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ONE MINUTE CONSULT
BRIEF ANSWERS TO SPECIFIC CLINICAL QUESTIONS

Q: How can I predict bleeding in my elderly patient taking anticoagulants?

A: We have tools to predict bleeding risk, but their predictive value is modest, and the estimated risk of bleeding is often outweighed by the benefits of anticoagulant therapy.

Anticoagulant therapy is commonly prescribed for conditions that disproportionately affect the elderly, including atrial fibrillation, venous thromboembolism, and valvular heart disease. Though anticoagulants are highly effective in preventing clots, they also significantly increase the risk of bleeding. Since older age is a risk factor for bleeding as well as thrombosis, it is essential to weigh the risks and benefits of anticoagulants for each patient.

WHAT KINDS OF BLEEDING DEVELOP IN PATIENTS ON ANTICOAGULANTS?

Patients taking anticoagulants have roughly double the risk of bleeding compared with patients not on anticoagulants.[1] Bleeding rates tend to be slightly higher in patients taking anticoagulants for venous thromboembolism than in those taking them for atrial fibrillation. The average yearly risk of a "major" anticoagulant-associated bleeding event (eg, requiring transfusion or intervention or occurring in a critical anatomic site) is about 2% to 3%, with most of the bleeding being gastrointestinal.[2]

Intracranial hemorrhage is by far the most deadly complication of anticoagulant therapy: it causes 90% of deaths and disability from warfarin-associated hemorrhage and is associated with a death rate over 50%; however, it is much less common than gastrointestinal bleeding.[3] Anticoagulant therapy increases the risk of intracranial hemorrhage by only 0.2% per year.[1]

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RISK-PREDICTION TOOLS HAVE LIMITATIONS

Not all patients have the same risk of bleeding when taking anticoagulants. Many factors in addition to advanced age have been associated with increased bleeding risk, including coexisting medical conditions (such as malignancy, prior stroke or bleeding event, and renal insufficiency), medications (particularly aspirin, nonsteroidal anti-inflammatory drugs, and other antiplatelet drugs), and the timing and intensity of anticoagulation therapy.[4]

Scoring tools have been developed to identify patients at higher risk of bleeding (**Table 1**).[4–9] The various schemes incorporate many of the same variables, such as older age, renal impairment, and history of bleeding, but some include additional risk factors while others are more parsimonious. They also differ in how individual risk factors are weighted to generate a final risk score.

In terms of predictive ability, none of the available risk schemes appears to be vastly superior, and their ability to predict hemorrhage is modest at best. There is also no universal or well-established threshold at which the risk of bleeding is so high that one would not consider anticoagulants. In fact, a "high-risk" patient may have an aggregate bleeding rate of only 4% to 6% per year. Using risk schemes such as ATRIA,[5] HEMORR$_2$HAGES,[6] and HAS-BLED[7] may be more useful because they provide an estimate of bleeding risk for each point on the scale.

Moreover, the current tools to predict bleeding risk have several other limitations.

Since age is a risk factor for both bleeding and thrombosis, weigh the risks and benefits of anticoagulants for each patient

TABLE 1

Bleeding risk tools and bleeding rates reported in original cohorts

Risk tool	Population	Risk score calculation	Scores and bleeding rates
Bleeding Risk Index[8]	Atrial fibrillation, venous thromboembolism, cardiac surgery	1 point for each of the following: Age ≥ 65, prior stroke, prior gastrointestinal bleeding 1 point if any one of the following: Recent myocardial infarction, diabetes mellitus, hematocrit < 30%, creatinine > 1.5 mg/dL	Points: Risk: Rate at 12 months 0: Low: 3% 1–2: Intermediate: 12% 3–4: High: 48%
HEMORR$_2$HAGES[6]	Atrial fibrillation	1 point for each of the following: Hepatic or renal disease, Ethanol abuse, Malignancy, Older age (> 75), Reduced platelet count or function, Hypertension (uncontrolled), Anemia, Genetic factors, Excessive fall risk, Stroke 2 points: prior bleeding event	Points: Events/100 person-years 0: 1.9 1: 2.5 2: 5.3 3: 8.4 4: 10.4 ≥ 5: 12.3
RIETE risk scheme[9]	Venous thromboembolism	2 points: Major bleeding within 15 days 1.5 points: Creatinine >1.2 mg/dL, Anemia 1 point: Malignancy, Pulmonary embolism, Age > 75	Points: Risk: Rate at 3 months 0: Low: 0.3% 1–4: Intermediate: 2.6% ≥ 5: High: 7.3%
HAS-BLED[7]	Atrial fibrillation	1 point for each of the following: Hypertension, Abnormal renal or liver function, Stroke, Bleeding history or predisposition, Labile international normalized ratio, Older age, Drug or alcohol use	Points: Events/100 person-years 0: 1.13 1: 1.02 2: 1.88 3: 3.74 4: 8.70 5: 12.50 ≥ 6: Not available[a]
ATRIA Risk Score[5]	Atrial fibrillation	3 points: Anemia, Severe renal disease 2 points: Age ≥ 75 1 point: Prior bleeding event, Hypertension	Points: Events/100 person-years 0: 0.40 1: 0.55 2: 0.97 3: 1.01 4: 2.62 5: 5.65 6: 4.95 7: 5.17 8: 9.61 9: 12.43 10: 17.25

[a] There were too few patients in original cohort to provide a reliable estimate.

Based on information in Lopes RD, Crowley MJ, Shah BR, et al. Stroke prevention in atrial fibrillation. Rockville (MD): Agency for Healthcare Research and Quality (US); 2013 Aug. Report No.: 13-EHC113-EF.

They were developed in patients already taking anticoagulants and so probably underestimate the actual risk of hemorrhage, as people who could not take anticoagulants were excluded, most likely because they were at high risk of bleeding. Therefore, bleeding risk tools probably apply best to a patient for whom anticoagulation *can* be considered.

Some clinical variables are necessarily broad. For example, "prior bleeding" is a risk factor included in several risk scores, but does not distinguish between massive variceal bleeding and minor hemorrhoidal bleeding.

Risk scores do not effectively predict intracranial hemorrhage.

Finally, these risk tools were developed in patients taking vitamin K antagonists, and it is not yet established that they can effectively predict hemorrhage related to other, newer anticoagulants.

WHEN DOES BLEEDING RISK OUTWEIGH ANTICOAGULATION BENEFIT?

For patients with atrial fibrillation, the net clinical benefit of anticoagulation (strokes prevented minus bleeding events induced) increases as the risk of stroke rises. Updated guidelines for managing atrial fibrillation now recommend anticoagulation for most patients.[10]

For most older patients with atrial fibrillation, the decision to anticoagulate may not change even if a bleeding risk tool indicates a high bleeding risk.[11] For example, a patient with a history of ischemic stroke will generally derive more benefit than harm from anticoagulants. The primary exception is in patients with prior lobar intracranial hemorrhage, because of the high risk of rebleeding and the worse outcomes associated with intracranial hemorrhage.[12] As a general rule, most patients with atrial fibrillation and an additional risk factor for stroke should be considered for anticoagulant therapy unless they have a history of lobar intracranial hemorrhage.

Anticoagulation may be deferred if the patient is at the lower end of the stroke risk spectrum and if the bleeding risk is calculated to be high. However, as noted before, current bleeding risk tools probably do not capture the experiences of patients at the extremes of high bleeding risk, so clinical judgment continues to be important. In addition, forgoing anticoagulation could be reasonable even in patients at high risk for recurrent stroke if their life expectancy is limited, if anticoagulation is unacceptably burdensome, or if it is not within their goals and preferences.

WHAT ABOUT FALL RISK?

Fall risk commonly deters clinicians from prescribing anticoagulants because of the fear of causing intracranial hemorrhage. In particular, falls increase the risk for subdural hematoma, which has a death rate comparable to that of ischemic stroke.[13]

Studies have had difficulty quantifying the exact risk associated with falls because these patients are less likely to be prescribed anticoagulants. One decision analysis estimated that a person would have to fall about 300 times per year before the risk of intracranial hemorrhage outweighed the benefits from stroke reduction.[14] Studies have found that patients at high risk of falls have a higher risk of intracranial hemorrhage, but that this risk is counterbalanced by an even greater risk of ischemic stroke.[15]

Therefore, if the baseline risk of ischemic stroke is high, anticoagulation is still favored.

WHEN SHOULD I USE A BLEEDING RISK TOOL?

Despite their limitations, bleeding risk tools are useful in clinical practice when estimates of bleeding risk affect clinical behavior. They are most helpful for patients at the lower end of the stroke or thromboembolism risk spectrum, where the decision to anticoagulate is strongly influenced by bleeding risk. Risk tools may also be helpful when counseling patients about their bleeding risk off and on anticoagulants.

Finally, recognizing that a patient is at high bleeding risk may lead the clinician to consider closer monitoring of anticoagulants or to implement strategies to reduce the risk.

None of the risk schemes appears vastly superior, and their ability to predict hemorrhage is modest at best

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