

# Towards a precision medicine in venous thromboembolism associated to lung cancer

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Oncological patients have a higher risk for venous thromboembolism (VTE) (1,2), and also have an elevated risk of VTE recurrence and bleeding (3-5). Actually, guidelines in oncological patients with VTE recommend anticoagulant treatment, although these recommendations are the same, irrespectively of cancer and VTE location (6-9). Nonetheless, there are works that reported risk of VTE according to cancer location. On this way, breast and prostate cancer have a relative low risk of VTE compared with lung and pancreas cancer (2). One of the hypotheses is that the more the cancer are biologically active the highest is the risk of developing VTE (2,10,11). In a cohort of 3,847 cancers associated thrombosis patients, Mahé *et al.*, compared the clinical VTE-related outcomes during the course of anticoagulation in patients with lung, breast, prostate, and colorectal cancer (12). In this study, while patients had anticoagulant therapy, in colorectal or breast cancer, the rate of major bleeding was similar to the rate of VTE recurrences. On the other hand, in patients with prostate cancer, the rate of major bleeding was the double of VTE recurrences, and in lung cancer the rate of VTE recurrences was the double of major bleeding. With these data authors concluded that cancer location is crucial to define the profile of VTE-related outcomes, indicating that the strategy to decide anticoagulant treatment could be different.

Lung cancer is a leading cause of death (13). There is little information about natural history in lung cancer

associated thrombosis, including signs, symptoms and outcomes. The knowledge of the risk of this population could help us to design prevention strategies. On this way, Ruiz-Artacho *et al.* did an analysis in Registro Informatizado Enfermedad Tromboembólica (RIETE), an international, multicentre, observational registry of consecutive patients with VTE (14). In this study they analyzed 1,725 lung cancer associated thrombosis patients, half of this patients had the event in the first 3 months after lung cancer diagnosis, and one each three patients did not receive oncological treatment yet. On this study, the rate of VTE recurrences was the double of major bleeding, and the rate of fatal PE was higher than fatal bleeding. Moreover, one in every five patients had no metastases. For all these reasons lung cancer associated thrombosis should be taken into account.

In this issue of the Journal, Li *et al.* provided an update to improve and standardize the prevention of VTE after lung cancer surgery (15). The Society for Translational Medicine developed this document with the collaboration of China National Research Collaborative Group on VTE in Thoracic Surgery. In this work authors summarized epidemiology of VTE, status of VTE prophylaxis in thoracic surgery in China, risk factors for VTE and their assessment and stratification, clinical characteristics and diagnosis of VTE and prevention of postoperative VTE. The most relevant aspects of the work imply that prevention against VTE has not been widely implemented

in China, finding that one each three of the Chinese thoracic surgeons did not use any thromboprophylaxis after lung cancer surgery (16). Risk assessment and stratification in lung cancer emphasize role of VTE risk scoring models as Caprini risk assessment model (Caprini *et al.*) (17), Rogers score (18), Padua prediction score (19), Wells score (20), and Khorana score (21). A modified Caprini scale has been used for the risk factors after thoracic surgery and for that reason should be considered the most recommended score (22,23). About measures to prevent VTE is crucial role of nursing care, and mechanical and pharmacological thromboprophylaxis throughout hospitalization, either preoperatively or as early as possible after surgery. The best way to evaluate prophylaxis is applying Caprini risk scale for classification. Early mobilisation is also recommended on this population. A key point is to consider mechanical prophylaxis in cases in which bleeding and thrombosis risk are both high (24). Although in major high-risk abdominal or pelvic surgery extended prophylaxis is recommended for up to 4 weeks (25), there is no clear indication for extended-duration prophylaxis in thoracic surgery patients (8,25). Actually, there is no indication for inferior vena cava filter for primary VTE prophylaxis in cancer patients.

Active surveillance on early signs or symptoms of VTE in patients with recently diagnosed lung cancer and prescription of VTE prophylaxis in patients undergoing surgery or during periods of immobilization should be considered due to half of the patients will be diagnosed in the first 3 months after cancer diagnosis (14). More quality studies should be done in lung cancer to prevent VTE due to shortage of specific studies.

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### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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