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To Bridge or Not to Bridge: Modelling Periprocedural Anticoagulation Management

Simon van der Pol, Maartje Jacobs, Karina Meijer, Margriet Piersma-Wichers, Robert Tieleman, Maarten Postma, Marinus van Hulst

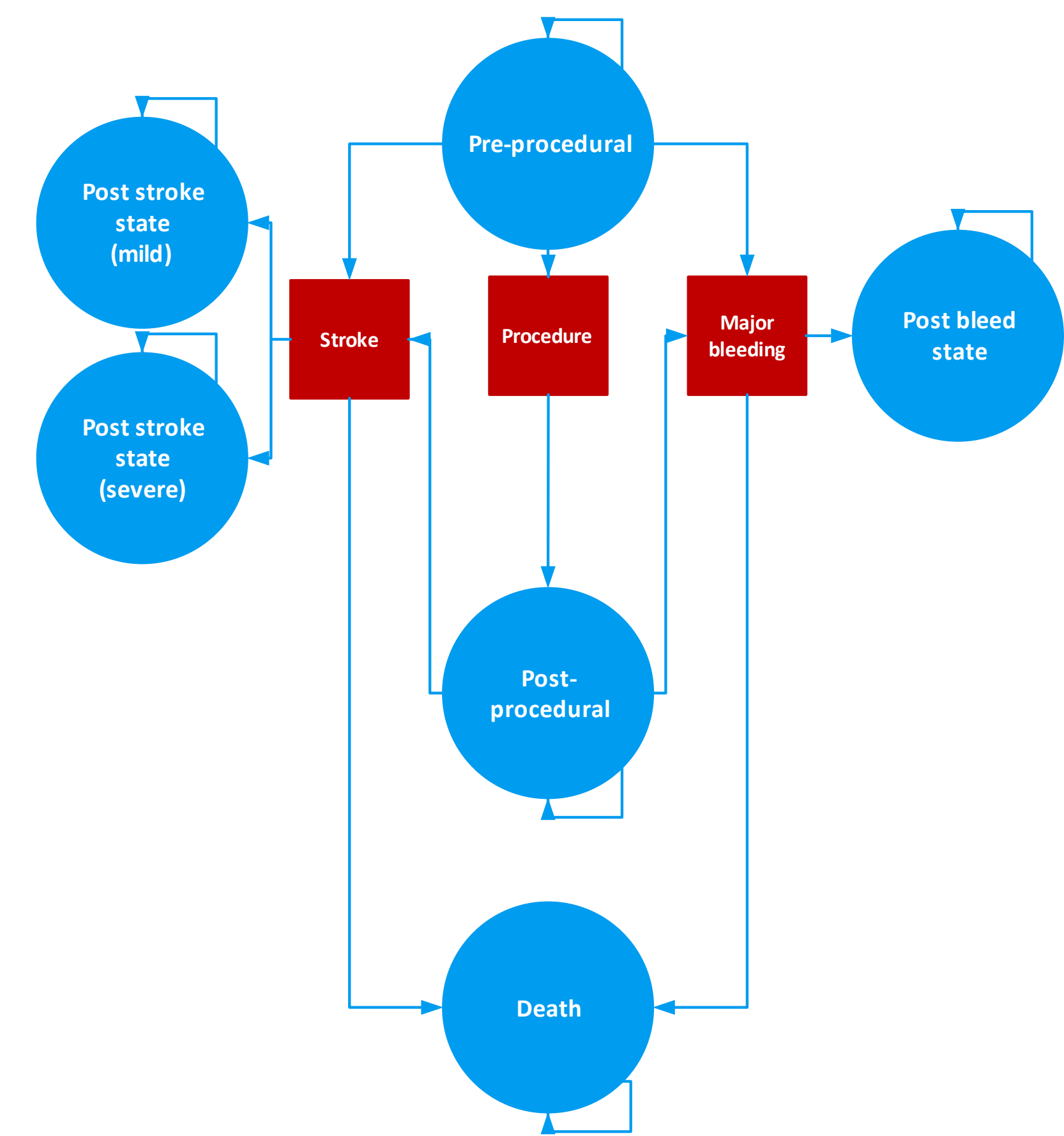
University of Groningen, University Medical Center Groningen, Martini Hospital Groningen, Certe Thrombosis Service Groningen

Background

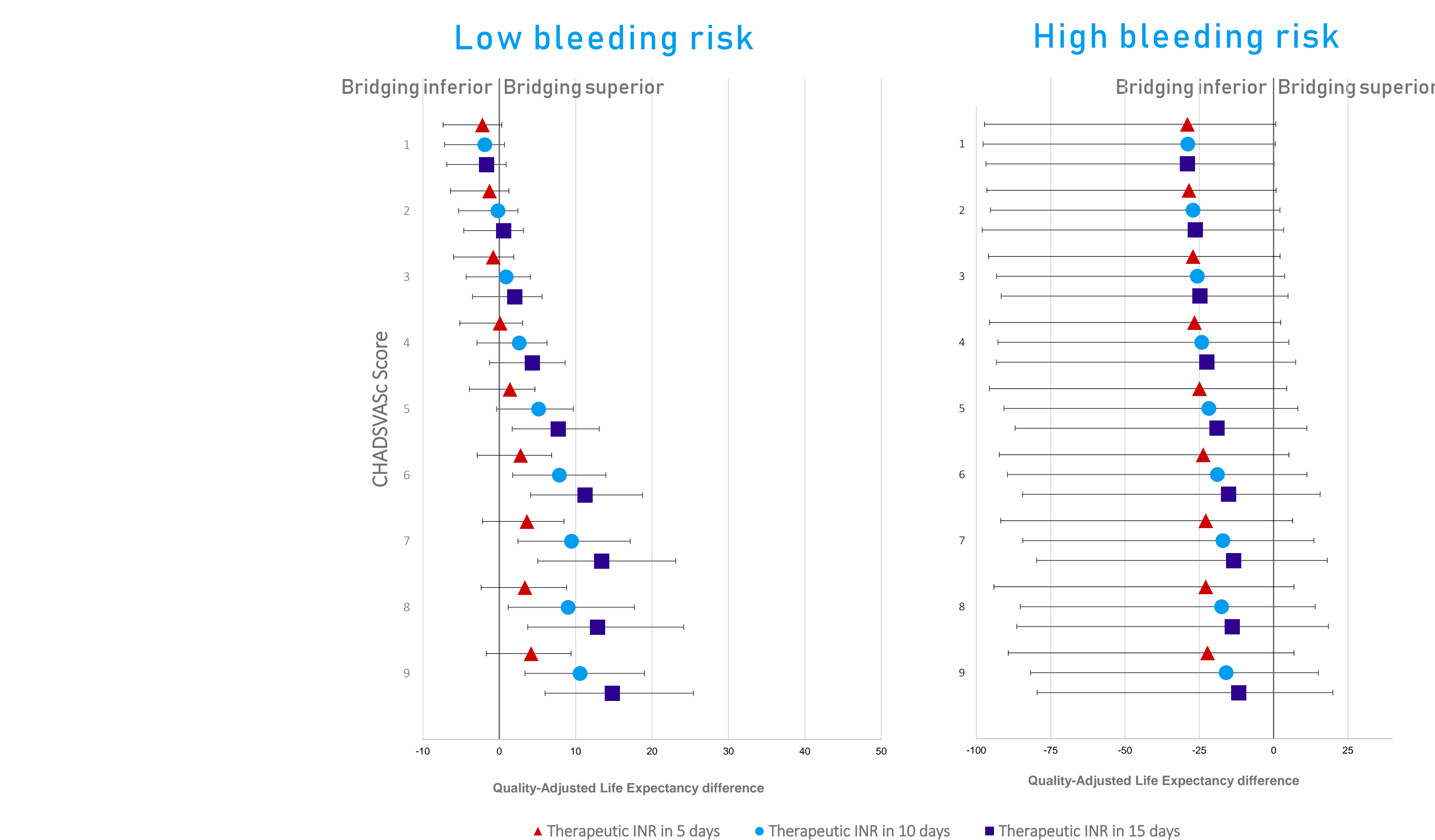
Bridging anticoagulation in atrial fibrillation patients who need to interrupt vitamin K antagonists for procedures is a clinical dilemma. Currently, guidelines recommend clinicians to take the stroke and bleeding risk into consideration, but no clear patient-specific thresholds are advised.

Main objectives

Using a Markov model, we compared two clinical strategies: administering vs. withholding periprocedural bridging therapy in atrial fibrillation patients, using clinical stroke (CHA₂DS₂-VASc) and bleeding (HAS-BLED) scores. The effect of INR management was investigated by modelling different post-procedural periods to reach therapeutic INR.



Schematic of Markov model



Benefit of bridging therapy, stratified by stroke and bleeding risk scores, with 95% confidence intervals

Methods

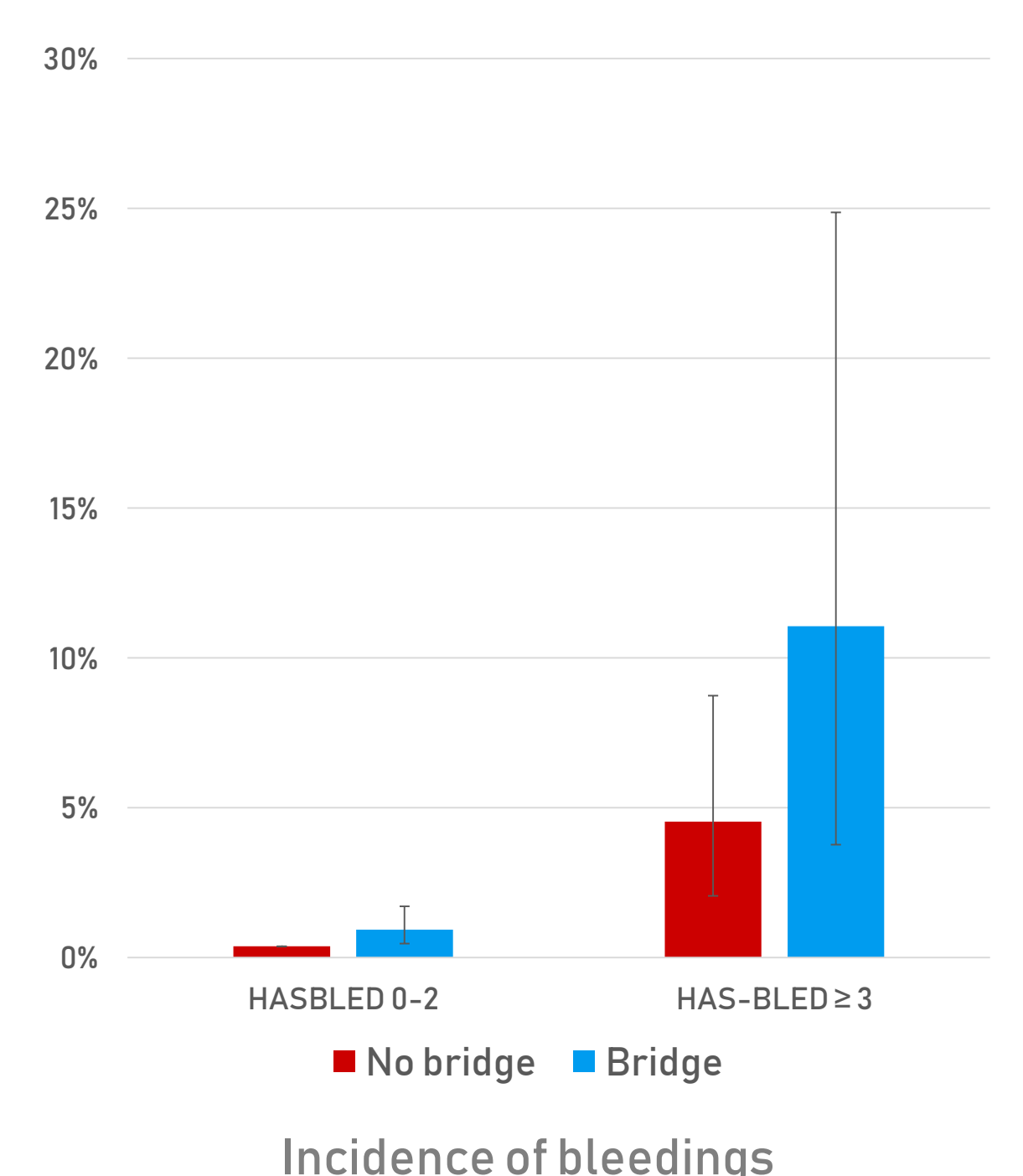
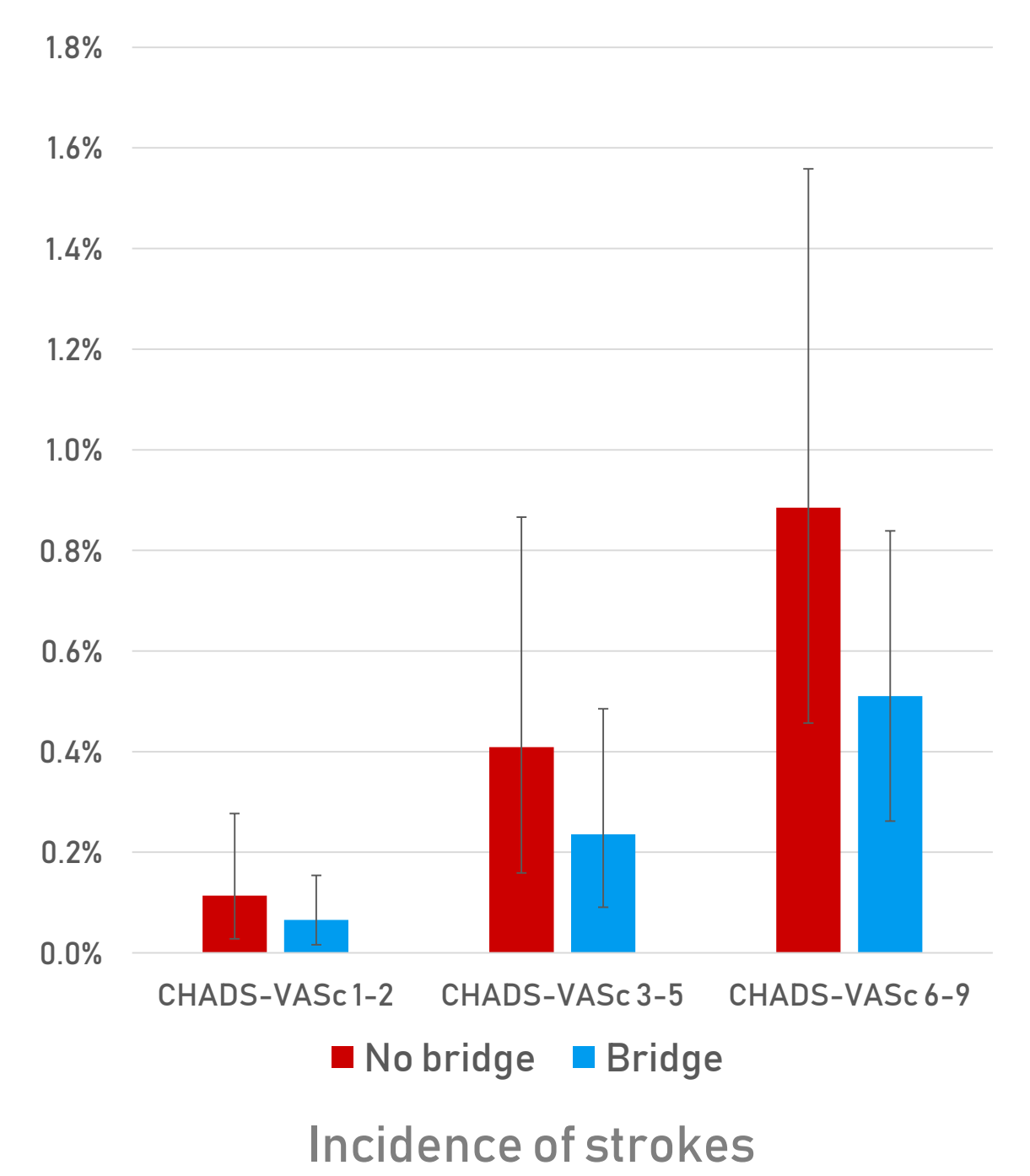
A probabilistic Markov model was developed to simulate both a bridge and a non-bridge cohort of AF patients periprocedurally (5 days before and 30 days after the procedure). Quality-adjusted life expectancy after the procedure, was the main outcome considered. The base case considered women 75–80 years old.

Strokes were modelled using CHA₂DS₂-VASc scores, incorporating the stroke preventive effects of warfarin and the LMWH using the INR trajectories. Long-term disabilities were taken into account using utility values. An increased post-operative stroke risk was applied, as compared to the population risks, using data published by Kaatz et al.

Bleedings were simulated using the rates as reported in the BRIDGE trial, as an average for many procedures. Two groups were included: low-risk (HAS-BLED 0–2) and high-risk patients (HAS-BLED ≥ 3). For high-risk patients, an additional bleeding risk was applied, as described in literature by Omran et al.

Results

The base case analysis shows that bridging anticoagulation increases the bleeding rate, but reduces the stroke rate. Bridging may be beneficial for the quality-adjusted life expectancy in patients with a CHA₂DS₂-VASc scores of 6 or higher and HAS-BLED scores of 0 to 2. Bridging is less likely to be beneficial if the life expectancy is shorter. For expected shorter periods to reach therapeutic INR, bridging therapy is less likely to be beneficial.



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Key Findings

For patients at high risk of stroke and low risk of bleeding (CHA₂DS₂-VASc ≥ 6 and HAS-BLED ≤ 2), bridging anticoagulation may result in additional quality-adjusted life years. For patients at high risk of bleeding or at a low risk of stroke, bridging anticoagulation is unlikely to be beneficial. In practice, few patients are expected to benefit from bridging. INR management is an important factor to consider periprocedurally when making the decision whether to bridge.

