Longitudinal changes in CHA2DS2-VASc and HAS-BLED scores are superior to baseline score values for predicting ischemic stroke and major bleeding in atrial fibrillation patients

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Background: Stroke and bleeding risks in atrial fibrillation (AF) are often assessed at baseline, as a “one-off” evaluation. However, these baseline values are usually applied to predict outcomes many years later, and therefore lack the consideration that the risk is not static.

Purpose: Our aim was to investigate if dynamic changes of CHA2DS2-VASc and HAS-BLED over time have an effect on the prediction of stroke and bleeding risks.

Methods: We included AF patients who were stable while taking vitamin K antagonists (INR 2.0–3.0) for 6 months attending a tertiary hospital (May 2007–December 2007). During 6-years of follow-up, ischemic strokes/transient ischemic attacks (TIAs), major bleeds, and all-cause deaths were recorded. CHA2DS2-VASc and HAS-BLED were recalculated every 2-years, and their predictive abilities were tested for outcomes in periods of 2-years (from year 0 to 2, year 2 to 4 and year 4 to 6).

Results: 1361 patients (693 [50.9%] females, median age 76 [IQR 71–81] years, mean CHA2DS2-VASc and HAS-BLED of 4.0±1.7 and 2.9±1.2, respectively) were included. The predictive ability for ischemic stroke/TIA of the baseline CHA2DS2-VASc for 2-years events was 0.662 (0.637–0.688, p<0.001). Compared to the baseline CHA2DS2-VASc, the CHA2DS2-VASc re-calculated at 2-years presented significantly higher predictive ability for ischemic stroke/TIA during the period 2–4 years (c-indexes: 0.701 [0.675–0.727] vs. 0.604 [0.576–0.631], p<0.001). Integrated discrimination improvement (IDI) and net reclassification improvement (NRI) showed an improvement in sensitivity of 0.014 (p<0.001) and a better reclassification (0.677, p<0.001). Similarly, the CHA2DS2-VASc re-calculated at 4-years yielded significantly better predictive performance for ischemic stroke/TIA during the period 4–6 years in comparison to the baseline CHA2DS2-VASc (c-indexes: 0.761 [0.734–0.786] vs. 0.682 [0.653–0.710], p=0.026). Again, IDI reported an improvement (IDI = 0.030, p<0.001) and there was an important enhance of the reclassification ability (NRI = 0.757, p<0.001).

Conclusions: In AF patients, stroke and bleeding risks are dynamic and change over time. The CHA2DS2-VASc and HAS-BLED scores should be regularly reassessed.