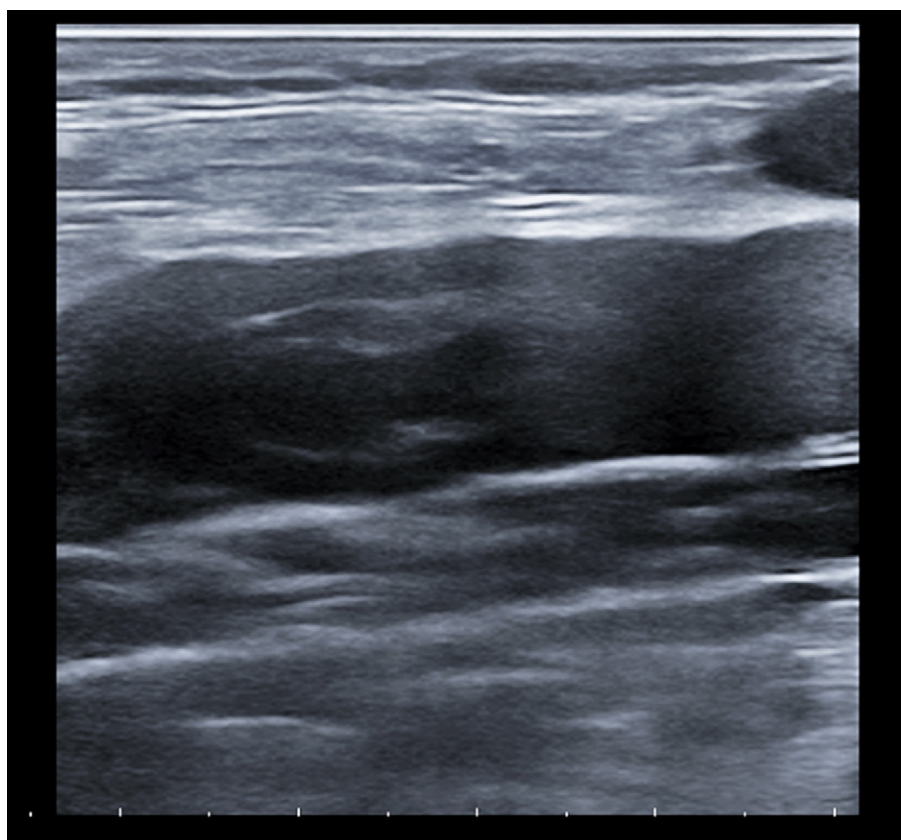


Fig. 3. Floating thrombus in the popliteal vein
Picture taken by the authors



Fig. 4. Sapheno-popliteal junction after resorption of thrombotic masses on the background of the anticoagulant therapy
Picture taken by the authors

months, followed by a maintenance dose of 10 mg daily on a long-term basis in coordination with a hematologist.

At the 6-month follow-up, complete regression of CVI symptoms was noted. Duplex ultrasound revealed

a fibrous cord in the projection of the MPV with a diameter of 3–4 mm and its partial resorption; no signs of recanalization or thrombotic masses were detected. Fig 5. The patient continues outpatient follow-up care.

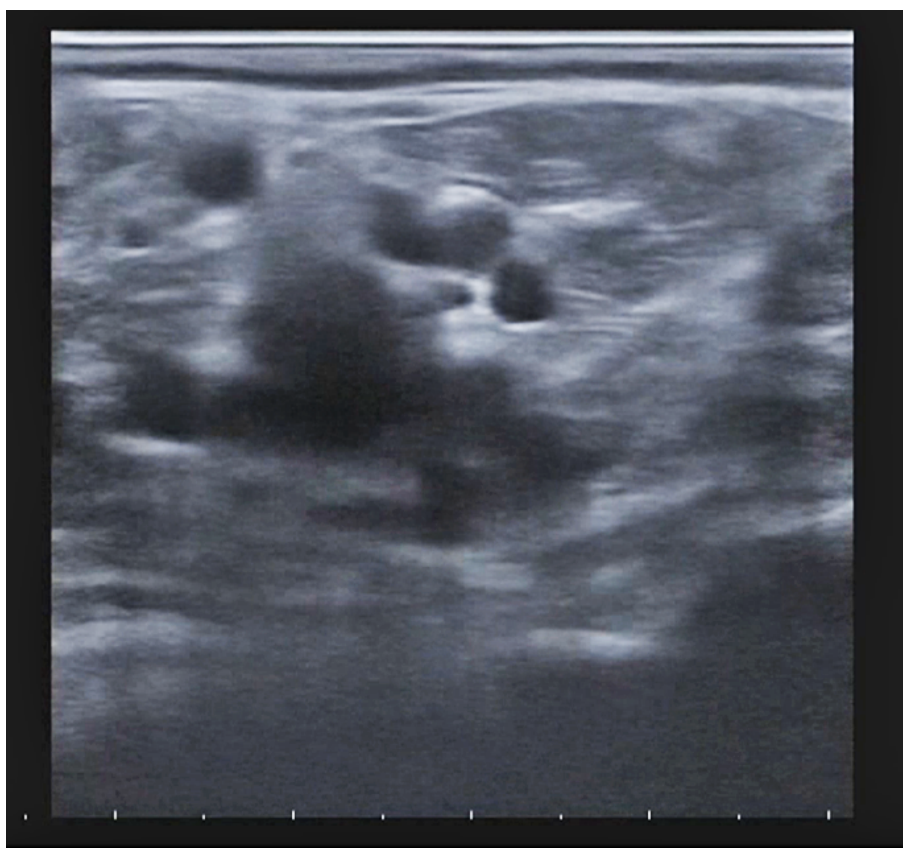


Fig. 5. Resorbption of the SSV after 6 month after the operation

Picture taken by the authors

DIAGNOSTIC ASSESSMENT

The diagnosis was established based on clinical presentation, medical history, and duplex ultrasound findings. The patient presented with typical signs of recurrent varicose vein disease, including swelling, induration, and pigmentation of the lower leg skin. According to the history, the patient had previously undergone classical surgical treatment (crossectomy and GSV stripping); however, several years later, new symptoms developed, suggesting the formation of compensatory venous hemodynamics and disease recurrence.

Ultrasound examination revealed thrombosis of the SSV at the level of the saphenopopliteal junction, with thrombus extension into the popliteal vein, the presence of floating thrombi, absence of flow in the affected segment, and thickening of the venous wall. The proximal end of the thrombus was identified at the lower margin of the popliteal fossa. The presence of a floating thrombus, without signs of stenosis or occlusion of the deep venous system, indicated a high risk of thromboembolic complications. At the same time, deep veins of the lower extremities remained patent, which allowed consideration of a staged minimally invasive intervention following anticoagulant therapy.

Given the presence of type 2 diabetes mellitus, stage 4 chronic kidney disease, and gout, a decision was made to first stabilize the condition conservatively, followed by surgical intervention. Administration of rivaroxaban

at 15 mg twice daily for three weeks, followed by 20 mg once daily, resulted in thrombus lysis in the popliteal vein and partial recanalization of the SSV. This enabled safe performance of EVLA followed by sclerotherapy of tributaries.

THERAPEUTIC INTERVENTION

Following the initial examination and confirmation of the diagnosis of varicthrombophlebitis with a floating thrombus in the popliteal vein, the patient was prescribed rivaroxaban: 15 mg twice daily for 21 days, followed by 20 mg once daily. Dynamic duplex ultrasound monitoring revealed partial recanalization of the thrombosed segment and stabilization of the patient's condition.

In the third week, EVLA of the SSV was performed. The procedure utilized a 1470 nm diode laser (Biolitec) with 2-ring radial fibers. Laser power was set at 9–10 W, with automatic fiber traction at a speed of 0.7 mm/s; the linear endovenous energy density (LEED) was 130 J/cm.

The procedure was performed under tumescent anesthesia and included laser obliteration of the thrombosed SSV segment along with ultrasound-guided sclerotherapy of varicose tributaries. Additional treatments included compression therapy using Class II compression stockings and continued rivaroxaban therapy for another two months under hematologist supervision.

The postoperative period was uneventful. The patient was provided with recommendations for outpatient follow-up, recurrence prevention, and secondary thrombosis prophylaxis.

FOLLOW-UP AND OUTCOMES

At the 6-month follow-up after the intervention, duplex ultrasound demonstrated a fibrotic cord in the projection of the SSV trunk with a diameter of 3–4 mm, without signs of recanalization, thrombotic masses, or venous reflux. All deep veins remained patent. No evidence of recurrent thrombosis or venous hypertension was identified.

Subjectively, the patient reported complete resolution of pain, swelling, nocturnal cramps, and decreased skin pigmentation. During the following 6 months, no episodes of recurrent thrombosis or signs of chronic venous insufficiency were observed.

These treatment outcomes suggest that with a staged approach and close clinical monitoring, EVLA can be safely and effectively applied even in cases of complicated recurrent varicose disease with associated thrombosis.

RELEVANCE OF THE CLINICAL CASE

The presented case of patient Ihor S. is a vivid example of the complexity and multifaceted nature of treating recurrent varicose vein disease of the lower extremities, especially when compounded by severe comorbidities and life-threatening thromboembolic episodes. The significance of this case lies in demonstrating the effectiveness of modern minimally invasive techniques, such as EVLA, in high-surgical-risk patients.

The patient had undergone bilateral great saphenous vein stripping in 2003, indicating a long-standing and progressive course of varicose vein disease. The recurrence, with saphenopopliteal reflux in the right lower limb and subsequent development of small saphenous vein varicothrombophlebitis complicated by a floating thrombus in the popliteal vein, marked a critical clinical turning point. A floating thrombus poses a direct life-threatening risk due to its high potential for pulmonary embolism, rendering this case particularly hazardous.

An additional challenge was the presence of trophic skin changes in the lower third of the leg (hyperpigmentation and edema), which indicated chronic venous insufficiency (C4). These changes further impaired quality of life and complicated the management strategy.

A particularly important aspect of this case is the presence of multiple severe comorbid conditions: stage 4 chronic kidney disease, type 2 diabetes mellitus (severe form), gout, and grade III arterial hypertension. These comorbidities significantly increased both anesthetic

and surgical risks, while also complicating perioperative management. They necessitated a careful multidisciplinary approach to treatment.

This case illustrates how timely diagnosis, intensive anticoagulant therapy, and an adapted minimally invasive strategy allowed clinicians to avoid the high risks associated with open surgery and to achieve a favorable clinical outcome.

OUTCOMES OF TREATMENT IN COMORBID PATIENTS IN THE CONTEXT OF LITERATURE DATA

The treatment of varicose vein disease in patients with comorbidities presents a significant challenge for phlebologists and surgeons. According to the literature, the presence of comorbid conditions such as diabetes mellitus, chronic kidney disease, cardiovascular disease, and obesity substantially increases the risks associated with surgical intervention and can negatively impact long-term outcomes of varicose vein treatment.

Patients with diabetes mellitus, for example, have an increased risk of infectious complications, delayed wound healing, and a higher tendency to develop trophic ulcers [5]. Chronic kidney disease (as in the presented case—stage 4 CKD) may alter the metabolism of medications, including anticoagulants, thereby increasing the risk of bleeding or thrombotic events [1]. Arterial hypertension and gout also require close monitoring during any surgical intervention.

Recent literature increasingly emphasizes the advantages of minimally invasive procedures, such as EVLA, for the treatment of varicose vein disease in patients with comorbid conditions. Compared to traditional open surgery, these methods are associated with reduced procedural trauma, the possibility of performing under local anesthesia, shorter recovery times, and a lower risk of complications [7].

For instance, studies have shown that EVLA is associated with lower postoperative pain scores, fewer hematomas, and faster return to normal activities—factors that are especially important in patients with limited physiological reserves [4]. These benefits make EVLA a viable and effective treatment option even in cases where open surgery may be contraindicated or associated with excessive risk.

RISKS OF OPEN SURGERY IN RECURRENT VARICOSE VEIN DISEASE AND COMORBIDITY

Traditional open surgery, such as redo crosssectomy and vein stripping, is associated with significantly higher risks and technical challenges in recurrent varicose

vein cases compared to primary interventions. Several factors contribute to this complexity:

1. **Anatomical changes and scarring:** Following primary surgery, significant scar tissue forms in the inguinal or popliteal regions. This complicates the identification of anatomical structures and increases the risk of nerve injury (e.g., femoral or saphenous nerves) and damage to lymphatic vessels, potentially leading to lymphorrhea, lymphocele, or persistent limb edema [6].
2. **Increased risk of bleeding:** Scarred tissues are poorly vascularized and do not hold sutures well, which increases the risk of intraoperative and postoperative hemorrhage.
3. **Neovascularization:** One of the main causes of recurrence after open surgery is neovascularization—the formation of new vessels at the site of previous ligation [4]. These newly formed veins are often fragile and prone to reflux, making them difficult to ligate effectively during redo surgery. Open revision may not fully address this phenomenon.
4. **Higher risk of infectious complications:** Any repeated surgical intervention in a scarred zone carries an increased risk of wound infection, especially in immunocompromised patients, such as those with diabetes or chronic kidney disease.
5. **Longer recovery and more pain:** Redo open surgeries are more traumatic, typically associated with greater postoperative pain and longer rehabilitation periods—undesirable in elderly patients or those with significant medical histories.
6. **Anesthetic risks:** In the case of patient Ihor S., the presence of stage 4 chronic kidney disease, diabetes, gout, and grade III hypertension significantly increased the risks associated with general or even regional anesthesia. These included cardiovascular complications, worsening renal function, glycemic instability, and other systemic issues. Open surgery usually requires deeper anesthesia and prolonged operative time.

In the context of this clinical case, where the patient presented with a floating thrombus in the popliteal vein and multiple severe comorbidities, open surgery would have been associated with an extremely high risk of both local and systemic complications, including potentially fatal pulmonary embolism during or shortly after the procedure. The decision to initiate intensive anticoagulant therapy to stabilize the thrombus, followed by EVLA—a less invasive procedure that can be performed under local anesthesia—was both justified and life-saving.

Our clinical observations are consistent with current literature. For example, a study by Gradman WS demonstrated that EVLA is safe in patients with concomitant thrombophlebitis, provided their condition is stabilized and appropriate anticoagulant preparation is administered [10]. In a randomized trial by Guex et al.

[11], the effectiveness of EVLA was compared with vein stripping in patients with varicothrombophlebitis; the EVLA group had a 40% lower complication rate and a 2.5-fold shorter rehabilitation period.

EVLA IN THE TREATMENT OF RECURRENT VARICOSE VEINS

The successful treatment outcome in this case highlights the potential of EVLA as an effective and safe modality for managing recurrent varicose veins, particularly in cases complicated by thrombosis where conventional surgical approaches may carry elevated risks. The mechanism of EVLA involves thermal injury to the venous wall via laser energy, leading to vessel obliteration and subsequent fibrosis. This approach minimizes the risk of neovascularization compared to crosssectionomy and ensures more durable clinical results [7].

MANAGEMENT OF THROMBOTIC COMPLICATIONS

This clinical case also highlights the importance of adequate preoperative management of thrombotic complications. The presence of a floating thrombus required immediate and effective anticoagulant therapy [12]. The use of high-dose rivaroxaban (Xarelto) followed by a maintenance dose allowed for successful recanalization of the small saphenous vein and lysis of the thrombus in the popliteal vein, thereby eliminating the immediate risk of pulmonary embolism and creating a safe setting for EVLA. This underscores the necessity of close collaboration between phlebologists and hematologists, as well as meticulous monitoring of patients at high risk for thromboembolic events.

COMPARISON WITH OTHER TREATMENT MODALITIES

In the context of recurrent varicose disease and complicated cases, EVLA demonstrates significant advantages over open surgery. Alternative minimally invasive methods such as radiofrequency ablation or cyanoacrylate closure are also effective, but the choice of technique depends on the anatomical characteristics of the recurrence, presence of thrombotic complications, and the patient's comorbid status. In this case, where a floating thrombus was present, controlled thermal ablation became a justified choice after thrombus resolution.

LIMITATIONS

This report describes a single clinical case, which limits the ability to generalize the findings. The favorable

outcome observed in this patient may not be universally applicable. Further controlled studies are needed to evaluate the safety and efficacy of EVLA in similar complex clinical scenarios.

CONCLUSIONS

This clinical case highlights the feasibility of a staged management strategy for recurrent varicose vein disease complicated by a floating thrombus in the popliteal vein in a patient with significant comorbidities.

Anticoagulant therapy with dynamic monitoring allowed us to avoid invasive intervention on the deep venous system. This, in turn, created safe conditions

for the subsequent performance of EVLA. Failing to recognize the floating component or delaying anticoagulant therapy could have resulted in potentially fatal complications.

A key factor in the management of such patients is timely diagnosis using duplex ultrasound scanning, a multidisciplinary approach, and early decision-making regarding personalized therapeutic strategy.

This clinical case suggests that EVLA may be considered a feasible and safe option in selected high-risk patients after appropriate anticoagulant preparation and careful monitoring.

However, larger prospective studies are required to confirm the safety and reproducibility of this approach.

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CONFLICT OF INTEREST

The Author declare no conflict of interest

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