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Original Article

Temporal alterations of mean platelet volume and platelet count after radiofrequency saphenous vein ablation

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Abstract

Aim: Endovenous radiofrequency ablation (RFA) is the primary treatment for chronic venous insufficiency. Localized thermal energy may cause endothelial disruption and trigger a systemic prothrombotic response. This study evaluated temporal changes in platelet indices after RFA and identified predictors of postoperative complications.

Material and Methods: This retrospective cohort included 200 patients who underwent elective great saphenous vein RFA between 2022 and 2024. Hematological parameters were recorded preoperatively (T0) and at 1 h (T1), 3 days (T2), and 1 month (T3) postoperatively. Ablation length, voltage, and total energy were retrieved from generator records. Hemoglobin and hematocrit were measured at T0 and T1 to assess hemoconcentration.

Results: All primary platelet indices varied significantly over time (Friedman $P < .001$). Mean platelet volume (MPV) and platelet count (PLT) increased sharply at T1; PLT normalized at T2, whereas MPV remained elevated at T2 and normalized at T3. Hemoglobin and hematocrit did not change between T0 and T1 ($P > .05$), excluding hemoconcentration. Complications occurred in 32 patients (16.0%); all endovenous heat-induced thrombosis events were Kabnick class 1. In multivariable logistic regression adjusted for clinical and procedural variables, vein diameter was the only independent predictor of complications (odds ratio, 2.55 per mm; 95% confidence interval, 1.80 – 3.62; $P < .0001$). Patients without a postoperative MPV increase (n = 14), despite higher baseline MPV, had a higher complication rate than those with an increase (n = 186) (42.9% vs. 14.0%; Fisher's exact $P = .021$).

Conclusion: RFA induces a marked but transient rise in platelet indices. Saphenous vein diameter is the dominant independent predictor of complications, and the absence of an expected postoperative MPV increase may indicate a higher-risk phenotype. Monitoring platelet indices and vein diameter may aid perioperative risk stratification.

Keywords: Radiofrequency ablation; mean platelet volume; venous insufficiency; saphenous vein; venous thrombosis; platelet activation

INTRODUCTION

Chronic venous insufficiency (CVI) affects approximately one-third of the adult population, imposing a substantial global health and economic burden [1]. Historically, high ligation and stripping were the gold standards; however, a definitive paradigm shift toward minimally invasive endovenous thermal ablation has occurred in the last two decades [2]. Techniques such as radiofrequency ablation (RFA) utilize targeted thermal energy (120°C) to induce collagen contraction and fibrotic occlusion, offering superior clinical outcomes and rapid recovery [3]. Despite its safety profile, RFA carries an inherent risk of thrombotic complications, notably endovenous heat-induced thrombosis (EHIT) and early-phase venous thromboembolism (VTE) [4]. The pathophysiology of these events is rooted in thermal energy-induced endothelial denudation, which triggers a robust inflammatory response and systemic alterations in platelet reactivity. Larger platelets, characterized by an increased density of alpha granules, are enzymatically more active and play a primary role in hemostasis [4]. Consequently, platelet indices, specifically mean platelet volume (MPV), platelet distribution width (PDW), and plateletcrit (PCT), have emerged as sensitive biomarkers of platelet activation and systemic

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thrombogenicity [5]. Although the clinical efficacy of RFA is well documented, the acute-phase temporal dynamics of these indices and their relationships with anatomical and procedural risk factors remain insufficiently explored [6]. This study aimed to evaluate the dynamic shifts in MPV, platelet count (PLT), and related parameters at four perioperative time points, describe the baseline and procedural characteristics of the cohort, and identify independent predictors of postoperative complications. We also aimed to incorporate procedural parameters (voltage, ablation length, total energy) and hematocrit/hemoglobin into the analysis to control for potential confounders.

MATERIAL AND METHODS

This retrospective, single-center analysis was approved by the Adıyaman University Clinical Research Ethics Committee (date: 18/11/2025, no: 2025/9-2) and was conducted in accordance with the Declaration of Helsinki. We analyzed 200 patients who underwent elective great saphenous vein (GSV) RFA between January 2022 and December 2024. The inclusion criteria were age 18 – 75 years, symptomatic GSV insufficiency (Clinical-Etiological-Anatomical-Pathophysiological [CEAP] class C2 – C6), and duplex-confirmed reflux > 2 s. The exclusion criteria were a history of deep vein thrombosis, therapeutic-dose anticoagulant use, active infection, malignancy, systemic inflammatory disease, and diabetes mellitus (to eliminate independent influences on platelet indices). A history of superficial thrombophlebitis and use of low-dose (100 mg) acetylsalicylic acid (ASA) for cardiovascular prophylaxis were not exclusion criteria and were present in a subset of patients; none of these patients were started on ASA for venous insufficiency prophylaxis. Patients who underwent concomitant phlebectomy or vein stripping were excluded. All procedures were performed under duplex-guided, local tumescent anesthesia. The RFA catheter tip was positioned 2 cm distal to the saphenofemoral junction, delivering 120°C of thermal energy in 7-cm segments. Ablation length (cm), voltage (V), and total energy delivered (J) were retrospectively retrieved from the radiofrequency generator records. Postoperatively, patients wore Class II compression stockings and initiated immediate ambulation. Perioperative heparin prophylaxis with low-molecular-weight heparin (LMWH) was administered to 5 patients (2.5%) who were on clopidogrel therapy, solely to mitigate the risk of a possible thrombotic event during the RFA procedure; this was not a routine prophylactic protocol and was individualized based on the concomitant use of clopidogrel. Hematological parameters were recorded at four intervals: T0, preoperative baseline (within 24 h); T1, early postoperative (within the first hour); T2, short-term follow-up (day 3); and T3, midterm follow-up (month 1). Blood samples were collected in ethylenediaminetetraacetic acid (EDTA) tubes and analyzed on a Beckman Coulter AU 5800 analyzer; the mean time from sampling to analysis was 45 minutes. Hemoglobin and hematocrit were measured at T0 and T1. The primary outcomes were temporal shifts in MPV and PLT. Secondary outcomes included alterations in PDW and PCT and the incidence of EHIT or symptomatic VTE. All patients underwent duplex ultrasonography during each postoperative visit. EHIT was classified according to the Kabnick classification endorsed by the American Venous Forum/Society for Vascular Surgery, which grades thrombus extension into the deep system from class 1 (confined to the ablated superficial vein) to class 4 (occlusive extension into the deep vein) [7]. All EHIT events in this cohort were class 1; no class 2 – 4 events occurred. Notably, at the T2 and T3 follow-up visits, complete blood count (CBC) could not be performed in a substantial proportion of patients due to financial constraints and out-of-pocket expenses, which limited the availability of paired hematological data at these later time points. This limitation is explicitly acknowledged in the Limitations section.

Statistical Analysis

Data were analyzed using SPSS version 28.0 and Python (SciPy 1.11). Normality was assessed using the Shapiro-Wilk test. As the variables followed a non-normal distribution, the Friedman test was used to evaluate temporal changes across T0 – T3. Significant findings were followed by post hoc Wilcoxon signed-rank tests for all pairwise comparisons with Bonferroni correction (α = .05/6 comparisons). Multivariable logistic regression was used to identify independent predictors of postoperative complications, including saphenous vein diameter, preoperative MPV, MPV change (T1 – T0), age, sex, CEAP class, procedure duration, ablation length, voltage, and total energy. A post hoc subgroup analysis compared patients whose MPV increased from baseline to T1 with those whose MPV did not increase, using independent-samples t-tests for continuous variables and Fisher's exact test for categorical variables. Given the small number of events (32) relative to the number of predictors, a sensitivity analysis using Firth penalized logistic regression was performed. Statistical significance was set at $P < .05$.

RESULTS

Baseline and Procedural Characteristics

The cohort comprised 200 patients (mean age, 49.1 ± 8.8 years; 104 females (52.0%) and 96 males (48.0%)). Most patients presented with CEAP class C3 disease (116/200, 58.0%); the mean preoperative Venous Clinical Severity Score (VCSS) was 7.44 ± 1.28. The mean GSV diameter was 7.94 ± 1.22 mm (range, 6.2 – 11.8 mm), the mean ablation length was 37.6 ± 4.6 cm (range, 32 – 46 cm), the mean voltage was 39.8 ± 4.9 V (range, 32 – 46 V), and the mean procedure duration was 19.5 ± 3.0 min. A history of superficial thrombophlebitis was present in 13 patients (6.5%), and 30 patients (15.0%) were maintained on low-dose ASA for cardiovascular prophylaxis. Preoperative hemoglobin and hematocrit levels were 13.1 ± 1.9 g/dL and 40.1 ± 6.4%, respectively (Table 1).

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Table 1. Baseline demographic, clinical, and procedural characteristics (N = 200)

Variable	Value
Age, mean ± SD	49.1 ± 8.8
Female sex, No. (%)	104 (52.0)
CEAP class, No. (%)	
C1	1 (0.5)
C2	63 (31.5)
C3	116 (58.0)
C4	15 (7.5)
C5	4 (2.0)
C6	1 (0.5)
Preoperative VCSS, mean ± SD	7.44 ± 1.28
GSV diameter, mm, mean ± SD (range)	7.94 ± 1.22 (6.2 – 11.8)
Ablation length, cm, mean ± SD (range)	37.6 ± 4.6 (32 – 46)
Voltage, V, mean ± SD (range)	39.8 ± 4.9 (32 – 46)
Procedure duration, min, mean ± SD	19.5 ± 3.0
Procedure side, No. (%)	
Left	165 (82.5)
Right	35 (17.5)
History of superficial thrombophlebitis, No. (%)	13 (6.5)
Low-dose (100 mg) ASA use, No. (%)	30 (15.0)
Perioperative heparin prophylaxis, No. (%)*	5 (2.5)
Preoperative Hb, g/dL, mean ± SD	13.1 ± 1.9
Preoperative Hct, %, mean ± SD	40.1 ± 6.4

*Perioperative heparin prophylaxis (LMWH) was administered to 5 patients who were on clopidogrel therapy, solely to mitigate the risk of a possible thrombotic event during the RFA procedure; this was not a routine prophylactic protocol and was individualized based on the concomitant use of clopidogrel. Abbreviations: ASA, acetylsalicylic acid; CEAP, Clinical-Etiological-Anatomical-Pathophysiological classification; GSV, great saphenous vein; Hb, hemoglobin; Hct, hematocrit; LMWH, low-molecular-weight heparin; No., number; RFA, radiofrequency ablation; SD, standard deviation; VCSS, Venous Clinical Severity Score.

Temporal Platelet Index Dynamics

All three primary indices varied significantly over time (Friedman test, P < .001 for MPV, PLT, and PDW). The MPV increased from 7.21 ± 0.75 fL at T0 to a peak of 9.10 ± 1.38 fL at T1 (Bonferroni-adjusted P < .001), remained elevated at T2 (7.53 ± 0.58 fL; adjusted P < .001 vs. T0), and normalized by T3 (7.28 ± 0.64 fL; adjusted P = .59 vs. T0). The PLT increased from 234.8 ± 57.7 ×10³/μL at T0 to 359.8 ± 30.1 ×10³/μL at T1 (adjusted P < .001) but had already normalized by T2 (237.0 ± 76.8 ×10³/μL; adjusted P = 1.0 vs. T0) and T3 (adjusted P = .35 vs. T0). PDW followed a pattern similar to MPV, peaking at T1 (19.32 ± 1.30%; adjusted P < .001) and remaining elevated at T2 (17.25 ± 1.16%; adjusted P < .001) before normalizing at T3 (16.49 ± 0.86%; adjusted P = 1.0) (Table 2, Figure 1). The parallel time courses of MPV and PLT are shown in Figure 2. Notably, the postoperative T1 PLT values clustered within a comparatively narrow range across the cohort (323 – 430 ×10³/μL). Hemoglobin and hematocrit did not change significantly between T0 and T1 (P = .42 and P = .38, respectively), excluding hemoconcentration as a contributor to the PLT rise. Due to financial constraints and out-of-pocket expenses, CBC could not be performed in a substantial proportion of patients at T2 and T3; therefore, the number of available samples at these time points was lower than at T0 and T1, and the T2/T3 values should be interpreted with caution.

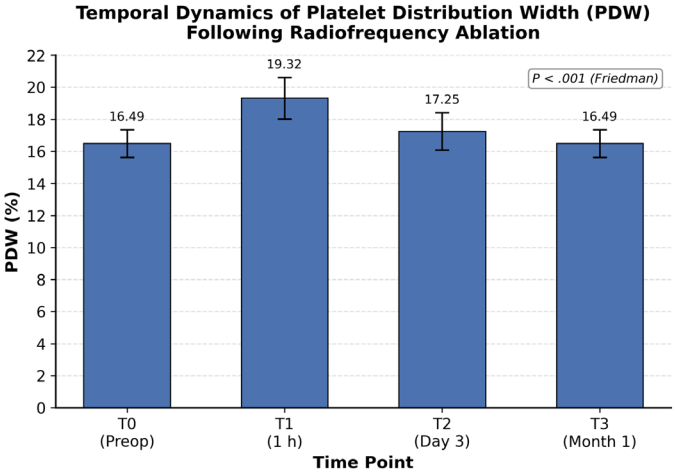


Figure 1. Temporal Dynamics of Platelet Distribution Width (PDW) Following Radiofrequency Ablation. PDW peaked at the first postoperative hour (T1: 19.32 ± 1.30%) and subsequently returned to baseline levels by the first postoperative month (T3: 16.49 ± 0.86%). The bar chart illustrates the mean PDW values at four time points: preoperative baseline (T0), 1st postoperative hour (T1), 3rd postoperative day (T2), and 1st postoperative month (T3).

Table 2. Temporal dynamics of platelet indices

Parameter	T0 (Preop)	T1 (1 h)	T2 (Day 3)	T3 (Month 1)	P (Friedman)
MPV, fL, mean ± SD	7.21 ± 0.75	9.10 ± 1.38	7.53 ± 0.58	7.28 ± 0.64	< .001
PLT, ×10³/μL, mean ± SD	234.8 ± 57.7	359.8 ± 30.1	237.0 ± 76.8	228.0 ± 52.0	< .001
PDW, %, mean ± SD	16.49 ± 0.86	19.32 ± 1.30	17.25 ± 1.16	16.49 ± 0.86	< .001
Hb, g/dL, mean ± SD	13.1 ± 1.9	13.0 ± 1.8	—	—	.42 (T0 vs T1)
Hct, %, mean ± SD	40.1 ± 6.4	39.9 ± 6.2	—	—	.38 (T0 vs T1)

T2 and T3 values are based on a reduced number of patients due to financial constraints limiting CBC availability at follow-up visits. Abbreviations: CBC, complete blood count; Hb, hemoglobin; Hct, hematocrit; MPV, mean platelet volume; PDW, platelet distribution width; PLT, platelet count; Preop, preoperative; SD, standard deviation.

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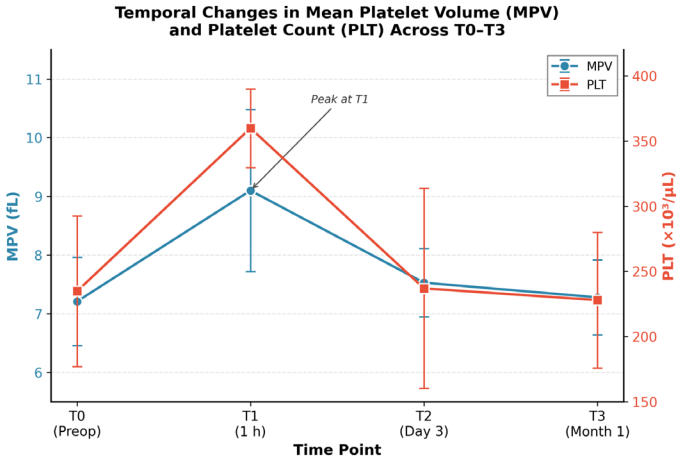


Figure 2. Temporal Changes in Mean Platelet Volume (MPV) and Platelet Count (PLT) Across T0 – T3. The line chart illustrates the fluctuations in MPV and PLT across four time points: preoperative baseline (T0), 1st postoperative hour (T1), 3rd postoperative day (T2), and 1st postoperative month (T3). Both parameters reached their peak at the 1st hour (T1) post-procedure, followed by a gradual decline. While PLT levels returned to baseline by the 3rd day (T2), MPV showed a more sustained elevation before normalizing at the 1-month follow-up (T3). Error bars represent standard deviations.

Predictors of Postoperative Complications

Postoperative complications occurred in 32 of the 200 patients (16.0%). All EHIT events were Kabnick class 1; no class 2 – 4 events occurred. A representative class 1 EHIT case is shown in Figure 3. In multivariable logistic regression incorporating saphenous vein diameter, preoperative MPV, MPV change, age, sex, CEAP class, procedure duration, ablation length, voltage, and total energy, vein diameter remained an independent predictor of complications (odds ratio [OR], 2.55 per mm; 95% confidence interval [CI], 1.80 – 3.62; P < .0001) (Table 3). Preoperative MPV showed a non-significant trend (OR, 1.84; 95% CI, 0.94 – 3.60; P = .074). Age, sex, CEAP class, procedure duration, ablation length, voltage, total energy, and MPV change were not independently associated with complications (all P > .2). A sensitivity analysis using Firth penalized regression yielded similar results.



Figure 3. Postoperative Endovenous Heat-Induced Thrombosis (EHIT) Following Radiofrequency Ablation (RFA). A clinical photograph of the leg of a 43-year-old male patient with a preoperative great saphenous vein (GSV) diameter of 10.2 mm, taken 5 days after RFA (120°C). Duplex ultrasonography revealed an organized thrombus confined to the ablated GSV segment (Kabnick class 1 EHIT), with no deep venous extension. The image is included with explicit written informed consent from the patient.

Table 3. Multivariable logistic regression for postoperative complications (N = 200)

Variable	OR	95% CI	P value
Saphenous vein diameter (per mm)	2.55	1.80 – 3.62	< .0001
Preoperative MPV (per fL)	1.84	0.94 – 3.60	.074
MPV change, T1 – T0 (per fL)	0.96	0.70 – 1.31	.772
Age (per year)	1.02	0.97 – 1.07	.490
Male sex (vs female)	0.56	0.23 – 1.38	.210
CEAP class	0.84	0.44 – 1.60	.599
Procedure duration (per minute)	0.94	0.81 – 1.10	.447
Ablation length (per cm)	1.01	0.97 – 1.05	.670
Voltage (per V)	1.02	0.98 – 1.06	.340
Total energy (per J)	1.00	0.99 – 1.01	.890

Abbreviations: CEAP, Clinical-Etiological-Anatomical-Pathophysiological classification; CI, confidence interval; MPV, mean platelet volume; OR, odds ratio.

Subgroup Analysis by Hematologic Response

Because not all patients exhibited the expected postoperative MPV increase, patients were stratified into those with an MPV increase from T0 to T1 (n = 186, 93.0%) and those without an increase (n = 14, 7.0%). The non-rising subgroup had a significantly higher preoperative MPV than the rising subgroup (8.79 ± 0.81 fL vs. 7.09 ± 0.59 fL; P < .001), consistent with a ceiling effect in patients who were already hyperreactive at baseline. Age, GSV diameter, procedure duration, and sex distribution did not differ significantly between the subgroups (all P > .2). The complication rate was 42.9% (6/14) in the non-rising subgroup versus 14.0% (26/186) in the rising subgroup (Fisher's exact P = .021). This finding should be considered hypothesis-generating given the small subgroup size.

DISCUSSION

The principal findings of this study are threefold: (1) RFA induces a significant but transient acute-phase surge in platelet indices, notably MPV and PDW, which resolves within one month; (2) saphenous vein diameter is the dominant independent predictor of postoperative complications, even after adjusting for procedural parameters including ablation length, voltage, and total energy; and (3) patients without the expected acute-phase MPV increase, despite higher baseline values, had a disproportionately higher complication rate.

The early and sharp increase in MPV and PDW at T1 is consistent with the known biology of platelet activation. Thermal injury to the endothelium triggers the release of proinflammatory cytokines and catecholamines, which in turn promote the release of larger, more metabolically active platelets from the bone marrow and splenic reservoirs. Larger platelets contain a higher density of alpha-granules, releasing prothrombotic mediators such as platelet-derived growth factor (PDGF), P-selectin, and thromboxane A2 [8].

The saphenous vein diameter remained the strongest independent predictor of complications after expanding the regression model to include age, sex, CEAP class, procedure duration, ablation length, voltage, and total energy (OR, 2.55 per mm), consistent with a thermal dose-response relationship in which larger veins require greater total energy delivery to achieve transmural fibrosis [9]. Although cumulative thermal exposure depends on the treated length and diameter, the inclusion of these procedural variables in the model did not attenuate the association, supporting the robustness of vein diameter as an anatomical risk factor. Nonetheless, other unmeasured procedural factors may exist and are acknowledged as limitations.

Regarding platelet count, we observed a dramatic immediate rise at T1 that had already resolved by T2. Contrary to the pure "consumption" hypothesis, this early reactive thrombocytosis more plausibly reflects the mobilization of splenic or pulmonary platelet reservoirs in response to procedural stress [10]. However, the magnitude of this rise (approximately 53% within 1 h) is large for such a short interval, and the T1 values clustered within an unusually narrow range across the cohort (323 – 430 $\times 10^3/\mu L$). Therefore, a purely biological explanation should be considered alongside possible preanalytical contributors, such as sample handling, anticoagulant tube type, or processing delay. All samples were collected in EDTA tubes and analyzed on a Beckman Coulter AU 5800 analyzer, with a mean time to analysis of 45 minutes. Importantly, concurrent hematocrit and hemoglobin measurements did not change significantly between T0 and T1, excluding perioperative hemoconcentration as a contributor to the PLT rise. This strengthens the biological interpretation of the PLT findings (in contrast to the MPV and PDW findings, whose more gradual, graded time course is less consistent with a simple analytic artifact). The normalization of MPV and PLT by T3 is consistent with a transient, self-limiting platelet response. However, it should be noted that CBC could not be performed in a substantial proportion of patients at T2 and T3 due to financial constraints and out-of-pocket expenses, which may have introduced selection bias and limited the precision of the later time-point estimates.

A novel finding of this study was that patients who did not exhibit the expected postoperative MPV increase (7.0% of the cohort) had a markedly higher complication rate than those who did (42.9% vs. 14.0%; Fisher's exact P = .021), despite having significantly higher baseline MPV. One interpretation is that these patients represent a baseline hyperreactive platelet phenotype with limited additional reserve capacity to mount a further acute-phase rise, and that this baseline state, rather than the acute increment itself, may better flag thrombotic risk. This observation should be considered hypothesis-generating, given the small subgroup size (n = 14), and warrants confirmation in a larger, prospectively designed cohort study.

Technical modifications to endovenous ablation, such as tumescentless radiofrequency ablation with local hypothermia and compression, have been reported to reduce procedural discomfort and may influence the magnitude of the perioperative thrombogenic response, although this was not directly assessed in the present study [11]. Comparative data across different endovenous ablation modalities further suggest that technique-related differences in thermal delivery could translate into different platelet activation profiles, an area that merits dedicated prospective comparisons in future studies [12,13]. The clinical utility of monitoring these inexpensive and accessible parameters lies in identifying patients with a baseline predisposition to thrombotic events, particularly those with larger saphenous diameters or a blunted acute-phase platelet response, who may benefit from intensified duplex surveillance. The normalization of indices by T3 confirms that the thrombogenic stimulus is self-limiting, reinforcing the first postoperative week as the

critical window for early ambulation and compression therapy [14]. Routine pharmacological prophylaxis is not recommended for all patients according to the 2022 European Society for Vascular Surgery guidelines [3]; individualized decisions should be based on patient-specific risk factors. In our cohort, LMWH was administered only to 5 patients on clopidogrel therapy to mitigate the risk of a possible thrombotic event during the RFA procedure; this was not a routine prophylactic protocol and was individualized based on the concomitant use of clopidogrel.

Limitations

This study has several limitations. First, its retrospective, single-center design may limit generalizability. Second, although hemoglobin and hematocrit were measured at T0 and T1 and did not change significantly, the possibility of preanalytical variability cannot be entirely excluded, although all samples were processed on the same analyzer under identical conditions. Third, although ablation length, voltage, and total energy were included in the regression model, other unmeasured procedural variables may have confounded the observed diameter-complication association. Fourth, EHIT and symptomatic VTE events were captured as binary outcomes, and although all events were Kabnick class 1, systematic grade-level classification for the full cohort was not consistently coded, limiting the granular description of complication severity. Fifth, patients with diabetes mellitus and those on therapeutic anticoagulation were excluded to reduce confounding of platelet indices, which may limit generalizability to these populations, which are common among patients with CVI. Sixth, the subgroup analysis of patients without a postoperative MPV increase was based on a small number of patients (n = 14) and should be regarded as hypothesis-generating. Seventh, the small number of events (32) relative to the number of predictors (7) limits model stability; however, Firth penalized regression yielded similar results. Eighth, MPV change is mathematically linked to baseline MPV, which may introduce collinearity; this should be considered when interpreting the MPV change variable. Ninth, and importantly, complete blood count could not be performed in a substantial proportion of patients at the T2 and T3 follow-up visits due to financial constraints and out-of-pocket expenses. This limitation reduced the number of paired hematological samples at these later time points, potentially introducing selection bias and limiting the precision of the T2 and T3 estimates. Future prospective studies should ensure adequate funding and logistical support to obtain complete hematological follow-up data. Tenth, perioperative LMWH was administered to only 5 patients on clopidogrel therapy, which was not a routine protocol; this individualized approach may limit the generalizability of our findings regarding prophylaxis. Future prospective multicenter studies with paired hematologic and procedural data are warranted to validate these parameters as robust perioperative risk biomarkers.

CONCLUSION

Endovenous RFA for saphenous vein insufficiency induces a significant but transient acute-phase surge in platelet indices, notably MPV and PDW, which resolves within one month postoperatively. Saphenous vein diameter, rather than the magnitude of the platelet response, was the primary independent predictor of postoperative complications, even after adjusting for procedural parameters including ablation length, voltage, and total energy. Patients without the expected acute-phase MPV increase despite higher baseline values had a disproportionately higher complication rate. Integrating platelet indices with anatomical risk factors, such as vein diameter, may enhance perioperative risk stratification. Future prospective studies should establish diagnostic thresholds and validate the predictive value of a blunted platelet response, while ensuring complete hematological follow-up through adequate funding and logistical support.

Ethics Committee Approval: This study was conducted retrospectively in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the Adıyaman University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee (approval no. 2025/9-2; date: 18/11/2025).

Patient Consent for Publication: The study was conducted using data obtained from patient medical records with the additional approval of the hospital administration (chief physician's office). As this study was based on a retrospective analysis of anonymized patient data, the requirement for informed consent was waived by the ethics committee. Written informed consent for publication of the clinical photograph (Figure 3) was obtained from the patient.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions: All authors contributed equally to the article.

Conflict of Interest: The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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