Prior History of Falls and Risk of Outcomes in Atrial Fibrillation: The Loire Valley Atrial Fibrillation Project
Amitava Banerjee, Nicolas Clementy, Ken Haguenoer, Laurent Fauchier, and Gregory YH Lip

Background and Purpose—Patients with non-valvular atrial fibrillation are often denied oral anticoagulation due to falls risk. The latter is variably defined and existing studies have not compared the associated risk of bleeding with other cardiovascular events. There are no data regarding outcomes in individuals with non-valvular atrial fibrillation with a prior history of (actual) falls, rather than being 'at risk of falls'. Our objective was to evaluate the risk of cardiovascular outcomes associated with prior history of falls in patients with atrial fibrillation in a contemporary 'real world' cohort.

Methods—Patients with non-valvular atrial fibrillation in a four-hospital-institution between 2000 and 2010 were included. Stroke/thromboembolism event rates were calculated according to prior history of falls. Risk factors were investigated by Cox regression.

Results—Among 7156 atrial fibrillation patients, prior history of falls/trauma was uncommon (n=76; 1.1%) and compared with patients without history of falls, those patients were older, less likely to be on oral anticoagulation and had higher risk scores for stroke/thromboembolism, but not for bleeding.

Compared with no prior history of falls, rates of stroke/thromboembolism (p=0.01) and all-cause mortality (p<0.0001) were significantly higher in patients with previous falls. In multivariable analyses, prior history of falls was independently associated with stroke/thromboembolism (hazard ratio, HR 5.19, 95% CI 2.1-12.6;p<0.0001), major bleeding (HR 4.01, 1.49-10.8;p=0.006) and all-cause mortality (HR 3.69, 1.52-8.95; p=0.04), but not haemorrhagic stroke (HR 4.20, 0.58-30.48; p=0.16) in patients on oral anticoagulation.

Conclusion—In this large 'real world' atrial fibrillation cohort, prior history of falls was uncommon, but independently increased risk of stroke/thromboembolism, bleeding and mortality, but not haemorrhagic stroke in the presence of anticoagulation. Prior history of (actual) falls may be a more clinically useful risk prognosticator than “being at risk of falls”.

Are We Too Hesitant to Anticoagulate Elderly Patients with Atrial Fibrillation?
A risk-benefit analysis
Sunny Shah

Summary and Conclusions—The decision to anticoagulate an elderly person with AF at high risk for stroke is a common problem faced by physicians. The benefit of warfarin in reducing the risk of stroke in patients with AF is indisputable, as is its superior efficacy in comparison to aspirin. Some
studies have shown that the rates of ICH may be comparable between patients treated with aspirin and those with well-managed warfarin regimens. Importantly, this review has focused on the use of Warfarin in patients with AF. As data on the newer anticoagulants continues to accrue, future risk/benefit analyses with the use of these agents should be conducted as well.

Because stroke risk increases with age, the elderly stand to benefit the most from warfarin therapy. Therefore, most experts would recommend an individual risk-benefit analysis per patient with careful attention to risk of ischemic stroke in this vulnerable population, and in general, advocate the use of warfarin therapy in those at high risk of stroke – i.e. CHADS2 or CHA2DS2-VASc score of 2 or greater – despite their fall risk. This would especially be advocated for patients who remain adherent to their regimen and have well-controlled INRs. Importantly, the patient should be included in a conversation regarding the risks, benefits, and lifestyle changes that go along with chronic anticoagulation therapy.

To help ameliorate physician concern and potentially decrease the risk of ICH in an elderly patient, more frequent INR checks should be obtained to ensure that the INR remains at the goal of between 2 and 3. In addition, minimization of a patient’s fall risk via environmental changes, medication management, and treatment of any underlying diseases that contribute to risk of fall should be emphasized.

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**Risk of Falls and Major Bleeds in Patients on Oral Anticoagulation Therapy**
Jacques Donze, Carole Clair, Balthasar Hug, Nicolas Rodondi, Gerard Waeber, Jacques Cornuz, and Drahomir Aujesky

**Background**—The risk of falls is the most commonly cited reason for not providing oral anticoagulation, although the risk of bleeding associated with falls on oral anticoagulants is still debated. We aimed to evaluate whether patients on oral anticoagulation with high falls risk have an increased risk of major bleeding.

**Methods**—We prospectively studied consecutive adult medical patients who were discharged on oral anticoagulants. The outcome was the time to a first major bleed within a 12-month follow-up period adjusted for age, sex, alcohol abuse, number of drugs, concomitant treatment with antiplatelet agents, and history of stroke or transient ischemic attack.

**Results**—Among the 515 enrolled patients, 35 patients had a first major bleed during follow-up (incidence rate: 7.5 per 100 patient-years). Overall, 308 patients (59.8%) were at high risk of falls, and these patients had a nonsignificantly higher crude incidence rate of major bleeding than patients at low risk of falls (8.0 vs 6.8 per 100 patient-years, \( P = .64 \)). In multivariate analysis, a high falls risk was not statistically significantly associated with the risk of a major bleed (hazard ratio 1.09; 95% confidence interval, 0.54-2.21). Overall, only 3 major bleeds occurred directly after a fall (incidence rate: 0.6 per 100 patient-years).

**Conclusions**—In this prospective cohort, patients on oral anticoagulants at high risk of falls did not have a significantly increased risk of major bleeds. These findings suggest that being at risk of falls is not a valid reason to avoid oral anticoagulants in medical patients.
Atrial Fibrillation, Anticoagulation, Fall Risk, and Outcomes in Elderly Patients
Matthew Sellers and L Kristin Newby

Abstract—Atrial fibrillation (AF) affects 2.5 million patients in the United States. The incidence of this condition increases with age, such that approximately 5% of people >65 years of age have AF. Because of the lack of organized atrial contraction and thrombus formation in the left atrium, patients with AF are at increased risk of stroke. The estimated risk of stroke among all AF patients is 5% per year. Among patients without mitral stenosis, there is a graded relationship of stroke risk with the number of CHADS2 risk factors. Warfarin is the recommended treatment for embolic stroke prophylaxis in AF in intermediate- to high-risk patients. However, elderly patients who are deemed to be at risk of falls are often not started on warfarin therapy secondary to a perceived higher risk of bleeding complications. These risks have been evaluated, but conclusive data regarding the risk-benefit trade-off are elusive. This review summarizes available data on the use of warfarin in elderly patients with AF, focusing on the risk of bleeding, and will specifically address the utility of falls risk assessment in the decision to initiate warfarin therapy for AF.

Anticoagulation for Stroke Prevention in Elderly Patients with Atrial Fibrillation, Including Those with Falls and/or Early-Stage Dementia: A single-center, retrospective, observational study
Laurie Jacobs, Henry Billett, Katherine Freeman, Cheryl Dinglas, and Lynette Jumaquio

Background—Anticoagulation for stroke prevention is underused in elderly patients with nonvalvular atrial fibrillation (AF). Those with falls and/or early dementia may be at particular risk for stroke and hemorrhage.

Objective—The aim of this study was to determine the prescribing patterns, risks, and benefits of anticoagulation with warfarin or acetylsalicylic acid (ASA) in elderly patients with AF at risk for stroke and hemorrhage, including those with falls and/or dementia.

Methods—In this single-center, retrospective, observational study, data from patients aged ≥65 years with chronic nonvalvular AF treated at an urban academic geriatrics practice over a 1-year period were included. Eligible patients were receiving noninvasive management of AF with warfarin or ASA. Data were assessed to determine the prevalences of stroke, hemorrhage, falls, and the possible effects of anticoagulation with dementia. Outcomes events at 12 months, including time-in-therapeutic range (TTR), stroke, hemorrhage, and death, were determined. The stroke risk in each patient was estimated using the CHADS2 (congestive heart failure, hypertension, age ≥75 years, diabetes, history of stroke or transient ischemic attack) score, and the risk for hemorrhage was estimated using the Outpatient Bleeding Risk Index.
**Results**—A total of 112 patients (mean age, 82 years) were identified; 106 were included in the present analysis (80 women, 26 men); 6 were not receiving antithrombotic therapy and thus were excluded from the analysis. Warfarin was prescribed in 85% (90 patients); ASA, 15% (16). International normalized ratio testing was done frequently, with a median interval of 13.7 days between tests (92% within 28 days). No association was found between an improved TTR and the number of tests per unit of time or the number of patients per clinician. The distributions of both the CHADS2 and Outpatient Bleeding Risk Index scores were not significantly different between the warfarin and ASA groups. The proportions of patients treated with warfarin were not significantly different between the groups with a high risk for hemorrhage and the groups at lower risk. At 12 months in the 90 patients initially treated with warfarin, the rate of stroke was 2% (2 patients); major hemorrhage, 6% (5); and death, 20% (18). Mortality was greater in patients with falls [45% [5/11]] and/or dementia (47% [8/17]) compared with those without either falls or dementia (12% [8/65]).

**Conclusions**—In this well-monitored geriatric population with chronic AF, including patients with falls and/or dementia, a high percentage were prescribed warfarin (85%), with low rates of stroke, hemorrhage, and death at 12 months despite a low TTR. Patients with falls and/or dementia had a high mortality rate (~45%).

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**Use of Anticoagulation in Elderly Patients with Atrial Fibrillation Who Are at Risk for Falls**

Candice Garwood and Tia Corbett

**Objective**—To evaluate data addressing use of anticoagulation in elderly patients with atrial fibrillation (AF), in particular those at risk of falls.

**Data Sources**—Primary literature was identified through PubMed MEDLINE (1966–December 2007) and EMBASE (1980–December 2007) using the search terms anticoagulation, warfarin, aspirin, elderly, falls, older persons, atrial fibrillation, bleeding, education, stroke, and use. Additional references were obtained through review of references from articles obtained.

**Study Selection and Data Extraction**—Clinical studies evaluating warfarin and aspirin efficacy in AF, as well as studies evaluating anticoagulation and falls, elderly patients, and bleeding were considered for inclusion. Selection emphasis was placed on randomized studies of AF and those evaluating anticoagulation and falls.

**Data Synthesis**—Uncertainties over the optimal treatment for elderly patients with AF still exist. Variance in the guidelines is reflected in current practice, as some discrepancies are present. Warfarin is underprescribed in elderly patients, with only about 50% of eligible patients receiving therapy. Falls are most often cited as the reason for not using anticoagulants in an elderly patient. Three risk–benefit analyses have been performed, and all found that despite risks associated with warfarin, its benefits outweigh its risks even in patients who fall. Warfarin should be used rather than aspirin or no therapy in elderly patients at risk of falls. Anticoagulation education has been shown to reduce the risk of bleeding in the elderly and should be a vital part of warfarin management.
**Conclusions**—The risk of falls alone should not automatically disqualify a person from being treated with warfarin. While falls should not dictate anticoagulant choice, assessment and management of fall risk should be an important part of anticoagulation management. Efforts should be made to minimize fall risk.

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**Incidence of Intracranial Hemorrhage in Patients with Atrial Fibrillation Who Are Prone to Fall**  
**Brian Gage, Elean Birman-Deych, Roger Kerzner, Martha Radford, David Nilasena, and Michael Rich**

**Purpose**—Patients at high risk for falls are presumed to be at increased risk for intracranial hemorrhage, and high risk for falls is cited as a contraindication to antithrombotic therapy. Data substantiating this concern are lacking.

**Methods**—Quality improvement organizations identified 1245 Medicare beneficiaries who were documented in the medical record to be at high risk of falls and 18 261 other patients with atrial fibrillation. The patients were elderly (mean 80 years), and 48% were prescribed warfarin at hospital discharge. The primary endpoint was subsequent hospitalization for an intracranial hemorrhage, based on ICD-9 codes.

**Results**—Rates (95% confidence interval [CI]) of intracranial hemorrhage per 100 patient-years were 2.8 (1.9–4.1) in patients at high risk for falls and 1.1 (1.0–1.3) in other patients. Rates (95% CI) of traumatic intracranial hemorrhage were 2.0 (1.3–3.1) in patients at high risk for falls and 0.34 (0.27–0.45) in other patients. Hazard ratios (95% CI) of other independent risk factors for intracranial hemorrhage were 1.4 (1.0–3.1) for neuropsychiatric disease, 2.1 (1.6–2.7) for prior stroke, and 1.9 (1.4–2.4) for prior major bleeding. Warfarin prescription was associated with intracranial hemorrhage mortality but not with intracranial hemorrhage occurrence. Ischemic stroke rates per 100 patient-years were 13.7 in patients at high risk for falls and 6.9 in other patients. Warfarin prescription in patients prone to fall who had atrial fibrillation and multiple additional stroke risk factors appeared to protect against a composite endpoint of stroke, intracranial hemorrhage, myocardial infarction, and death.

**Conclusion**—Patients at high risk for falls with atrial fibrillation are at substantially increased risk of intracranial hemorrhage, especially traumatic intracranial hemorrhage. However, because of their high stroke rate, they appear to benefit from anticoagulant therapy if they have multiple stroke risk factors.

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**Anticoagulant-Related Bleeding in Older Persons with Atrial Fibrillation: Physicians’ fears often unfounded**  
**Malcolm Man-Son-Hing and Andreas Laupacis**
Background—Many studies have documented the underuse of anticoagulant (ie, warfarin sodium) therapy as stroke prophylaxis in older persons with atrial fibrillation. Failure to prescribe anticoagulant agents to these patients is often due to physicians’ perceiving the risk of major bleeding as unacceptably high because of the presence of such clinical risk factors as hypertension, falls, a history of gastrointestinal tract bleeding, and lack of assurance about compliance.

Objectives—To critically appraise whether the presence of additional clinical factors that increase the risk of bleeding affects the chance of anticoagulant-related hemorrhage, and to develop an approach to the use of anticoagulant agents in older patients with atrial fibrillation who have any of these factors.

Methods—Systematic MEDLINE literature search from January 1966 to March 2002.

Results—Many of the factors that are purported to be barriers to anticoagulant therapy in older persons with atrial fibrillation probably should not influence the choice of stroke prophylaxis in these patients. These include previous episodes of upper gastrointestinal tract bleeding, predisposition to falling, and old age in itself. For some other factors, such as alcoholism, participation in activities that predispose to trauma, the presence of a bleeding diathesis or thrombocytopenia, and noncompliance with monitoring, there is little or conflicting evidence about their effect on anticoagulant-related bleeding. However, they should be considered in the clinical decision-making process.

Conclusions—For many older patients with atrial fibrillation, physicians’ fears of the risk of bleeding in association with anticoagulant therapy are often exaggerated and unfounded. Therefore, the salient issue in selecting older patients with atrial fibrillation for anticoagulation is accurately estimating their stroke risk, with bleeding risk during anticoagulation being a lesser issue, relevant to only a few patients.

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Choosing Antithrombotic Therapy for Elderly Patients with Atrial Fibrillation Who Are at Risk for Falls
Malcolm Man-Son-Hing, Graham Nichol, Anita Lau, and Andreas Laupacis

Objective—To determine whether the risk of falling (with a possible increased chance of subdural hematoma) should influence the choice of antithrombotic therapy in elderly patients with atrial fibrillation.

Design—A Markov decision analytic model was used to determine the preferred treatment strategy (no antithrombotic therapy, long-term aspirin use, or long-term warfarin use) for patients with atrial fibrillation who are 65 years of age and older, are at risk for falling, and have no other contraindications to antithrombotic therapy. Input data were obtained by systematic review of MEDLINE. Outcomes were expressed as quality-adjusted life-years.

Results—For patients with average risks of stroke and falling, warfarin therapy was associated with 12.90 quality-adjusted life-years per patient; aspirin therapy, 11.17 quality-adjusted life-years; and no antithrombotic therapy, 10.15 quality-adjusted life-years. Sensitivity analysis demonstrated that, regardless of the patients’ age or baseline risk of stroke, the risk of falling was not an important factor in determining their optimal antithrombotic therapy.
Conclusions—For elderly patients with atrial fibrillation, the choice of optimal therapy to prevent stroke depends on many clinical factors, especially their baseline risk of stroke. However, patients’ propensity to fall is not an important factor in this decision.