PERFORMANCE OF BLEEDING RISK SCORES IN DIALYSIS PATIENTS

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Introduction

Bleeding risk scores, including the HAS-BLED, ATRIA, HEMORR2HAGES and ORBIT scores, have been created to identify patients with a high bleeding risk in patients with atrial fibrillation in the setting of vitamin K antagonist use. These bleeding risk scores may also aid clinicians to identify dialysis patients at high bleeding risk, allowing for personalization of vitamin K antagonist prescription. However, the predictive performances of these bleeding risk scores in dialysis patients is unknown.

The aim of this study was to validate the HAS-BLED, ATRIA, HEMORR2HAGES and ORBIT scores in dialysis patients.

Methods

- **1745 incident dialysis patients** from the Netherlands Cooperative Study on the Adequacy of Dialysis (**NECOSAD**)

- **HAS-BLED:** hypertension=1 point, kidney disease=1 point, liver cirrhosis=1 point, prior stroke=1 point, gastro-intestinal bleeding as proxy for prior bleeding=1 point, age >65 years=1 point, antiplatelet use=1 point, drug or alcohol abuse history=1 point
- **ATRIA:** anemia =1 point, kidney disease=1 point, age ≥75 years=1 point, prior bleeding=1 point, hypertension=1 point
- **HEMORR2HAGES:** hepatic or renal disease=1 point, alcohol abuse=1 point, malignancy=1 point, age >75 years=1 point, antiplatelet use=1 point, prior bleeding=2 points, hypertension=1 point, anemia=1 point, neuropsychiatric diseases as proxy for excessive fall risk=1 point, prior stroke=1 point
- **ORBIT:** age ≥75 years=1 point, anemia=1 point, prior bleeding=1 point, kidney disease=1 point, antiplatelet use=1 point

- **Multiple imputation for missing values**

- **Performance of bleeding risk scores with three years bleeding risk as outcome: discrimination (c-statistic) and calibration**

Results

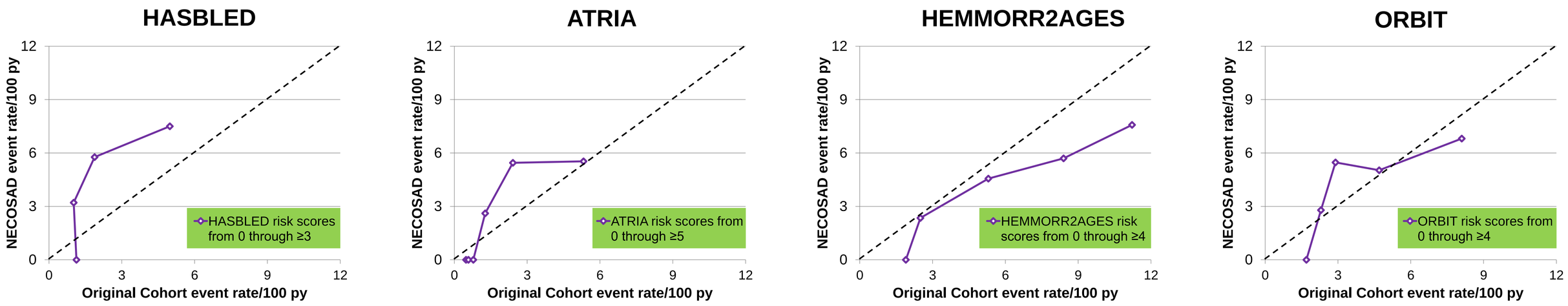
Table 1. Baseline characteristics

	Total N=1745
Age (years) (median)	59.6
Sex, female (%)	38.7
Antiplatelet use (%)	22.7
Vitamin K antagonist use (%)	12.7
Antihypertensive drug use (%)	82.5
Systolic blood pressure >160mmHg (%)	21.2
Anemia (%)	81.3
Comorbidities (%)	
Stroke	8.4
Prior bleeding	5.9
Malignancy	9.7
Liver cirrhosis	0.7
Alcohol abuse	0.3
Neuropsychiatric disease	3.0

Table 2. Performance of bleeding risk scores for three years bleeding

Risk-score	Total (n=1745)	Number of bleeds	Bleeds per 100 patient years	Hazard Ratio (95% CI)	C-statistic
HAS-BLED					**0.58**
Low risk	641	44	3.21	reference	
Intermediate risk	585	68	5.77	1.79 (1.22-2.61)	
High risk	519	71	7.50	2.29 (1.57-3.34)	
ATRIA					**0.55**
Low risk	162	9	2.61	reference	
Intermediate risk	130	14	5.45	2.04 (0.88-4.70)	
High risk	1453	160	5.53	2.06 (1.05-4.03)	
HEMMORR2AGES					**0.56**
Low risk	177	9	2.35	reference	
Intermediate risk	1190	122	5.02	2.08 (1.06-4.08)	
High risk	378	52	7.58	3.09 (1.52-6.26)	
ORBIT					**0.56**
Low risk	300	21	3.33	reference	
Intermediate risk	909	94	5.03	1.49 (0.93-2.39)	
High risk	536	68	6.81	1.99 (1.22-3.25)	

Figure 1. Calibration of bleeding risk scores



Conclusion

In this cohort of incident dialysis patients, increased bleeding risk scores for the HAS-BLED, ATRIA, HEMORR2HAGES and ORBIT were associated with major bleeding events, but with poor predictive abilities (discrimination and calibration). An explanation could be that most predictive factors that comprise these scores are already present in dialysis patients, such as hypertension and anemia. Therefore, these bleeding risk scores may not be useful in dialyis patients.

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