*Arrhythmias and Device Therapy − Atrial Fibrillation (AF), Epidemiology, Prognosis, Outcome, Stroke in Atrial Fibrillation*

# Prediction of atrial fibrillation in patients with stroke: a systematic review with meta-analysis

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**Background:** Atrial fibrillation-related strokes have a high rate of recurrence,1 and are associated with substantial morbidity, long-term disability, and mortality.2,3 Detection of AF at the time of stroke may require extended cardiac rhythm monitoring,4-6 which is costly.7 Identifying patients with stroke at high risk for AF can be challenging but important for preventing recurrent strokes.

**Purpose:** To provide an overview of prediction tools for AF in patients with an acute stroke, and to determine suitability for clinical use by synthesising discriminatory abilities.

**Methods:** We performed a systematic review of prediction tools (including multivariable scores and individual parameters) derived, validated and/or augmented for AF prediction in patients with strokes using Medline and Embase through 25 October 2023. Discrimination measures for tools with c-statistic data from ≥3 cohorts were pooled by Bayesian meta-analysis, with heterogeneity assessed through a 95% prediction interval (PI). Summary discrimination values of <0.60, 0.60-0.70, 0.70-0.80, and >0.80 were defined a priori as inadequate, adequate, good and excellent.1

**Results:** From 8125 unique records we included 71 studies from 135 cohorts with a mean age and percentage of women ranging from 43.0 years to 77.5 years, and 25.2% to 55.3%, respectively. We identified 99 prediction tools for incident AF after a stroke. 33 predictive tools used clinical variables, 13 only used Echocardiographic data, 14 only used electrocardiogram (ECG) data, and 39 used combinations of the above modalities.

87 tools were developed with Cox or logistic regression and 12 tools through machine learning approaches. 36 had undergone external validation, with 27 demonstrating a c-statistic >0.75 on external validation.

Nine multivariable prediction models and two predictive factors (B-type natriuretic peptide and age) were eligible for meta-analysis. Of multivariable prediction models, 4 showed good summary discrimination with wide heterogeneity (Figure 1): LADS (n = 1286, summary c-statistic 0.713, 95% CI 0.534-0.882 95% PI 0.379 -0.979), CHASE-LESS (n = 22747 summary c-statistic 0.726, 95% CI 0.667-0.785 95% PI 0.608-0.836), AS5F (n = 31517, summary c-statistic 0.726, 95% CI 0.693-0.754 95% PI 0.645-0.808), STAF (n = 3759, summary c-statistic 0.771, 95% CI 0.679-0.859 95% PI 0.456-0.973). BNP showed excellent summary discrimination with acceptable heterogeneity (Figure 2), (n = 1343 summary c-statistic 0.832, 95% CI 0.776-0.886 95% PI 0.718-0.927).

**Conclusions:** Five prediction tools externally validated for prediction of risk of AF in those who have had an acute stroke demonstrate good predictive ability. In meta-analysis, BNP performed the best out of all the models and variables tested.