

CHADS₂ FOR ASSESSING STROKE RISK IN PATIENTS WITH ATRIAL FIBRILLATION

Several clinical prediction rules have been developed to estimate the annual risk of stroke in a patient with atrial fibrillation (AF). The CHADS₂ score was developed by expert opinion based on risk factors of stroke in AF identified in the subset of patients not treated with warfarin in classic stroke prevention studies in AF. The score was meant to be easily memorized and easy to use.

The CHADS₂ score, has been adopted by many clinicians as a standardized approach. The letters in this acronym stand for patient characteristics that have been independently associated with an increased risk for stroke: congestive heart failure, hypertension, age >75, diabetes, and prior stroke/transient ischemic attack (TIA). As the number of these characteristics increases, the annual risk of stroke rises almost exponentially. Compared to the other factors, a history of stroke or TIA is associated with a higher risk of future ischemic events.

Calculating a CHADS₂ Score

	CONDITION	POINTS
C	Congestive heart failure	1
H	Hypertension (HTN)	1
A	Age >75 years	1
D	Diabetes mellitus	1
S₂	Prior stroke or TIA	2



A patient's score is calculated by adding all applicable points, so it will be a number between 0 and 6.

The CHADS₂ score was first tested in 2001 against two other prior validated stroke risk estimation tools developed directly from trial data: the SPAF scheme (Stroke Prevention in AF study) and AFI (Atrial Fibrillation Investigators) scheme. The CHADS₂ score was validated and proved not only to be easier to use, but was more accurate than the SPAF or AFI scheme.

Originally, the predictive value of this scoring system was evaluated in 1733 Medicare beneficiaries with nonvalvular AF between the ages of 65 and 95 who were not given warfarin at hospital discharge.¹ The adjusted stroke rate was derived from multivariate analysis assuming no aspirin usage.² The CHADS₂ score is the most validated risk scheme, having been independently tested in at least 10 separate cohorts after its original derivation.³ Evaluating the CHADS₂ score in more contemporary studies has shown a much lower risk of stroke.⁴

CHADS ₂	EVENTS PER 100 PERSON-YEARS		Number Needed to Treat (NNT)*
	Warfarin	No Warfarin	
0	0.25	0.49	417
1	0.72	1.52	125
2	1.27	2.5	81
3	2.2	5.27	33
4	2.35	6.02	27
5-6	4.6	6.88	44

**Number of patients with AF needed to treat with warfarin to prevent one stroke per year*

Therapy Guidelines

Benefits of anticoagulation almost always outweigh the risk. Bleed risk is most relevant for patients with lower CHADS₂ scores.

CHADS₂: "0"=Aspirin; "1"=Aspirin or oral anticoagulants; "≥2"=Oral anticoagulants.

Multiple studies looking at net clinical benefit have been conducted to identify the threshold of the benefits of oral anticoagulation outweighing the risks of anticoagulation.⁵⁻⁸ When using the threshold of a CHADS₂ score of 2, net

clinical benefit is clear, whereas with a score of 1 or 0 there is no clear evidence of benefit with possible evidence of harm.

Cases

1. Mr. James is a 76-year-old male with AF whose medical comorbidities include type 2 diabetes (T2DM) and HTN.
 - ▶ CHADS₂ score of 3
2. Mrs. Jane is a 66-year-old female with AF whose medical comorbidities include prior stroke.
 - ▶ CHADS₂ score of 2
3. Mr. Jones is a 65-year-old male with AF whose medical comorbidities include HTN.
 - ▶ CHADS₂ score of 1
4. Mr. Johns is a 55-year-old male with AF and no other comorbid conditions.
 - ▶ CHADS₂ score of 0

Example of Communication With Patients About Their Risk of Stroke:

“Mr. James, having nonvalvular AF gives you a risk of stroke 5 times greater than that of the general population. Along with your AF, you age and medical comorbidities, T2DM and HTN, put you at an elevated risk of stroke. This risk can be reduced by approximately two-thirds with oral anticoagulation, or “blood thinners”. Oral anticoagulation carries the risk of bleeding, but it is generally felt that at your current risk of stroke, the benefits of stroke reduction outweigh the potential risk of bleeding.”

References

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