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Clinical Research

Emergency Department Re-Presentation for Atrial Fibrillation and Atrial Flutter

Damian P. Redfearn, MD, Muhammad Ali Furqan, BSc, Andres Enriquez, MD, David Barber, Cathy Shaw, RCT, Christopher Simpson, MD, Adrian Baranchuk, MD, Kevin Michael, MD, Hoshiar Abdollah, MB, ChB, and Robert J. Brison, MD, MPH

Heart Rhythm Service, Queen's University, Kingston, Ontario, Canada

ABSTRACT

Background: Identification and appropriate management of patients with atrial fibrillation (AF) is critical to mitigate the consequences of the disease. We sought to assess the frequency and pattern of the emergency department (ED) use by patients who presented with AF and/or atrial flutter (AFL) in a midsized Canadian hospital.

Methods: We conducted a retrospective cohort analysis of patients who presented to the ED with AF and/or AFL during the calendar years 2010-2012. Patients were identified using the MUSE (General Electric Healthcare, Bucks, United Kingdom) electrocardiogram database and matched with the National Ambulatory Care Reporting System and Discharge Abstract Database up to and including December 31, 2013, a follow-up period of 12 months. The number of presentations and time between visits was assessed. Admissions were identified and lengths of stay and reason for admission were recorded.

Results: We identified 1361 patients who represented a total of 4783 visits to the ED, a mean of 2.8 ± 2.9 visits per patient with 949 (69.7%) who returned for a subsequent ED visit in the subsequent

RÉSUMÉ

Introduction : L'identification et la prise en charge appropriée des patients souffrant de fibrillation auriculaire (FA) sont essentielles pour atténuer les conséquences de la maladie. Nous avons cherché à évaluer la fréquence et le schéma d'utilisation du service des urgences (SU) d'un hôpital canadien de taille moyenne par les patients qui présentaient une FA ou un *flutter* auriculaire (FLA), ou les deux.

Méthodes : Nous avons mené une analyse de cohorte rétrospective constituée des patients qui se sont présentés au SU pour une FA ou un FLA, ou les deux, au cours des années calendaires de 2010 à 2012. Les patients ont été identifiés à l'aide de la banque de données sur les électrocardiogrammes MUSE (GE Healthcare, Bucks, Royaume-Uni) et appariés avec le Système national d'information sur les soins ambulatoires et la Base de données sur les congés des patients jusqu'au 31 décembre 2013 inclusivement, soit une période de suivi de 12 mois. Le nombre de consultations et le laps de temps entre les visites ont été évalués. Les admissions ont été déterminées, puis les durées de séjour et la raison de l'admission ont été enregistrées.

Atrial fibrillation (AF) is the most common sustained arrhythmia seen in clinical practice, accounting for approximately one-third of hospitalizations for cardiac rhythm disturbances.[1] In Canada, the estimated overall rate of hospitalization for AF is 583 per 100,000 population.[2] Hospital admissions for AF have increased dramatically over the past 20 years because of an aging population and an increasing prevalence of chronic heart disease.[1,3,4] The overall mortality rate for patients with AF is approximately double that of patients in normal sinus rhythm.[5] The rate of ischemic stroke among patients with nonvalvular AF averages 5% per year, 2-7 times that of the population without AF.[6,7] After the age of 60 years, fully one-third of all strokes are due to AF and are far more likely than non-AF-related strokes to be permanently disabling or fatal.[6,7] AF or atrial flutter (AFL) is a frequent finding in the emergency department (ED) and many patients initially present or are diagnosed within this context. The number of patients who present to the ED with AF and/or AFL and the number who return is not well defined; presentation to the ED might represent an opportunity to intervene and modify the course of AF with appropriate intervention. Current best practice for AF management consists of a coordinated multiprofessional approach in a chronic disease management model similar to that seen in the diabetes and congestive heart failure (CHF) populations.[8,9] In addition, major advances have been made in the management of the disease in recent years, which highlights the importance of understanding the burden of AF and AF-related health care resource use.[10] Currently, however, AF care is episodic, fragmented, and heavily reliant on hospital resources;

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Corresponding author: Dr Damian P. Redfearn, Heart Rhythm Service, Queen's University, FAPC 3, Kingston General Hospital, 76 Stuart St, Kingston, Ontario K7L 2V7, Canada. Tel.: +1-613-549-6666 ×3377; fax: +1-613-548-1387.

E-mail: redfeard@kgh.kari.net

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12 months. Mean time between base and subsequent visits was 136.8 ± 114.2 days. ED visits generated 1462 admissions (63.0% at repeat ED visits); mean length of stay was 9.7 ± 16.0 days. Stroke or transient ischemic attack accounted for 80 return visits and 8 deaths in 77 patients, 74% of whom with subtherapeutic or no anticoagulation medication.

Conclusions: Presentation to the ED with AF and/or AFL, either as a primary reason for consultation or as a secondary diagnosis, was associated with a high risk of subsequent re-presentation and hospital admission.

Résultats : Nous avons identifié 1361 patients qui ont représenté un total de 4783 visites au SU, soit une moyenne de 2,8 ± 2,9 visites par patient; parmi ces patients, 949 (69,7 %) sont revenus pour une visite subséquente au SU dans les 12 mois suivants. La durée moyenne entre la visite initiale et les visites subséquentes a été de 136,8 ± 114,2 jours. Les visites au SU ont généré 1462 admissions (63,0 % de visites répétées au SU); la durée moyenne du séjour a été de 9,7 ± 16,0 jours. L'accident vasculaire cérébrale ou l'ischémie cérébrale transitoire a représenté 80 visites subséquentes et 8 décès chez 77 patients, dont 74 % recevaient des médicaments anticoagulants à des doses inférieures au seuil thérapeutique ou aucun médicament anticoagulant.

Conclusions : La consultation au SU pour une FA ou un FLA, ou les deux, soit comme principale raison de consultation ou comme diagnostic secondaire, a été associée à un risque élevé de consultations et d'admissions subséquentes à l'hôpital.

particularly EDs. We sought to establish the contemporary rates of presentation to the ED, including re-presentation, and admission rates in a geographically defined community using electrocardiographically confirmed AF and/or AFL as inclusion criterion.

Methods

This was a retrospective cohort analysis of visits to the ED at Kingston General Hospital and the Urgent Care Centre at Hotel Dieu Hospital. Patients who presented with AF and/or AFL confirmed with a 12-lead electrocardiogram (ECG) during calendar years 2010-2012 were included. We have innovated a new approach to AF screening in ED encounters using an electronic ECG database (MUSE, General Electric Healthcare, Bucks, United Kingdom). We found this to be more accurate than the use of International Classification of Disease (ICD)-10 codes because of the usual limitations of diagnostic coding, which is too often incorrect or non-comprehensive in multiple-diagnosis cases, whereas an ECG diagnosis confirmed by a cardiologist is much more definitive. We identified AF patients at ED encounters using both methods and compared the results to assess our approach. The index visit should not be considered the first-ever visit of patients to an emergency service or the time of AF diagnosis. However, any patient with an ECG indicative of AF or AFL in the year before inclusion was excluded to create a relatively clean cohort.

Patients who presented to the ED with medically significant symptoms generally had an ECG performed. In addition, an ECG might be performed for nonmedical complaints at the discretion of the ED team. Our centres' ECGs have unique identifiers that permit linkage to the ED and to a specific patient encounter. ECG data were stored within the MUSE ECG database. The MUSE database was examined to identify all ED-based ECGs that showed AF or AFL during the time period between January 1, 2010 and December 31, 2012. In the case of multiple ECGs from a single encounter, the first ECG was selected. When identified, this index cohort was matched with the National Ambulatory Care Reporting System (NACRS) and Discharge Abstract Database databases to collect 12-month ED and hospital encounter data after the index visit.

The ECG database search was performed by a MUSE system administrator with advanced training in the MUSE application. The parameters of the search included all AF and/or AFL statements from the MUSE 12SL ECG Analysis Program statement library, the location of the patient within the hospital, and the identification number of the ECG cart on which the test was performed. These hospitals represent the only EDs in the city and therefore present an opportunity to capture presentations and all re-presentations for the Kingston community. All ECGs were read by a cardiologist. Each subsequent ED encounter was numbered manually, and time elapsed between visits calculated. Using this database, the number of total visits to the ED was calculated. The hospital records systems were used to identify patients from the MUSE database of ED encounters that were subsequently admitted over the 2010-2013 period using a unique patient identifier to link the 2 data sets. For patients who were observed to re-present to the ED after the base or index visit, reasons for seeking care were identified using the ICD-10 code from the NACRS database. Mean length of stay was calculated for all of these admissions and the most responsible diagnosis at the patient's second or subsequent ED encounter was determined. Data on age and sex of admitted patients were extracted using the hospital database system. For any patients returning with codes for cerebral embolic events, a chart review was undertaken; a **C**ongestive Heart Failure, **H**ypertension, **A**ge, **D**iabetes, **S**troke/Transient Ischemic Attack ($CHADS_2$) score was calculated from available data and anticoagulation status was reviewed according to medication listed and results of blood work and international normalized ratio.

Results

The MUSE ECG database identified 1361 index ED patient encounters for AF or AFL during the 2010-2012 study window. These accounted for a total of 4783 index and subsequent ED encounters in the 12-month period after the index presentation, with a mean of 2.8 ± 2.9 visits per patient. Demographic characteristics are shown in Table 1. The mean age of the cohort was 74.8 ± 13.5 years with slightly more men (58.2%).

Only 409 of the 1361 base/index visits were coded in NACRS using the ICD-10 codes for AF or AFL as a primary

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