CHAD is Dead: Pragmatic Utility of the CHA_2DS_2-VASc Score in Non-Valvular Atrial Fibrillation?

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The $CHADS_2$ score and its second iteration, CHA_2DS_2-VASc, are ubiquitous in clinical decisions pertaining to assessment of a patient's thromboembolic risk from non-valvular atrial fibrillation (AF). Clinicians rely on these scores when deciding whether to prescribe long-term oral anticoagulation (OAC) for AF patients, weighing the bleeding risks of OAC against the actuarial risk of an embolic stroke. However, societal guidelines have incrementally expanded indications for anticoagulant use through the addition of novel risk factors and lowering the threshold for initiation of OAC.[1] In fact, O'Brien et al. recently demonstrated that 91% of patients with non-valvular AF now have a guideline-based indication for anticoagulation.[2] Despite the overwhelming eligibility patients for OAC, a recent retrospective study of patients with non-valvular AF who suffered an acute ischemic stroke demonstrated that only 16% of eligible stroke patients were receiving therapeutic anticoagulation.[3] Given this background, we argue that:

1. The clinician's focus should be on when to *initiate* OAC, or alternatively, on identifying those rare circumstances in which *not to initiate* OAC.
2. The $CHADS_2$ and CHA_2DS_2-VASc scores may not be relevant for clinical decision-making.
3. Risk scores foster clinical inertia, creating a barrier to guideline-directed care.

The balance of risk for thromboprophylaxis in AF patients has been slowly shifting in favor of OAC. Although aspirin is commonly prescribed for AF, the evidence of its utility in stroke prevention is weak, with a clear increased risk of bleeding. Moreover, safer bleeding profiles with novel oral anticoagulants and improved monitoring of international normalized ratios (INR) have reduced the risk of OAC. In addition, validated approaches have emerged to help quantify individual patient risk of bleeding when receiving OAC for AF, which help practitioners identify patients most vulnerable to major bleeding. Finally, specific reversal agents for novel OAC agents have been approved or are under development, which have the potential to ameliorate the severity of spontaneous bleeding episodes.

By contrast, the data supporting the predictive utility of $CHADS_2$ and CHA_2-DS_2-VASc scores have increasingly been called into question. Validation of these scores has been mainly limited to European populations, and c-statistics in repeated validation studies have been unimpressive, with some providing clinicians and patients little more than a coin flip for ascertaining who might experience an embolic stroke.[4]

Given lower bleeding risk and the inability to accurately predict stroke using the $CHADS_2$ score, one possible approach would be to implement a population-based treatment strategy with universal prescription of OAC for all non-valvular AF patients, with exceptions for OAC assessed on a case-by-case basis. This would dramatically increase therapeutic uptake. The question should no longer be who is eligible for OAC, but who are the ineligible exceptions. With this simplified approach, is the CHAD score dead?

Our view is that at present, the CHAD score impedes appropriate prescribing of OAC for a condition with a highly debilitating consequence. Rather than serving as a gateway to therapy, the CHADS score functions as a roadblock. We suggest that in the future, the CHADS score might be better utilized for shared clinical decision-making. Patients are more risk-averse for a thromboembolic stroke than bleeding, since the latter is generally reversible. Because patients with the highest risk for stroke also have the highest risk for bleeding, an imperfect clinical prediction tool such as the CHADS or CHA_2DS_2-VASc score may be better used as a vehicle to engage patients in their care. By providing an (albeit inexact) estimate of annual stroke and bleeding risk, patient buy-in and ultimate adherence to long-term OAC might be enhanced. Therefore, while offering less and less for the clinician's calculus for OAC initiation, the risk scores may have an increasing role in educating and informing our patients.

The principal strength of this approach is that stroke incidence would likely decline among US adults if non-valvular AF without a self-limited trigger or an absolute contraindication were treated universally. Nonetheless, we agree with the recent perspective in the *Journal of General Internal Medicine* that broadening AF screening via wearables and smartphones is likely to identify an extremely low-risk population, where the risk–benefit balance of OAC would be questionable.[5] Accordingly, our proposal for universal treatment would be limited to individuals with documented evidence of non-

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valvular AF presenting for clinical care. Our hope is that therapeutic inertia will be overcome if atrial fibrillation is considered an anticoagulation-eligible population that is not conditionally based upon the CHADS score or any of its subsequent iterations.

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