

## Editorial

# Venous thromboembolism in patients with lymphoma

Chatree Chai-Adisaksopha

Department of Internal Medicine, Chiang Mai University

Venous thromboembolism (VTE), which is mainly comprised of deep vein thrombosis (DVT) and pulmonary embolism (PE), is a common complication in cancer patients<sup>1</sup>. The risk of VTE is around 4 times higher in cancer patients comparing to normal population<sup>2</sup>. In addition, cancer patients who have VTE are at risk of higher morbidity and mortality as compared to those without<sup>3</sup>. There are several mechanisms that can promote a hypercoagulable state in cancer patients. Tumor cells are capable of activating the coagulation cascade<sup>4</sup>. Moreover, cancer chemotherapy are known to be prothrombotic<sup>5</sup>. Hospitalization and surgery in cancer patients commonly provoke thrombosis. Therefore, incidence of thrombosis is found to be greatest among cancer patients admitted to the hospital<sup>6</sup>.

Lymphoma is one of hematologic malignancies that is associated with high risk of thrombotic complications. A systematic review and meta-analysis by Caruso et al. included a total of 18 studies, involving 18,018 lymphoma patients<sup>7</sup>. The pooled incidence rate of thromboembolic complications for patients with lymphoma was 6.4% (95% confidence interval [CI]: 6.0-6.8%)<sup>7</sup>. Of these, the pooled incidence rate of venous thrombosis was 5.3% (95%CI: 5.0-5.7%)<sup>7</sup>.

Incidence of venous thromboembolism in Asian patients with lymphoma was reported in several studies. The prospective and retrospective studies conducted in Korean, Japanese and Chinese patients reported a cumulative incidence of lymphoma of 7-11% during follow-up duration of 3 months to 2 years<sup>8-11</sup>. Incidence of cancer-associated thrombosis in Asian population seems to be comparable with studies conducted in Caucasian patients<sup>4</sup>. It is important to note that the differences of incidence of venous thromboembolism

among studies needs to be interpreted with caution, since the characteristics of patients, including type of lymphoma, age, race, duration and completeness of follow-up were varied among studies.

Risk factors of venous thrombosis in lymphoma patients are classified into lymphoma-related and individual patient-related factors. Lymphoma-related factors include histology type of lymphoma, site of disease, stage, initial laboratory findings, International Prognostic Index (IPI), type of lymphoma treatment, presence of indwelling central venous catheters or supportive care agents<sup>4</sup>. Individual-patient-related factors include traditional risks for venous thrombosis, for example, age, sex, obesity, performance status, immobility, thrombophilia, family history of thrombosis, prior thrombosis and comorbidity<sup>4</sup>.

This issue, Phusanti S and Angchaisuksiri retrospectively collected data in 1,769 Thai lymphoma patients. The prevalence of venous thrombosis was 5.1%. The risk factors of venous thrombosis were determined using a nested case-control study design and analyzed by a logistic regression. In a multivariable logistic regression model, B-cell non-Hodgkin lymphoma, initial bulky mass  $\geq 10$  cm and platelet count  $\geq 350 \times 10^9/L$  were independent risk factors for venous thrombosis.

In summary, the incidence of venous thrombosis among lymphoma patients in Asian population is high without thromboprophylaxis. The risk score for predicting the venous thrombosis in particular Asian patients is required in order to identify patients who have high risk of venous thrombosis. Thromboprophylaxis is likely to be beneficial in patients with high risk of venous thrombosis and low risk of bleeding complications.

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