

BACKGROUND

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

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 57%, $P=0.024$), 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, $P=0.031$).

Table 2. Laboratory parameters in all patients, patients with provoked and unprovoked pulmonary embolism.

Parameter	All patients (n=147)	Provoked PE (n=47, 32%)	Unprovoked PE (n=100, 68%)	P
HbA1C/%*	5,79 (1,31)	5,74 (1,13)	5,88 (1,18)	0,571
NT-proBNP/ng/L*	2789 (4912)	2729 (4833)	2816 (4974)	0,519
eGFR/mL/min/1.73m2*	72,28 (23,82)	76,30 (26,76)	70,39 (22,19)	0,161
CRP/mg/L*	38,57 (44,74)	46,21 (45,92)	34,6 (43,9)	0,039
Leu/ $\times 10^9/L$ *	10,35 (3,51)	10,89 (3,07)	10,09 (3,70)	0,203
NLR*	5,07 (3,79)	5,61 (4,25)	4,81 (4,85)	0,259
Trc/ $\times 10^9/L$ *	241,43 (94,39)	263,87 (106,30)	230,56 (86,54)	0,047
Fibrinogen/g/L*	4,58 (1,51)	5,03 (1,59)	4,38 (1,44)	0,033
RDW/%*	14,06 (2,42)	14,06 (2,26)	14,05 (2,50)	0,979
SE/mm/3.6ks*	29,14 (23,87)	38,25 (25,84)	24,63 (21,59)	0,002
Hb/g/L*	136,56 (16,56)	132,94 (16,01)	138,18 (16,12)	0,068
MPV/fL*	9,80 (1,17)	9,64 (1,06)	9,88 (1,22)	0,254
CCI*	2,74 (1,94)	2,51 (2,24)	2,84 (1,78)	0,342
PESI*	78,19 (24,20)	75,34 (26,60)	79,53 (23,0)	0,329

*Mean (standard deviation)

Table 1. Demographic data of all patients, patients with provoked and unprovoked pulmonary embolism

Parameter	All patients (n=147)	Provoked PE (n=47, 32%)	Unprovoked PE (n=100, 68%)	P
Age*	65 (17)	60 (19)	67 (15)	0,027
Female gender**	81 (55,1)	28 (59,6)	53 (53,0)	0,456
CCI*	2,73 (1,94)	2,83(1,78)	2,51 (2,24)	0,342
PESI*	78,19 (24,20)	75,34 (26,60)	79,53 (23,0)	0,329
BMI/kg/m2*	28,1 (5,79)	27,6 (5,46)	28,33 (5,96)	0,472
Hypertension**	104 (70,7)	27 (57,4)	77 (77,0)	0,024
Diabetes**	22 (15)	6 (13)	16 (16)	0,609
Smoking**	39 (26,5)	12 (25,5)	27 (27,0)	0,772
Hyperlipidemia**	66 (45,9)	21 (44,7)	45 (45,0)	0,982
History of CV diseases**	18(12,2)	4(8,5)	14(14,0)	0,345

*Mean (standard deviation); ** Value (percentage)

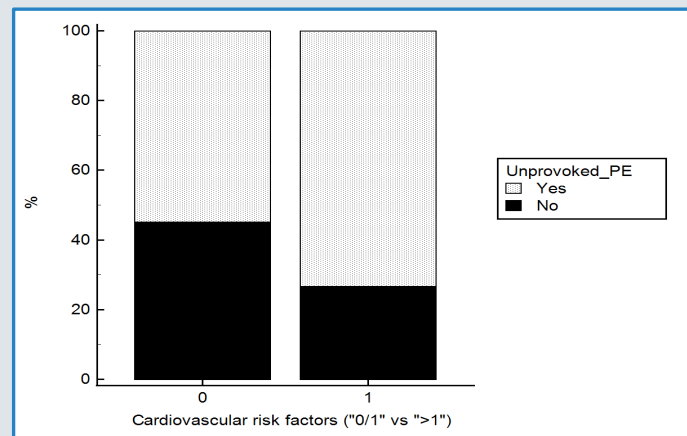


Figure 1. Cardiovascular risk factors in PE patients

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.

KEYWORDS: venous thromboembolism, cardiovascular risk factors, inflammation

LITERATURE

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