

EPIDEMIOLOGY

A NOVEL RISK ASSESSMENT MODEL FOR CANCER DETECTION WITHIN ONE YEAR AFTER INCIDENT VENOUS THROMBOEMBOLISM

C. Antoun¹, J. Hansen^{1,3}, S. Brækkan^{1,3}, C. Langholm¹, N. Eide¹, V. Morelli^{1,3}, K. Hveem²

¹Department of Clinical Medicine, UiT The Arctic University of Norway, Tromsø; ²HUNT Center for Molecular and Clinical Epidemiology, Norwegian University of Science and Technology, Trondheim; ³Thrombosis Research Center, Division of Internal Medicine, University Hospital of North Norway, Tromsø, Norway

Introduction. The cumulative incidence of cancer within 1-year after incident VTE is high (5-10%) with poor prognosis. Extensive screening strategies (ESS) for cancer in incident unprovoked VTE has shown earlier cancer detection but without a clear benefit on survival. As ESS are resource-demanding and burdensome with putative adverse events for patients and health care systems, targeted screening in high-risk VTE patients is justified. However, existing risk assessment models (RAMs) (e.g. RIETE) are not recommended in clinical guidelines due to limited discriminative power.

Aim. To develop a novel RAM for prediction of cancer diagnosis within 1-year after incident VTE using readily available markers registered at the VTE event.

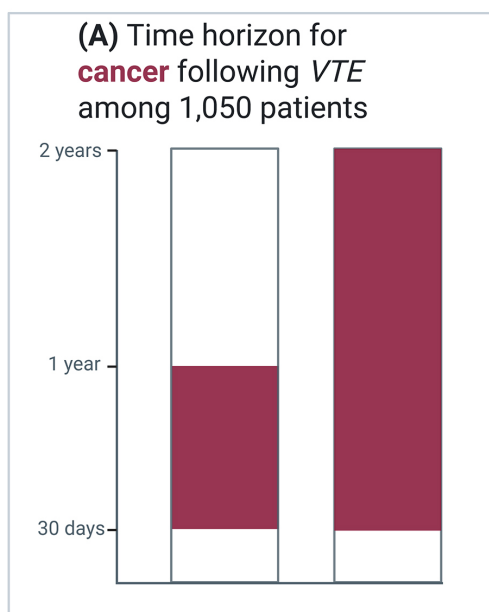
Methods. Leveraging data from a population-based Norwegian cohort with validated first VTE (n = 1,050), we developed a prediction model from variables routinely captured at VTE diagnosis. The candidate predictor set comprised demographics (age, sex), anthropometrics (BMI), VTE characteristics, and routine laboratory measures, including D-dimer levels. The outcome was incident cancer diagnosed between 1 and 12 months (primary, n=29) and between 1 and 24 months (secondary, n=44) after VTE. Penalized Cox

regression (LASSO) was applied for variable selection given the expected low event rate, identifying six candidate predictors, which were reduced to a parsimonious three-variable model for better clinical translation. Discrimination was assessed using the c-index with 95% bootstrap confidence intervals. Decision curve analysis (DCA) compared the model against screen-none and screen-all strategies.

Results. The final model included male sex, surgery <3 months preceding VTE, and quantitative D-dimer, with a c-index of 0.71 (0.61-0.80) for primary and 0.70 (0.63-0.77) for secondary outcome (see figure). The c-index for the RIETE score was 0.58 (0.47-0.69) for primary and 0.60 (0.52-0.69) for secondary outcome, consistent with prior external validation. DCA showed that the derived model yielded higher net clinical benefit than screen-none or screen-all from a risk threshold of 6%.

Conclusions. We developed a promising RAM including readily accessible variables (sex, surgery, and D-dimer levels) that provided moderate discrimination and meaningful net benefit for predicting 12-month occult cancer after a first VTE. External validation is warranted to evaluate generalizability and inform threshold-guided clinical decision-making. □

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(B) Occult cancers	29	44
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(C) c-index of RIETE score	0.58 (0.47-0.69)	0.60 (0.52-0.69)
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(D) c-index of 3-variable model	0.71 (0.61-0.80)	0.70 (0.63-0.77)
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- Male sex
- Surgery
- D-dimer (*continuous*)