

Visual Aid Tool to Improve Decision Making in Anticoagulation for Stroke Prevention

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Background: The management of stroke prevention among patients with atrial fibrillation (AF) has changed in the last few years. Despite the benefits of new oral anticoagulants (NOACs), decisions about the optimal agent remain a challenge. We provide a visual aid tool to guide clinicians and patients in the decision process of selecting oral anticoagulants for stroke prevention. *Methods:* We created visual plots representing benefits of warfarin versus NOACs from a meta-analysis comprising 58,541 participants. Visual plots (Cates plots) were created using software available at nntonline.net. The primary outcome was stroke or systemic embolism during the study period. *Results:* In the chosen meta-analysis, 29,312 participants received a NOAC and 29,229 participants received warfarin. For every 1000 patients with AF, 38 would have a stroke or systemic embolic event in the warfarin group compared to 31 in the NOAC group (RR .81; 95% CI .73-.91). Fifteen patients would develop an intracranial hemorrhage in the warfarin group compared to 7 in the NOAC group (RR .48; 95% CI .39-.59). Conversely, 25 patients would develop gastrointestinal bleeding in the NOAC group compared to 20 in the warfarin group (RR 1.25; 95% CI 1.01-1.55). *Conclusion:* For every 1000 treated individuals with AF, NOACs would prevent stroke or systemic embolism in 7 additional patients and cerebral hemorrhage in 8 additional patients compared to warfarin. On the other hand, 5 more patients would develop gastrointestinal bleeding with NOACs compared to warfarin. These data are visually shown in Cates plots, facilitating conversations with patients regarding anticoagulation decisions. **Key Words:** Novel oral anticoagulation—visual aid tool—Cates plots—decision making.

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Background

The current management of atrial fibrillation (AF) for stroke prevention has recently changed with the publication of randomized controlled trials (RCTs) using new oral anticoagulants (NOACs). A recent meta-analysis from these RCTs consistently revealed the benefits of NOACs compared with warfarin in the prevention of stroke and systemic embolism.¹

However, providing patients with the correct information to make an informed decision regarding anticoagulation remains a challenge around the world²⁻⁴ because of lack of certainty, patient understanding, and communication methods.⁵ One strategy for conveying choice information more simply and accurately involves graphical display, which can allow patients to rapidly understand the risks and benefits of a certain choice.⁶

One such visual aid, Cates plot (http://www.nntonline.net/visualrx/cates_plot),⁷ is a decision tool created in 1999

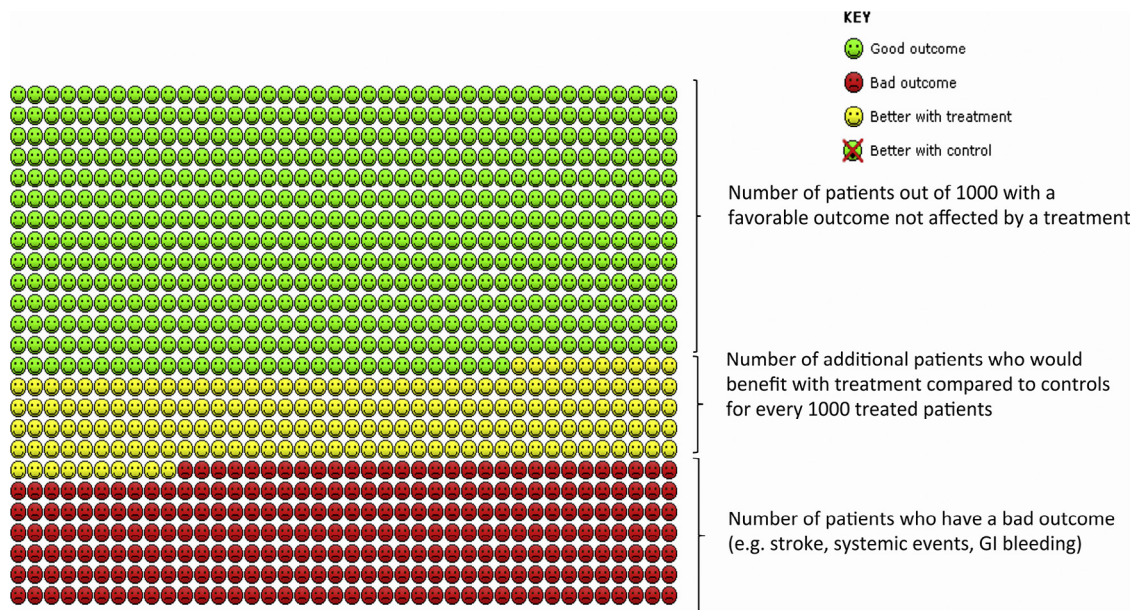


Figure 1. Schematic interpretation of Cates plots. Abbreviation: GI, gastrointestinal.

to visually illustrate and communicate the risks and benefits of treatments per 100 or 1000 patients. Here, we used the Cates plot to provide a visual aid tool to guide clinicians caring for patients with an acute ischemic stroke in making therapeutic decisions.

We chose to demonstrate NOAC efficacy and safety using the largest available meta-analysis,¹ as there is currently no available visual aid tool to discuss this complex topic with patients.

Methods

We created Cates plots derived from a recent meta-analysis of 4 large randomized trials comprising participants with AF assigned to receiving either NOACs or warfarin.¹

Cates plots include 4 smiley face categories to visually depict the following: patients not affected by a treatment (green faces for those with a good outcome and red faces for those with a bad outcome); additional benefits of treatment compared to controls (yellow faces); and people with an adverse event that changes from a good outcome to a bad outcome (crossed-out green faces) (Fig 1). (Color version of figure is available online.) Cates plots were created with the available online calculator, by entering the event rate of the control group (warfarin), and relative risk of the intervention (NOACs) with 95% confidence intervals, obtained from Ruff et al.¹ The main outcome measure was stroke and systemic embolism. Safety outcomes included intracerebral hemorrhage and gastrointestinal bleeding. Mortality was a secondary outcome measure.

Results

Overall, 58,541 participants contributed to the estimates represented by the Cates plots. Although 42,411

patients were assigned to NOACs, only the higher doses of dabigatran and edoxaban were included in the meta-analysis, leaving 29,312 participants in the NOAC group (intervention group). 29,229 participants were assigned to standard warfarin (control group). The median follow-up was 1.8-2.8 years.¹ Table 1 summarizes the participants' characteristics.

For every 1000 patients with AF, 38 in the warfarin group would develop stroke or systemic embolism compared to 31 (RR .81; 95% CI .73-.91) in the NOAC group (Table 2, Fig 2, A). Differences based on CHADS₂ score and age are shown in Table 2 and Supplemental Materials.

Per 1000 patients, 15 would develop an intracranial hemorrhage in the warfarin group versus 7 in the NOAC group (RR .48; 95% CI .39-.59; Fig 2, B). However, there was a higher rate of gastrointestinal bleeding in the NOAC group (25 per 1000; RR 1.25; 95% CI 1.01-1.55) compared to the warfarin group (20 per 1000; Fig 2, B).

Discussion

The communication of the risk of stroke and complications related to anticoagulants constitutes a challenge for clinicians.^{4,8} Previous studies showed that patients and physicians may misinterpret the risk of developing a medical condition or the expected response to a treatment.^{9,10} Behavioral psychologists suggest the use of natural frequencies presented as visual aid decision tools to facilitate communication and understanding of risks in the real world.^{9,11} Unfortunately, there are not many visual aid tools available to discuss therapeutic options, efficacy, and safety in stroke prevention.

In the present study, we introduced Cates plots as a visual aid tool to illustrate the risks and benefits of using

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