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Health Economics and Health Technology Assessment (HEHTA)

Augmenting Atrial Fibrillation Risk Prediction Tools How Does Risk Differ by Prior Stroke Type?

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Introduction

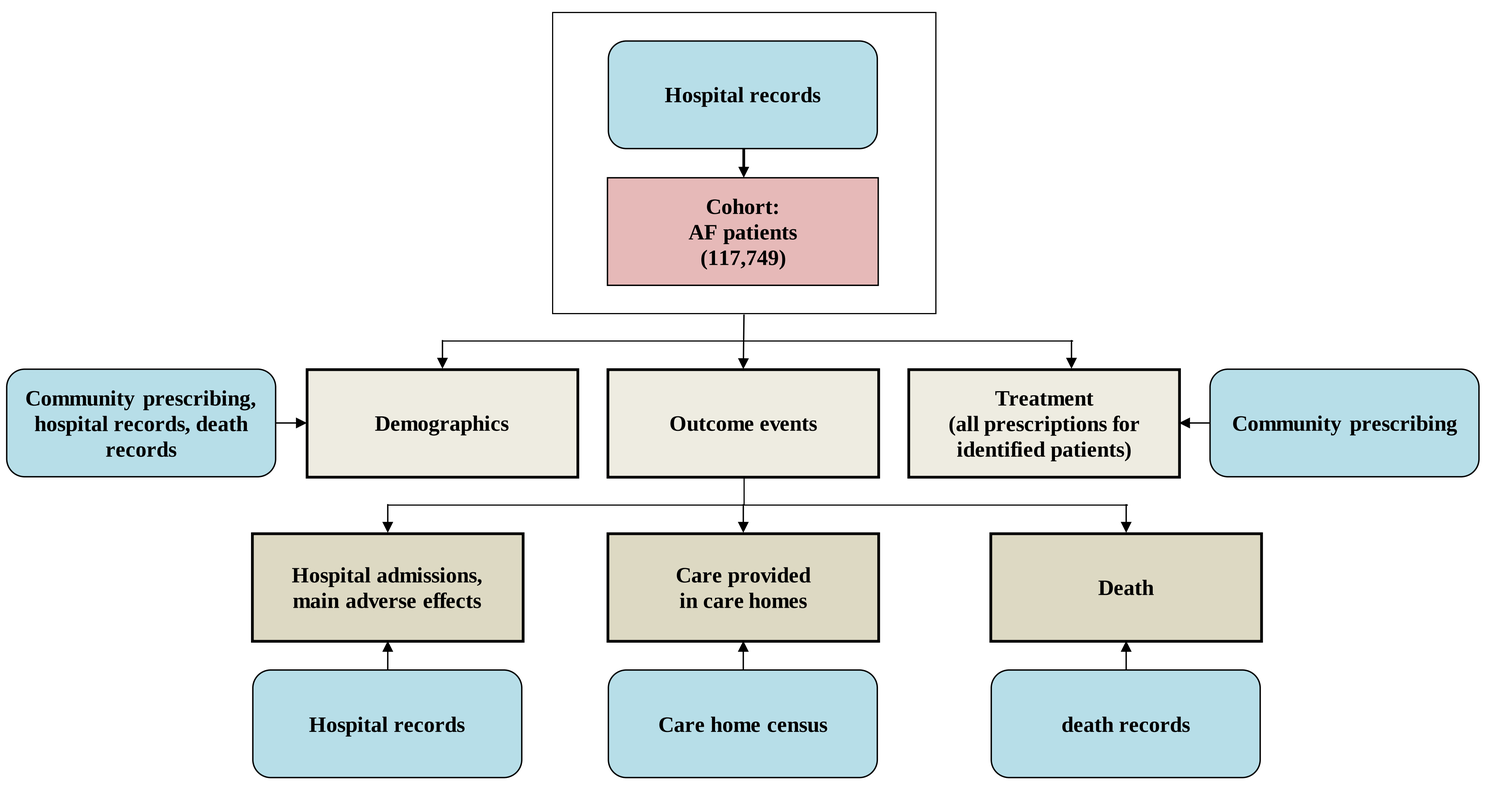
Atrial fibrillation (AF) is the commonest form of arrhythmia seen in the UK. It is an important cause of mortality and morbidity, predominantly driven through cardioembolism. Oral anticoagulants (OACs), associated with increased risk of bleeding, can reduce the risk of AF cardioembolic stroke. In contemporary practice, management decisions in AF are often informed by multi-item clinical prediction tools, including CHA_2DS_2-VASc designed to stratify risk of stroke, and HAS-BLED to stratify the risk of bleeding. The categories that inform the scoring of these prediction tools are broad clinical syndromes. The main concern is under-scoring risk and denying appropriate treatment. By augmenting the tools with additional clinical information there may be potential to improve their risk prediction. For instance, within the category ‘stroke’, ischaemic and haemorrhagic events may have different natural histories and risk, as may transient ischaemic attack versus stroke.

Objectives

Augmenting AF risk prediction tools by adding more detail regarding the stroke event while maintaining the scoring structure of the original scale.

Methods (1)

Figure 1. Cohort identification



Patients with AF or atrial flutter are identified from hospital records. Patients are then linked to community prescribing, care home census and death records to obtain info on demographics, outcome events and prescribing (Figure 1).

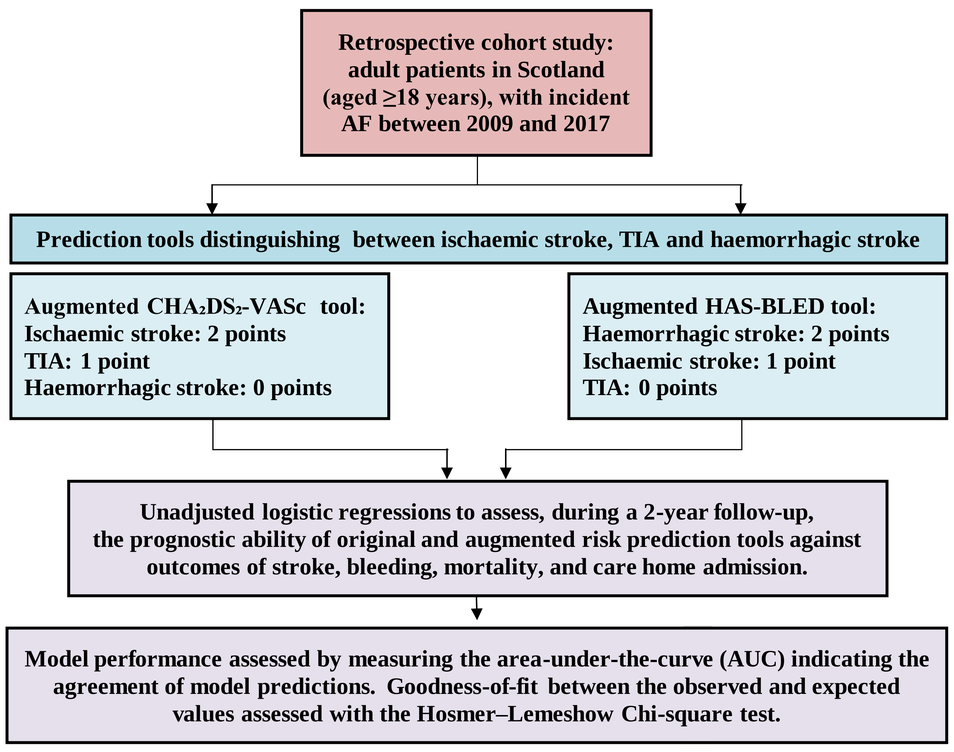
Cohorts characteristics

Table 1. Cohort identification and data extraction

Patients characteristics	AF cohort N(%) N=117,749
Age (sd) (range)	73 (12.7) (18-104)
Age groups	
18-34	779 (0.66)
35-49	3,098 (2.63)
50-64	15,707 (13.34)
65-79	49,637 (42.15)
80-max	48,528 (41.21)
Sex	
Male	61,165(51.95)
Female	56,584 (48.05)
Charlson Comorbidity Index	
no comorbidity	18,515 (15.72)
1 comorbidity	22,126 (18.79)
>1 comorbidities	77,108 (65.49)
Anticoagulation status	
Patients anticoagulated	28,604 (24.29)
Patients not anticoagulated	89,145 (75.71)
Scottish Index of Multiple Deprivation	
1(most deprived)	24,099 (20.99)
2	25,133 (21.33)
3	23,408 (20.08)
4	21,942 (19.42)
5 (least deprived)	20,421 (17.21)
Geography	
Urban	77,327 (67.45)
Small towns	15,389 (13.42)
Rural	21,930 (19.13)

Methods (2)

Figure 2. Augmenting risk prediction tools



Results

Table 2. Prediction values of risk stratification

Risk	Original	Augmented	P-Value
CHA_2DS_2VASc score			
Stroke	0.565 (0.556 - 0.574)	0.570 (0.561 - 0.579)	0.0488
Mortality	0.616 (0.613 - 0.619)	0.623 (0.620 - 0.627)	0.0001
Care home admission	0.632 (0.627 - 0.636)	0.635 (0.631 - 0.639)	0.0314
HAS-BLED score			
Major bleeding	0.530 (0.521 - 0.539)	0.531 (0.522 - 0.540)	0.0075
Mortality	0.576 (0.573 - 0.579)	0.576 (0.573 - 0.579)	0.2026
Care home admission	0.560 (0.554 - 0.563)	0.558 (0.553 - 0.563)	0.0655

Original and augmented tools performed similarly (Table 2).

- **CHA_2DS_2-VASc** prediction of stroke, *AUC original:0.567* (95%CI:0.558-0.576), *AUC augmented:0.574* (95%CI:0.565-0.583).
- **HAS-BLED** prediction of bleeding, *AUC original:0.53* (95%CI:0.51-0.54), *AUC augmented:0.53* (95%CI:0.52-0.54).
- Patterns were similar for mortality and care-home outcomes.

Conclusions

We have shown that it is possible to use routinely-recorded clinical data to augment AF risk prediction tools. The inclusion of care-home admission, an outcome prioritised by patients, as well as traditional cardiovascular outcomes is a further strength of this study. However, improvements in prognostic utility were negligible. When applying CHA_2DS_2-VASc and HAS-BLED, any previous history of stroke is important regardless of pathology.

Disclosures and source of founding

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