



Predictors of Recurrent Venous Thromboembolism after Pulmonary Embolism in Korea

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To identify risk factors for index venous thromboembolism (VTE) patients is important to estimate the recurrence rate of VTE after discontinuing treatment and to decide how long anticoagulation therapy should continue for patients. Extended treatment after at least 3 months of anticoagulation depends on patient-specific factors and laboratory test results, including antiphospholipid antibodies. The recurrence rates after discontinuing anticoagulation in patients with pulmonary embolism (PE) having transient risk factors and in those with PE without cancer, known thrombophilia, or any transient risk factor were ~2.5% and 4.5% per year, respectively¹. In a population-based case-cohort study performed with patients having VTE, the overall 5-year recurrence rate was 24.5%, whereas the rates were 43.4%, 27.3%, and 18.1% in cancer-associated, idiopathic, and non-cancer secondary cases, respectively². The suggested high risks of recurrence of >8% per year were observed in cases with active cancer, one or more previous episodes of VTE in the absence of a major transient or reversible factor, and antiphospholipid antibody syndrome (APS)¹. The poor quality control of vitamin K antagonist is a risk factor for recurrent VTE. In a prospective warfarin management study, patients with first acute unprovoked VTE episode were

managed with international normalized ratio (INR) and followed up 21 months for recurrence. The relative risk (RR) of recurrence in patients who stayed more time at INR values <1.5 in the first 90 days was 2.70 (95% confidence interval [CI], 1.39–5.25)³.

To evaluate the effect of preceding length of vitamin K antagonist treatment and VTE recurrence after discontinuing treatment, a pooled analysis of data from seven randomized trials was performed⁴. The hazard ratio (HR) for recurrence in patients with interruption in 1 month or 1.5 months compared with that in 3 months was 1.52 (95% CI, 1.14–2.02). However, HR in 3 months compared with that in 6 months was 1.19 (95% CI, 0.86–1.65). Shorter durations of anticoagulation were related to higher rates of VTE recurrence.

With respect to patients' sex, the recurrence rate of VTE after discontinuing treatment was higher in men than in women. In a meta-analysis, RR in men compared with that in women was 1.6 (95% CI, 1.2–2.0)⁵. In a patient-level meta-analysis, the HR for recurrence in men compared with that in women was 1.8 (95% CI, 1.4–2.5). After adjustment for hormone-associated VTE, the risk of recurrence in men was 2.2-fold higher than that in women⁶. In a retrospective cohort study performed in Korea, the recurrence rate in men was 1.8-fold (95% CI, 0.8–4.1) higher than that in women⁷.

Studies revealed no relationship between excessive body weight of patients and recurrence of VTE. In a prospective cohort study, 4 years after discontinuing treatment, the recurrence rates of VTE in patients with normal weight, overweight, and obesity were 9.3% (95% CI, 6.0–12.7), 16.7% (95% CI, 11.0–22.3), and 17.5% (95% CI, 13.0–22.0), respectively⁸. As a result, excess of body weight is reported as a risk factor for recurrent VTE. Contrary to this study, in the Multiple Environmental and Genetic Assessment follow-up study, the adjusted HR of recurrent VTE in overweight or obese patients and that in normal body weight patients were 1.05 (95% CI, 0.88–1.27) and 0.94 (95% CI, 0.74–1.19), respectively⁹. In a multicenter prospective cohort study of patients with elderly VTE, HRs for body mass index (BMI) and waist circumference on re-

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current VTE were 1.02 (95% CI, 0.98–1.05) and 1.01 (95% CI, 0.99–1.02), respectively¹⁰. BMI was not a suitable variable for predicting recurrent VTE.

In this issue of the journal, Hwang et al.¹¹ reported the incidence and risk factors of recurrent VTE after PE in a retrospective cohort study. The 5-year cumulative incidence of recurrent VTE events was 21.5% (95% CI, 17.7–25.4). HRs for BMI >25 kg/m² and longer anticoagulation duration in the multivariate analysis were 2.02 (95% CI, 1.17–3.46) and 0.90 (95% CI, 0.84–0.96), respectively. In contrast to another western studies, the recurrence was slightly higher in females. However, the difference was not significant. Several limitations of the study, including its retrospective, single-center design, absence of results for quality control of vitamin K antagonist, and absence of the results for APS were addressed; however, considering the paucity of VTE recurrence study in Korea, this study performed among Korean VTE patients is meaningful. To clarify whether the differences in the results of this study compared with those of western studies can be explained based on ethnic difference, large-scaled studies are needed.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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