

# A Scoring System to Guide Oral Anticoagulation among Incident Dialysis Patients with a Preexisting Diagnosis of Atrial Fibrillation/Flutter

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#### Introduction

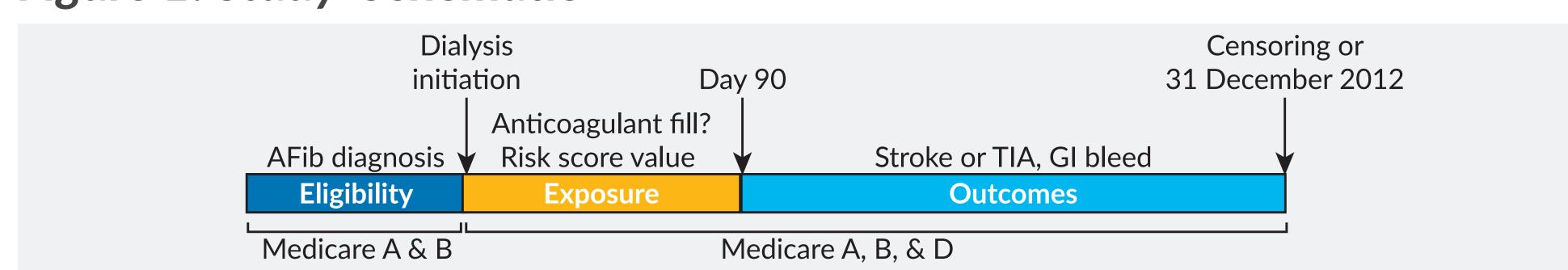
- Atrial fibrillation/flutter (Afib) is associated with significant morbidity and mortality and is common among patients with end-stage renal disease (ESRD).<sup>1</sup>
- Oral anticoagulants reduce the risk of ischemic stroke while imposing risk of hemorrhagic stroke and gastrointestinal bleeding.
- Among the general population, patients with a CHA<sub>2</sub>DS<sub>2</sub>-VASc risk score of ≥2 are considered to be of moderate-high stroke risk, and are considered candidates for oral anticoagulation.<sup>2</sup>
- Applicability of the CHA<sub>2</sub>DS<sub>2</sub>-VASc score to the ESRD population is not clear.
- Prior efforts to develop population-specific risk scores were moderately successful for patients with earlier stages of chronic kidney disease, but were unsuccessful for those with ESRD.<sup>3</sup>

## Objectives

- Determine the utility of the CHA<sub>2</sub>DS<sub>2</sub>-VASc risk score among patient with ESRD initiating dialysis with a preexisting diagnosis of Afib
- Develop an ESRD-specific score that may be used to identify those patients initiating dialysis with a preexisting diagnosis of Afib who are more likely to benefit from oral anticoagulation

## Methods

Figure 1: Study Schematic



- Patients were adult, non-Veterans Affairs beneficiaries who initiated hemodialysis at a large dialysis organization (LDO) in 2010 or 2011; were enrolled in Medicare Parts A, B, and D as of dialysis initiation; had an existing Afib diagnosis as of dialysis initiation based on Medicare A and B claims; and continued hemodialysis at the LDO for at least 90 days.
- Exposure status was ascribed based on the presence of at least one Medicare Part D claim for a prescription fill for an oral anticoagulant between dialysis initiation and day 90, and upon the calculated value of either the CHA<sub>2</sub>DS<sub>2</sub>-VASc score or the dialysis-specific risk score (see below).
- Outcomes, ascertained based on claims data, were considered from day 91 until the earliest of study end (31 December 2012) or loss to follow-up. Comparisons between exposure groups were made using intention-to-treat principles and Cox proportional hazard models.
- A dialysis-specific risk score was developed using a logistic model fit by step-wise elimination of non-contributing variables (*P* > 0.1). Outcomes supporting the use of anticoagulation were considered as oral anticoagulation and no stroke/transient ischemic attack (TIA), and no oral anticoagulation and stroke/TIA. Outcomes disfavoring use of anticoagulation were the converse (oral anticoagulation and stroke/TIA, and no oral anticoagulation and no stroke/TIA).

### Results

## Utility of the CHA, DS, -VASc Score in Incident Dialysis Patients

- More than 80% of patients initiating dialysis with a preexisting diagnosis of Afib had a CHA₂DS₂-VASc score of ≥ 3 (Table 1).
- The distribution of patients by  $CHA_2DS_2$ -VASc score category (0-2, 3-5, and 6-9) was similar among patients who were and were not treated with oral anticoagulation.
- Overall, patients with CHA<sub>2</sub>DS<sub>2</sub>-VASc scores of 3-5 and 6-9 had higher rates of stroke or transient ischemic attack (TIA) compared to those with scores of 0-2, with similar rates of gastrointestinal (GI) bleeding (Figure 2).
- Within each CHA<sub>2</sub>DS<sub>2</sub>-VASc score category, rates of these two outcomes were similar among patients who did vs. did not receive oral anticoagulation (Figure 2).

Table 1: Patient Characteristics by Oral Anticoagulant Fill Status

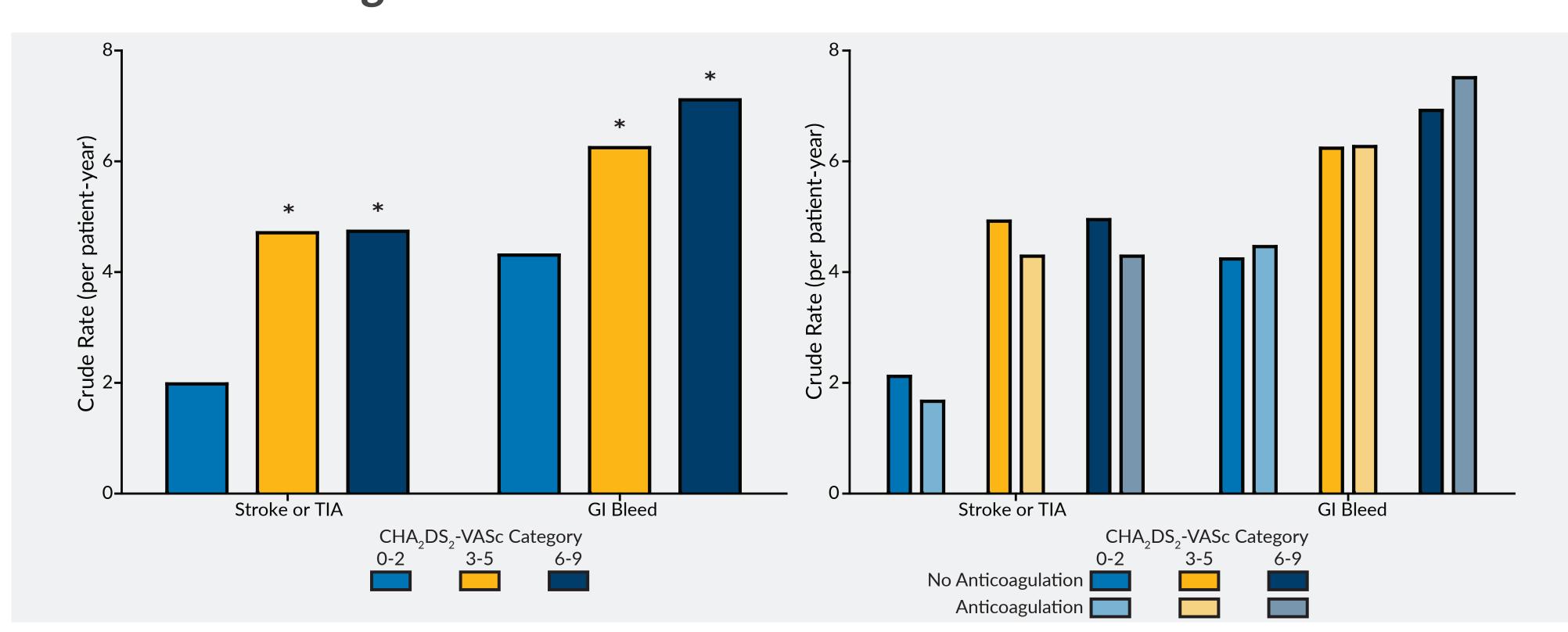
	No Anticoagulant Fill N = 1907	Anticoagulant Fill N = 835	Std Diff (%)	P-Value
Time at risk, days	356.2 ± 267.7	384.0 ± 271.5		
Age, years, mean ± SD	73.9 ± 10.4	72.8 ± 10.0	-10.3	0.01
Sex, female, n (%)	966 (50.7)	375 (44.9)	-11.5	0.006
Race, n (%) White Black Hispanic Other/unknown	1244 (65.2) 369 (19.4) 179 (9.4) 115 (6.0)	599 (71.7) 134 (16.1) 58 (7.0) 44 (5.3)	14.0 -8.7 -8.9 -3.3	0.01
Vascular access, n (%) AVF AVG CVC	204 (10.7) 58 (3.0) 1645 (86.3)	121 (14.5) 30 (3.6) 684 (81.9)	11.5 3.1 -11.9	0.01
Etiology of ESRD, n (%) Diabetes Hypertension Other	894 (46.9) 598 (31.4) 415 (21.8)	356 (42.6) 279 (33.4) 200 (24.0)	-8.5 4.4 5.2	0.12
BMI, kg/m2, mean ± SD	29.1 ± 7.9	$30.3 \pm 9.0$	14.2	<0.001
Diabetes, n (%)	1336 (70.1)	551 (66.0)	-8.7	0.03
CHF, n (%)	987 (51.8)	486 (58.2)	13.0	0.002
CVD, n (%)	200 (10.5)	109 (13.1)	8.0	0.05
Institutional living, n (%)	343 (18.0)	94 (11.3)	-19.0	<0.001
CHA <sub>2</sub> DS <sub>2</sub> -VASc score, n (%) 0-2 3-5 6-9	354 (18.6) 1327 (69.6) 226 (11.9)	164 (19.6) 574 (68.7) 97 (11.6)		0.80

Abbreviations: AVF, arteriovenous fistula; AVG, arteriovenous graft; BMI, body mass index; CHF, congestive heart failure; CVC, central venous catheter: CVD, cerebrovascular disease: SD, standard deviation

## Development of a Dialysis-Specific Score

- A logistic model was used to identify components of a dialysis-specific score to identify patients likely to benefit from anticoagulation, and to assign them coefficients (Table 2).
- Quartiles of risk score were determined for the study cohort
- In the highest quartile of this score, use of oral anticoagulant was associated with a lower point-estimate for risk of stroke/TIA, referent to no anticoagulant use.
- In contrast, no such trend was observed when considering patients in any category of CHA<sub>2</sub>DS<sub>2</sub>-VASc, including the highest (6-9).

Figure 2: Rates of Stroke or TIA and GI Bleed by CHA<sub>2</sub>DS<sub>2</sub>-VASc Score Category and Oral Anticoagulation Status



\*Significantly different referent to CHA<sub>2</sub>DS<sub>2</sub>-VASc 0-2 (left panel) based upon unadjusted incidence rate ratios. Within each CHA<sub>2</sub>DS<sub>2</sub>-VASc category, no statistically significant differences in outcome rates observed between patients who did or did not have an anticoagulant fill (right panel) based upon adjusted incidence rate ratios.

Table 2: Components of the Dialysis-Specific Risk Score

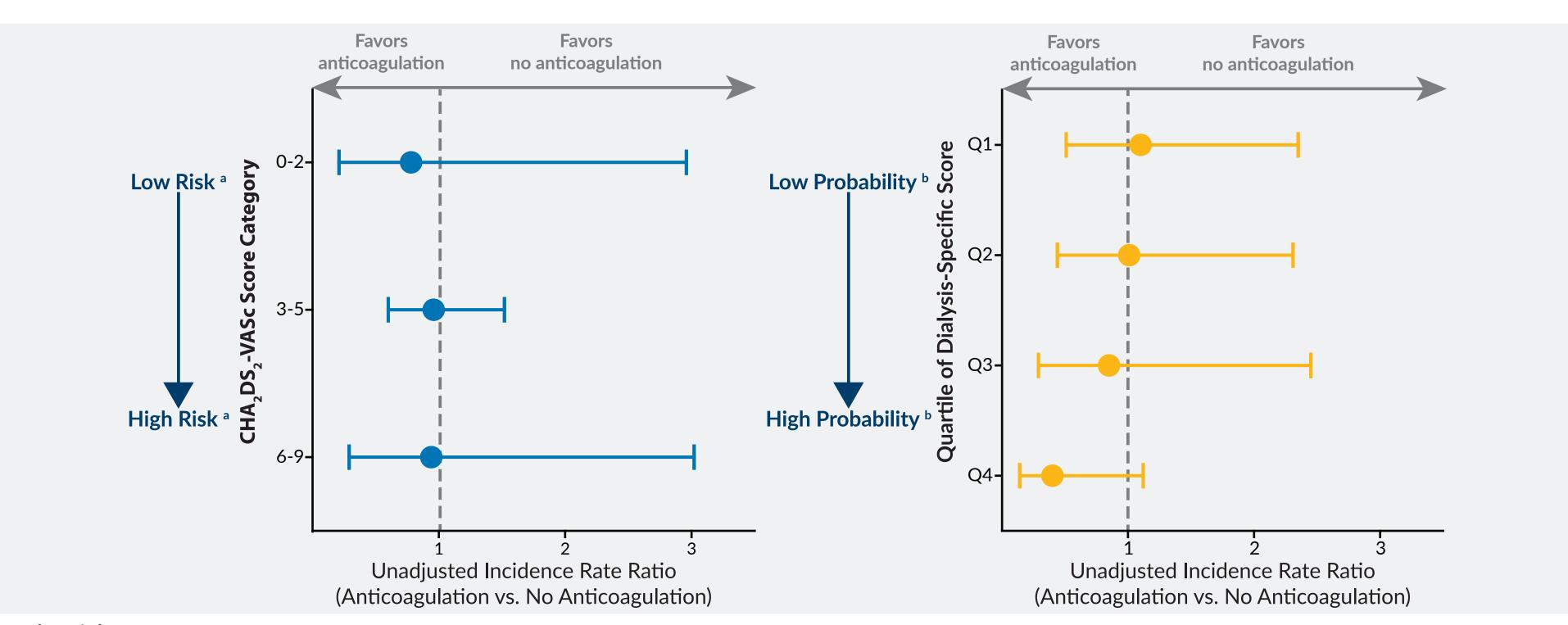
Characteristic	Coefficient	Odds Ratio (95% CI)	P Value
Constant	-0.1272657	0.88 a	N/A
Congestive heart failure	0.3156719	1.37 (1.09, 1.73)	0.008
Hispanic ethnicity	-0.3896992	0.68 (0.44, 1.05)	0.08
Central venous catheter	-0.344466	0.71 (0.53, 0.95)	0.02
Diabetes	-0.3507975	0.70 (0.55, 0.90)	0.006
Female sex	-0.217744	0.80 (0.64, 1.02)	0.07

<sup>a</sup> Represents the underlying odds of benefit from oral anticoagulation therapy, to which the odds ratios are applied.

Score is calculated by summing the constant plus the relevant coefficients. For the study population, quartile ranges of the score were: Q1, < -0.8225291; Q2, -0.8225291 - < -0.6894758; Q3, -0.6894758 - < -0.4717317; Q4,  $\geq$  -0.4717317

Abbreviations: CI, confidence interval; N/A, not applicable

Figure 3: Risk of Stroke or TIA by Score Category and Anticoagulation Status



Stroke risk
 Probability of beneficial effect of oral anticoagulant treatment with respect to stroke or TIA

## Summary and Conclusions

- Among incident dialysis patients with pre-existing Afib, the CHA<sub>2</sub>DS<sub>2</sub>-VASc score does to some degree discriminate based on subsequent risk of stroke, but does not appear to influence oral anticoagulant prescribing behavior and does not appear to identify patients who will benefit from oral anticoagulation therapy.
- Other scoring systems, such as the one developed here, can more meaningfully stratify such patients with respect to the likelihood of receiving a benefit from oral anticoagulation therapy.
- This score did not consider bleeding risk; clinical judgement must be applied when using any scoring system.
- Further work is needed to refine and validate this scoring system or to develop independent scoring systems that appropriately identify which dialysis patients with Afib would benefit from anticoagulation.

### References

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3. Bautista J, et al. *Clin Kidney J* 2015 Apr; 8(2):226-31.

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