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ORIGINAL ARTICLE

Who Gets Stroke Prevention? Stroke Prevention in Atrial Fibrillation Patients in the Inpatient Setting

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Background Current guidelines strongly recommend antithrombotic therapy, particularly warfarin, for stroke prevention in atrial fibrillation (AF) patients at high risk of stroke. Despite this, use of these medications is far from optimal. The aim of this study was to describe the use of stroke prevention medication in inpatients and identify factors associated with prescription in one local health district in Sydney, Australia.

Methods A prospective audit of medical records for patients admitted with an AF diagnosis to five hospitals in the health district and excluding cardiac surgery patients was undertaken. Patients were classified as high or low for stroke risk as well as for risk of bleeding and predictors were identified by logistic regression.

Results A total of 204 patients were enrolled from July 2012 to April 2013, with a mean age of 75 years (SD 13) and half (50%) were male. Valve disease was present in 17% and 15% received a procedure for their AF (cardioversion/ablation/pulmonary vein isolation). Patients were least likely to be prescribed warfarin/novel oral anticoagulant (NOAC) if they were non-valvular and did not undergo cardioversion/ablation ($p = .03$), and least likely to be prescribed aspirin if they had no AF procedure ($p = .01$). In non-valvular patients who did not have cardioversion/ablation the odds of being prescribed warfarin/NOAC were increased by being classified at high risk of stroke (OR 3.1, 95% CI 1.0 -9.5) and decreased if there was a prescription for aspirin (OR .3. 95% CI .1 -.6).

Conclusions Overall use of stroke prevention medication indicates that gaps remain in translation of evidence into clinical practice.

Keywords Atrial fibrillation • Stroke prevention • Antithrombotic • Stroke risk classification • Bleeding risk classification

Introduction

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia, affecting 1-2% of the population, and demographic changes due to aging mean these rates will increase sharply in coming decades [1]. The primary goal of AF treatment is stroke prevention, as AF substantially increases the risk of stroke (2.5 to 7 times) [2]. Recent studies indicate that at least one-third of ischaemic strokes are attributable to AF [3], and strokes resulting from AF are typically

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severe or fatal [4]. International guidelines strongly recommend that oral anticoagulation should be used in AF patients who are at risk of stroke through having one or more stroke risk factors, and distinguish the treatment of non-valvular from valvular AF to differentiate the higher risk posed by valve disease [1,5].

There is a substantial body of evidence that appropriate use of the oral anticoagulant warfarin reduces the risk of stroke in patients who have AF by two-thirds [6]. However, patients prescribed warfarin are required to increase their medical appointments to ensure surveillance of international normalised ratio (INR) with medication adjustment to ensure therapeutic effects while minimising bleeding risk. Adherence to warfarin is also challenging. A recent study reported that 40% of patients miss more than 20% of their warfarin doses [7]. Evidence is emerging that novel oral anticoagulants (NOACs) may have similar [8] or superior benefits [9] to warfarin, but there are limitations to their use. None have approval for valvular AF, and at present there are no reversal agents for overdose or in emergency [10]. Furthermore, adherence to the NOACs is critical, since they have a much shorter half-life than warfarin, and therefore the therapeutic window is much smaller [10]. Aspirin, which was once a mainstay of treatment when warfarin was contraindicated, has now been removed from guidelines [11], since it increases bleeding risk to the same rate as oral anticoagulants, but has a much less potent effect on stroke prevention [12].

Increased risk for bleeding events is an important consideration and stroke prevention benefits must be weighed against these risks to determine appropriate prescription [13]. Guidelines to help balance the risks and benefits of anticoagulant therapy in AF patients refer to scoring systems for the risk of stroke in non-valvular patients using the $CHADS_2$ score (an acronym for Congestive heart failure, Hypertension, Age $\geq$75 years, Diabetes, previous Stroke or thromboembolism) and risk of bleeding using the HAS-BLED score (an acronym for Hypertension, Abnormal renal/liver function, Stroke, Bleeding history or predisposition, Labile International Normalized Ratio, Elderly, Drugs/alcohol concomitantly) and are updated regularly [1,14]. For instance, the $CHADS_2$ scoring system was updated to the CHA_2DS_2VASC scoring system in 2012 to include younger ages (65-74 years) and vascular disease history on the basis of new evidence [5].

Despite the presence of these guidelines and dissemination programs, not all patients who could benefit from stroke prevention medication are prescribed these medications. Evidence at the population level in high-risk AF patients suggests that warfarin prescription rates are as low as 26% even after accounting for bleeding risk [15]. Warfarin prescription rates are higher in hospitalised patients at 56% [16] and higher still (71.6%) in patients presenting to cardiologists in the recent EURObservational Research Programme Atrial Fibrillation (EORP-AF) study [17]. However, in the latter study the authors note that compliance with treatment guidelines for the highest stroke risk score was suboptimal [17].

Aside from stroke and bleeding risk, other factors identified as associated with lower prescription of stroke prevention medications include coronary artery disease [15], age [15,16,18], female gender [16], aspirin use [16,17] and admission through outpatients (versus the ED) [16]. However, it is likely that the availability of local guidelines and other contextual factors may be influential. For instance, there are no specific guidelines for stroke prevention in Australia, thus European or US guidelines are referred to [18], and only one study was found that reported antithrombotic prescription in AF patients, and this study was limited to a single hospital site [18]. Investigation of local practices specific to the Australian inpatient context is needed. This study aims to describe the use of stroke prevention medication in AF inpatients and identify factors associated with prescription across an entire local health district in Sydney, Australia.

Material and Methods

Patients

Between July 2012 and April 2013, all medical records of patients were included if they were admitted with an AF diagnosis to one metropolitan Local Health District in Sydney, Australia. The study forms a component of a larger study on AF patient services [19]. The Local Health District includes one tertiary referral hospital and four community hospitals. Medical records were eligible for the study if the patient was admitted with an AF diagnosis to any ward which catered for cardiac patients in any of these hospitals and included coronary care units and cardiology and general medical wards. An AF diagnosis was considered to be present if the AF diagnosis was stated along with an ECG illustrating AF in the admission notes. Records were excluded if the patient was admitted for cardiac surgery. All hospitals and the university provided human research ethics committee approval for this low risk study, and the study conforms to the requirements stated in the Declaration of Helsinki [20].

Sample size was calculated to ensure sufficient power for the logistic regression analyses on the subsample of non-valvular AF patients who did not have cardioversion or ablation procedures. For this analysis a sample of 113 patients was determined to be needed on the basis of including nine variables (age, gender, high risk of stroke, high risk of bleeding, prescribed aspirin, AF type, AF as primary diagnosis and ischaemic heart disease) in the analyses, power of 0.8, alpha of 0.05 and effect size of 0.1 [21]. Previous research indicated that approximately 50% of patients admitted with AF would have non-valvular AF and not receive cardioversion or ablation treatments, so we concluded that 240 patients would have to be recruited to achieve that subsample [15].

Data Collection

All patient data was prospectively obtained by clinical nurse specialists expert in cardiology and cardiac rehabilitation for