Evaluation of 5 Prognostic Scores for Prediction of Stroke, Thromboembolic and Coronary Events, All-Cause Mortality, and Major Adverse Cardiac Events in Patients With Atrial Fibrillation and Coronary Stenting

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Management of antithrombotic therapy in patients with atrial fibrillation (AF) and coronary stenting remains challenging, and there is a need for efficient tools to predict their risk of different types of cardiovascular events and death. Several scores exist such as the CHA_2DS_2-VASc score, the Global Registry of Acute Coronary Events (GRACE) score, the Synergy between Percutaneous Coronary Intervention with Taxus and Cardiac Surgery (SYNTAX) score, the Anatomical and Clinical Syntax II Score and the Reduction of Atherothrombosis for Continued Health score. These 5 scores were investigated in patients with AF with coronary stenting with the aim of determining which was most predictive for stroke/thromboembolic (TE) events, nonlethal coronary events, all-cause mortality, and major adverse cardiac events (MACE). Among 845 patients with AF with coronary stenting seen from 2000 to 2014, 440 (52%) were admitted for acute coronary syndrome and 405 (48%) for elective percutaneous coronary intervention. The rate of cardiovascular complication was at 14.1% per year, and nonlethal coronary events were the most frequent complications with a yearly rate of 6.5%. CHA_2DS_2-VASc score was the best predictor of stroke/TE events with a c-statistic of 0.604 (95% CI 0.567 to 0.639) and a best cut-off point of 5. SYNTAX score was better to predict nonlethal coronary events and MACE with c-statistics of 0.634 (95% CI 0.598 to 0.669) and 0.612 (95% CI 0.575 to 0.647), respectively, with a best cut-off point of 9. GRACE score appeared to be the best to predict all-cause mortality with a c-statistic of 0.682 (95% CI 0.646 to 0.717) and a best cut-off point of 153. In conclusions, among validated scores, none is currently robust enough to simultaneously predict stroke/TE events, nonlethal coronary events, death, and MACE in patients with AF with stents. The CHA_2DS_2-VASc score remained the best score to assess stroke/TE risk, as was the SYNTAX score for nonlethal coronary events and MACE, and finally, the GRACE score for all-cause mortality in this study population. **(Am J Cardiol 2016;118:700−707)**

Different scores exist to predict different clinical events such as the CHA_2DS_2-VASc score for predicting stroke,[1] the Global Registry of Acute Coronary Events (GRACE) score for predicting death in the short term and midterm after non−ST-elevation myocardial infarction (NSTEMI),[2] the Reduction of Atherothrombosis for Continued Health (REACH) Score to assess the development of the cardiovascular event in patients with clinically recognized atherothrombotic cardiovascular disease,[3] the SYNTAX score for grading coronary anatomy and guiding patient selection toward the optimal revascularization treatment to treat complex coronary artery disease[4] and Anatomical and Clinical Syntax II Score (ACSS) for predicting adverse clinical outcomes after percutaneous coronary intervention (PCI).[5] There are controversies on using such scores for each clinical event and which scores may be used to predict other than their original end point. It has never been established that these scores had a good ability for risk prediction in the particular setting of atrial fibrillation (AF) with coronary stenting where the competitive risk of the several events may be different. This study examines the most appropriate score to use in such patients to predict stroke/thromboembolic (TE) events, nonlethal coronary events (myocardial infarction or target vessel revascularization), death and major adverse cardiac event (MACE) and evaluate their respective predictive ability in this context.

Methods

We included all patients seen in the cardiology department at the University Hospital of Tours from January 2000

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to December 2014 with a diagnosis of AF and admitted for elective PCI, or NSTEMI or STEMI requiring stent implantation. Individual patient management decisions, such as the type of revascularization performed, type of stent implanted, as well as the regimen of oral anticoagulation (OAC) and/or antiplatelet drugs proscribed at discharge were decided by the interventional cardiologist and/or the responsible clinical cardiologist. Clinical characteristics, indication, and procedural characteristics at admission, treatment before hospitalization, and at discharge were obtained by screening hospitalization reports and information obtained by the coding system filled in for each patient hospitalized through the computerized system of the institution, based on the *International Classification of Diseases, Tenth Revision*.

The CHA_2DS_2-VASc score was calculated to assess stroke risk as previously described.[1] We also calculated the hypertension, abnormal renal/liver function, stroke, bleeding history or predisposition, labile international normalized ratio, elderly, drugs/alcohol con-comitantly (HAS-BLED) bleeding risk score.[6] The GRACE score, for the risk of death in the short term and midterm after NSTEMI, was calculated including the Killip's class, systolic blood pressure, cardiac frequency, age, renal function, cardiac arrest at admission, ST-segment modification, and increase in cardiac enzymes.[2] The REACH score was calculated as initially reported, using data on age, current smoking habits, diabetes mellitus, number of vascular beds, cardiovascular events in the past year, congestive heart failure, statin therapy, and acetylsalicylic acid therapy matched with the status for each variable. The assigned points are then summed and the total number of points then matched with the estimated risk of events.[3] Coronary disease severity was assessed according to the SYNTAX score, which informed on severity of coronary lesion during PCI.[4] By the use of Cardioreport XP base (Medireport, CVX Medical, Croissy-Beaubourg, France), we identified PCI procedures in a patient with AF, which allowed analysis of clinical, angiographic, and procedural characteristics according to evaluation of 5 experienced operators in interventional cardiology and then used the SYNTAX score calculator, which results were reviewed by 2 operators blinded for outcomes and other predictors. The ACSS was obtained by combination of 8 predictors: anatomical SYNTAX score, age, creatinine clearance, left ventricular ejection fraction, the presence of unprotected left main coronary artery disease, peripheral vascular disease, female gender, and chronic obstructive pulmonary disease.[5]

During the follow-up of the patients, events of interest that occurred during the follow-up were identified whenever they occurred in our institution, which includes a total of 4 hospitals covering all medical and surgical specialties. Our hospital covers an area of 4,000 km^2, and a population of 400,000 inhabitants and is the only public institution in the area. In addition, mortality data were obtained using a search tool on a dedicated website for the Région Centre: *http://nrco.lanouvellerepublique.fr/dossiers/necro/index.php*. We considered major bleedings, using the Bleeding Academic Research Consortium (BARC) bleeding definitions.[7] "Major adverse cardiac events" (MACE) were defined as the occurrence of any episode including death, stroke, TE event, acute myocardial infarction, and stent thrombosis or target lesion revascularization. We also considered a composite cardiovascular end point, (MACE or major BARC bleeding).

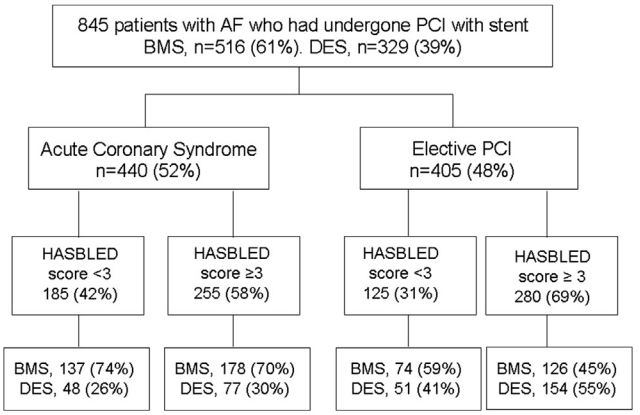

Figure 1. Flow Chart of patients with AF for categorizing coronary disease pattern: elective PCI or ACS, bleeding risk, and type of stent (bare-metal stent or drug-eluting stent). BMS = bare-metal stent; DES = drug-eluting stent.

The study was approved by the Institutional Review Board of the Pole Coeur Thorax Vaisseaux from the Trousseau University Hospital, on December 7, 2010 and registered as a clinical audit. Ethical review was therefore not required. Patient consent was not sought. The study was conducted retrospectively, patients were not involved in its conduct, and there was no impact on their care.

A proportional hazard model was used to identify independent characteristics associated with the occurrence of an event during follow-up. The results were expressed as hazard ratios and 95% CIs. We calculated Harrell's c-statistic with 95% CIs as a measure of model performance. The c-statistics were compared using the DeLong test. The net reclassification improvement was used to compare the reclassification for best versus other risk scoring systems. Patients with missing data were not used for comparisons (e.g., this was a complete-case analysis). A p value <0.05 was considered statistically significant. Statview 5.0 (Abacus, Berkeley, California) and Medcalc 15.2 (MedCalc Software, Mariakerke, Belgium) were used for statistical analysis.

Results

From January 2000 to December 2014, of 845 patients with a medical history of AF referred to our cardiology department who underwent PCI with stent implantation, 440 (52%) were admitted for acute coronary syndrome (ACS) and 405 (48%) for elective PCI. Figure 1 shows the flow chart of the patients. Table 1 lists baseline clinical characteristics and compares patients grouped according to clinical setting. There were 366 patients (46%) with OAC use, among whom 339 were treated with vitamin K antagonist and 27 (7%) were treated with non−vitamin K antagonist oral anticoagulants. Patients treated by an elective PCI were more often men, with permanent AF and treated with OAC, had a higher HAS-BLED and REACH death score and were more often implanted with a DES. In contrast, patients with