SGIM Foundation
Solothurnerstrasse 68
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Project Funding 2015/16
«CLINICAL DECISION MODELS IN HOSPITAL AND OUTPATIENT CARE»

The award of CHF 50'000.-- is granted to the following project:

«Derivation and validation of a bleeding risk score for elderly patients with venous thromboembolism»

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Abstract

Background
While extended anticoagulation (i.e., >3 months) is recommended for many patients with acute venous thromboembolism (VTE), the risk of major bleeding is substantial, with an incidence of 2.7% major bleeds per year. Advanced age is associated with a two-fold increased risk for major bleeding due to age-related physiologic changes, comorbid conditions, and an increased sensitivity to vitamin K antagonists. Because major bleeds are associated with a significant premature mortality, disability, and costs, a tool that reliably identifies elderly patients with VTE who are at high-risk of bleeding and in whom extended anticoagulation should be avoided, would be particularly useful. Contemporary bleeding risk scores have a poor predictive performance in elderly patients and are rarely used in clinical practice. One potential reason why existing bleeding risk scores fail to discriminate elderly patients who bleed from those who do not is that the elderly may have distinct bleeding risk factors that are less common in younger patients, such as risk of falls and a low physical activity level. To date, no specific bleeding risk scores exist for elderly patients with VTE. To fill this gap, the ***broad objective*** of this project is to develop an easy-to-use clinical score to identify elderly patients with VTE who are at high-risk of bleeding during extended anticoagulation and who may not be candidates for extended anticoagulant therapy.

Aims
The ***specific aims*** of the project are the following:
1) To derive a clinical score that identifies elderly patients with VTE who have a risk of major bleeding during extended anticoagulation (i.e., beyond the first 3 months)
2) To internally validate this score using bootstrap resampling

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The hypothesis guiding this project is that the clinical score developed in the project can identify a subgroup of elderly patients with acute VTE at high-risk of major bleeding (≥6.5%/year) during extended anticoagulation, and who potentially may not benefit from extended anticoagulation.

Methods
We will use prospectively collected data from 743 patients aged ≥65 years with acute VTE who received extended treatment with vitamin K antagonist to derive and internally validate a clinical score to identify elderly patients with VTE who are at high-risk of major bleeding. The development of this clinical score will be guided by methodological standards for prediction rules/scores established by Wasson, McGinn, and Reilly, et. al. Potential predictor variables will comprise previously described clinical predictors of bleeding. The outcome will be the time to a first major bleeding up to 36 months of follow-up. We will derive our model using competing risk regression, accounting for non-bleeding related deaths as a competing event. We will use backward selection to identify bleeding risk variables. We will convert beta-coefficients of the variables retained in the model into integer point scores and classify patients into 3 categories of increasing risk of major bleeding (low, moderate, high). We will assess discrimination and calibration of the modal. Finally, we will internally validate the model using bootstrapping.

Relevance for general internal medicine
We view this study as a first step in developing an evidence-based approach for risk-stratification in elderly patients with VTE who receive extended anticoagulation with vitamin K antagonists. The ultimate goal of this project is to improve quality of care and reduce health care costs by minimizing the risk of anticoagulation-related bleeding in vulnerable, elderly patients with acute VTE. Upon successful completion of this project, we will seek further support to prospectively validate our score in an independent cohort of elderly patients with VTE.