




Cardiovascular risk factors and inflammatory markers in patients with venous thromboembolic disease

 Ana Radišić¹,
 Karlo Tikvicki¹,
 Mislav Vrsalović^{1,2*}

¹University of Zagreb, School of Medicine, Zagreb, Croatia

²University Hospital Centre "Sestre milosrdnice", Zagreb, Croatia

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***ADDRESS FOR CORRESPONDENCE:** Mislav Vrsalović, Klinički bolnički centar Sestre milosrdnice, Vinogradska 29, HR-10000 Zagreb, Croatia. / Phone: +385-91-5301-478 / Email: mislav.vrsalovic@gmail.com

ORCID: Ana Radišić, <https://orcid.org/0009-0006-0269-9881> • Karlo Tikvicki, <https://orcid.org/0000-0002-3911-9477>
Mislav Vrsalović, <https://orcid.org/0000-0002-8432-404X>

Introduction: The relationship between cardiovascular risk factors (CVRF) and venous thromboembolism (VTE) remains controversial and is not yet fully understood.¹⁻³ This study aimed to investigate the potential association of CVRF and inflammatory markers with provoked and unprovoked VTE.

Patients and Methods: A cohort study was conducted on 147 patients (median age 69 years, 55% female) diagnosed with pulmonary embolism (PE), classified as provoked or unprovoked, who were hospitalized at the University Hospital between January 2020 and June 2023. Patients with active cancer or COVID-19 infection were excluded. Variables of interest included age, sex, body mass index, history of cardiovascular disease, arterial hypertension, diabetes mellitus, dyslipidemia, active smoking, renal function, as well as leukocyte and platelet counts, C-reactive protein (CRP), fibrinogen, the Pulmonary Embolism Severity Index (PESI), and the Charlson Comorbidity Index (CCI).

Results: Patients with unprovoked VTE (68%) were older (67 vs 60 years, $P=0.027$) and more frequently had hypertension (77% vs 58%, $P=0.024$), with a trend towards a higher cumulative number of CVRF (2.4 vs 2.0, $P=0.09$). Patients with provoked PE had higher fibrinogen (5.0 vs 4.4 g/L, $P=0.033$), CRP (46 vs 35 mg/L, $P=0.039$), and platelet counts (264 vs 230 $\times 10^9/L$, $P=0.047$). PESI and CCI scores did not significantly differ between the two groups. Logistic regression analysis, adjusted for age and sex, showed that the presence of two or more CVRF was associated with an increased risk of unprovoked VTE (odds ratio 2.27, 95% CI 1.08-4.79, $P=0.031$).

Conclusion: This study demonstrates an association between unprovoked VTE and CVRF, and suggests a link between provoked VTE and elevated markers of inflammation. The similar CCI and PESI scores between the provoked and unprovoked PE groups suggest no significant differences in disease severity or comorbid conditions.

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LITERATURE

1. Konstantinides SV, Meyer G, Becattini C, Bueno H, Geersing GJ, Harjola VP, et al; ESC Scientific Document Group. 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS). *Eur Heart J.* 2020 Jan 21;41(4):543-603. <https://doi.org/10.1093/eurheartj/ehz405>
2. Rodríguez-Núñez N, Ruano-Raviña A, Lama A, Ferreiro L, Ricoy J, Álvarez-Dobaño JM, et al. Impact of cardiovascular risk factors on the clinical presentation and survival of pulmonary embolism without identifiable risk factor. *J Thorac Dis.* 2020 Oct;12(10):5411-5419. <https://doi.org/10.21037/jtd-20-1634>
3. Vrsalović M. Prevencija i liječenje duboke venske tromboze i plućne embolije. *Medix.* 2016;22(121/122):151-155.