Heartbeat: bleeding risk in atrial fibrillation patients on non-vitamin K oral anticoagulant medications

doi:10.1136/heartjnl-2022-320820

Catherine M Otto

In patients with atrial fibrillation (AF), the decision to recommend long-term anticoagulation is based on consideration of the relative risk of a thromboembolic event versus the risk of major bleeding. Current risk scores for bleeding on anticoagulation were developed for vitamin K antagonists (VKA) and antiplatelet therapy, yet now many patients are treated with non-VKA oral anticoagulants (NOACs). Barnett-Griness and colleagues¹ used data from a large integrated healthcare organisation to develop a novel risk score for risk of bleeding in patients with AF treated with NOACs. The risk score was derived from data on 28 055 AF patients treated with apixaban and then tested in 19 569 patients treated with either dabigatran or rivaroxaban. Points were assigned for each identified risk factors and then added to provide an overall score: male sex (7), anaemia (6), thrombocytopenia (9), antiplatelet therapy (7), hypertension (8), prior major bleeding (5), fall risk (4), low serum cholesterol (0–5) and renal function (0–8). There was a strong relationship between the total risk score and 1 year probability of major bleeding (figure 1).

In the accompanying editorial, Morrone and De Caterina² summarise the numerous previous risk scores for bleeding in patients with AF, pointing out that all have limited predictive values and that the factors that predict risk of bleeding also tend to predict risk of thromboembolic events. Although the proposed new model provides some a somewhat improved risk estimate, older scores have easily remembered acronyms and are practical for daily clinical practice. Still, none of the existing scores is ideal so that continued research to improve outcomes in patients with AF is needed with the goal of minimising thromboembolic risk without increasing bleeding risk.

Division of Cardiology, University of Washington, Seattle, Washington, USA

Correspondence to Professor Catherine M Otto, Division of Cardiology, University of Washington, Seattle, WA 98195, USA; cmoatto@uw.edu

Figure 1 Points-based tool for predicting major bleeding event by 1 year. The histogram refers to the risk score distribution in the cohort. Each bar represents the proportion of subjects in the cohort that was assigned the relevant score range. The histogram was divided into quartiles; each quartile was coloured differently. For example, the middle 50% of the cohort had points score between 20 and 30. The 1 year major bleeding probability can be read by the predicted risk blue curve, using the right y-axis. For example, a points score of 50 is associated with ~6% risk.

Population based data on disease incidence is needed to inform healthcare policy and planning and, perhaps, might lead to improved preventative strategies. In a study of heart failure (HF) incidence from 2006 to 2018 in New Zealand, Chan and colleagues³ found that overall HF incidence declined from 403 to 323 per 100 000 between 2006 and 2013. However, overall HF incidence plateaued from 2013 to 2018, with an increase in HF younger (age 20–49 years) individuals offsetting a decline in HF incidence in those age 80 years of age or older (figure 2). The increase in HF incidence in younger individuals occurred despite an overall reduction in the proportion of HF hospitalisation due to ischaemic heart disease from 35% in 2006 to 28% in 2018.

As discussed in an editorial by Nedkoff and Weber,⁴ the causes of increased HF incidence in younger individuals are unknown. One hypothesis is that the increase in obesity and diabetes is leading to an increased incidence of HF. Other possible causes include genetic cardiomyopathies, or alcohol and methamphetamine use. Nedkoff and Weber⁴ point out that the incidence of HF in younger individuals is '50 times lower than rates in the oldest age groups. However, in absolute terms, this equates to nearly 600 people annually in the New Zealand population aged <50 years with onset of heart failure, with ongoing substantial risk of poor cardiovascular outcomes and increasing heart failure burden with ageing.'

In patients with cardiovascular conditions, the effects and risk of fasting

Figure 2 Age-standardised and age-specific rates of incident heart failure hospitalisation by history of IHD. Rates are age-standardised to revised 2013 European standard population. Trend lines calculated with joinpoint regression modelling. IHD, ischaemic heart disease.

Figure 3 Suggested pre-Ramadan and post-Ramadan checklist for reviewing patients with cardiovascular conditions. CKD, chronic kidney disease; DM, diabetes mellitus; IM, intramuscular; S/L, sublingual; U&E, urea and electrolytes. †See figure 1 in this article; ‡see references 3, 9, 11–14 in this article; §§see table in this article (created with biorender.com).

during Ramadan vary with the specific type and severity of disease. In this issue of *Heart*, Akhtar and colleagues⁵ provide guidance for classifying patients as low-moderate versus high-very high risk and make recommendations to avoid dehydration, fluid overload or cardiac decompensation due to altered

medication dosing schedules during Ramadan (figure 3).

The *Education in Heart* article⁶ in this issue, discusses the use of sodium-glucose co-transporter 2 (SGLT2) inhibitors in treatment of patients with heart failure which complements a state-of-the-art review article on this topic published recently in *Heart*.⁷ Two large, randomised, placebo-controlled trials of SGLT2 inhibitors in patients hospitalised for HF with reduced ejection fraction (HFrEF) demonstrated a reduction in mortality and morbidity as well as symptoms. Thus, although guideline updates are pending, the authors recommend the use of SGLT2 inhibitors in patients with HFrEF and provide practical guidance for starting and monitoring therapy (figure 4).

The *Cardiology-in-Focus* topic⁸ in this issue focuses on the ethics of allocating scarce resources, such as extracorporeal membrane oxygenation (ECMO) during a pandemic or other crisis situation. The authors conclude that ‘An understanding of the practical constraints of ECMO is essential, as is an appreciation for the strengths and limitations of different ethical perspectives that drive decision-making in resource allocation, particularly the impact of utilitarian-prioritisation on justice and equity.’

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

SGLT2 inhibitors in HFrEF

Figure 4 Summary of the benefits of SGLT2 inhibitors in patients with HFrEF. BP, blood pressure; eGFR, estimated glomerular filtration rate; HFrEF, heart failure and reduced ejection fraction; IV, intravenous; LV, left ventricle; NT-proBNP, N-terminal prohormone of B-type natriuretic peptide; T2DM, type 2 diabetes mellitus.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study does not involve human participants.

Provenance and peer review Commissioned; internally peer reviewed.

© Author(s) (or their employer(s)) 2022. No commercial re-use. See rights and permissions. Published by BMJ.

To cite Otto CM. *Heart* 2022;**108**:243–245.

Heart 2022;**108**:243–245.
doi:10.1136/heartjnl-2022-320820

ORCID iD

Catherine M Otto <http://orcid.org/0000-0002-0527-9392>

REFERENCES

- 1 Barnett-Griness O, Stein N, Kotler A, *et al*. Novel bleeding prediction model in atrial fibrillation patients on new oral anticoagulants. *Heart* 2022;**108**:266–73.
- 2 Morrone D, De Caterina R. Bleeding risk score: limits and practicability. *Heart* 2022;**108**:246–8.
- 3 Chan DZL, Kerr A, Grey C, *et al*. Contrasting trends in heart failure incidence in younger and older New Zealanders, 2006–2018. *Heart* 2022;**108**:300–6.
- 4 Nedkoff L, Weber C. Heart failure: not just a disease of the elderly. *Heart* 2022;**108**:249–50.
- 5 Akhtar AM, Ghouri N, Chahal CAA, *et al*. Ramadan fasting: recommendations for patients with cardiovascular disease. *Heart* 2022;**108**:258–65.
- 6 Docherty KF, Petrie MC. Sodium-glucose cotransporter 2 inhibitors as a treatment for heart failure. *Heart* 2022;**108**:312–20.
- 7 Gulsin GS, Graham-Brown MPM, Squire IB, *et al*. Benefits of sodium glucose cotransporter 2 inhibitors across the spectrum of cardiovascular diseases. *Heart* 2022;**108**:16–21.
- 8 Zaidi D, Fedson SE, Kirkpatrick JN. Allocating scarce cardiovascular support in a pandemic: ECMO in crisis standards of care. *Heart* 2022;**108**:321–3.