



Predictors and clinical outcomes of inpatient versus ambulatory management after an emergency department visit for atrial fibrillation: A population-based study

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Background There is substantial variation in the management of atrial fibrillation (AF) in the emergency department (ED), particularly whether these patients are admitted to hospital. We sought to identify factors that predict admission and to examine the relationship between AF admission and outcomes.

Methods We performed a retrospective cohort analysis of patients ≥ 20 years of age who had an index ED visit with a primary diagnosis of AF from between April 1, 2005, and March 31, 2010, in Ontario, Canada. We excluded patients who died during the index ED visit or hospitalization. A hierarchical logistic regression model was used to determine predictors of hospital admission during the index ED visit. A propensity-matched analysis was used to test for associations between hospital admission and 1-year outcomes.

Results The cohort consisted of 33,699 patients, of whom 16,270 (48.3%) were admitted to hospital. Substantial variation was seen across the 154 hospitals, with admission rates ranging from 3.0% to 91.0%. Admitted patients had higher rates of comorbidities compared to discharged patients. Mortality rates at 1 year were significantly higher in matched admitted versus discharged patients (hazard ratio 1.45, 95% CI 1.33-1.57, $P < .001$), as were all-cause hospitalizations (hazard ratio 1.18, 95% CI 1.13-1.22, $P < .001$).

Conclusions Wide practice variation was observed between hospitals in terms of the proportion of patients admitted. Our data suggest that selected patients when discharged have similar or improved outcomes compared to those who are initially admitted. Future research is needed to better standardize admission/discharge decisions for AF patients in the ED. (*Am Heart J* 2016;173:161-9.)

Atrial fibrillation (AF) is the most common cardiac arrhythmia, affecting ~1% of the population, with substantially higher prevalence rates in the elderly.¹⁻³ Patients with AF are at increased risk for both mortality and morbidity, and

thus, management of both the disease and its complications places a substantial burden on the health care system.^{4,5} Indeed, AF is the most common cardiac arrhythmia leading to emergency department (ED) visits.^{1,6,7}

There is substantial variation in how AF is managed in the ED, particularly with regard to ED disposition.⁷⁻¹⁰ The decision of whether to admit a patient for inpatient management or to discharge him or her from the ED for subsequent outpatient/ambulatory evaluation has important implications for the health care system, as hospital care for AF patients has been shown by our group to be the largest component of total health care costs.¹¹⁻¹³ There is limited research elucidating the patient, hospital, and system factors that contribute to these variations in AF practice⁷ and whether such variation translates into differences in clinical outcomes.¹⁴⁻¹⁷ Identifying the factors that contribute to the variation in AF management in the ED would optimize the use of scarce health care resources by minimizing unnecessary hospitalizations and improving the quality of care for these patients.

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Accordingly, to address these gaps in knowledge, we evaluated the patient and institutional factors that impact admission decisions for AF patients presenting to the ED for the first time, using population-level data from Ontario, Canada. In addition, we examined the relationship between admission during the index ED visit and subsequent clinical outcomes as well as processes of care.

Methods

This retrospective cohort study was approved by the institutional review board at Sunnybrook Health Sciences Centre, Toronto, Canada.

Data sources

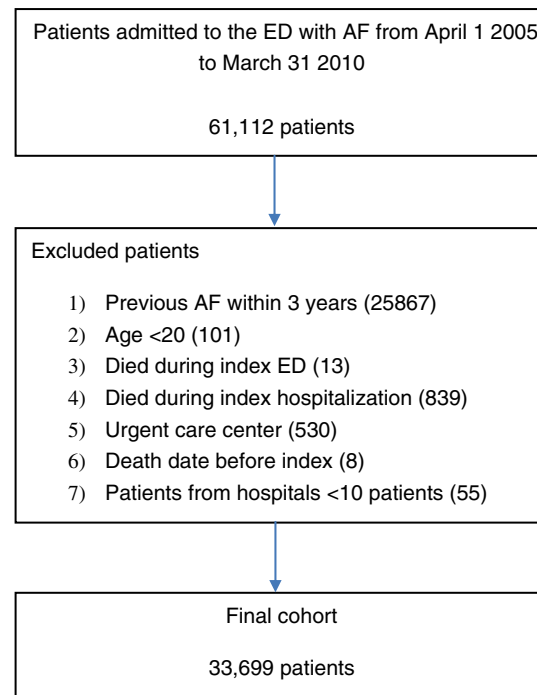
Ontario is Canada's largest province with a population of >13 million people, all of whom receive universal health coverage through a single third-party payer, the Ministry of Health and Long Term Care (MOHLTC). Data regarding the care of these patients are captured in population-level administrative databases housed at the Institute for Clinical Evaluative Sciences (ICES). These databases are linked using unique, encoded identifiers at ICES, allowing for the creation of distinct patient cohorts and longitudinal ascertainment of clinical outcomes.

We used the Canadian Institute for Health Information (CIHI) National Ambulatory Care Reporting System (CIHI-NACRS) database, which contains information on all ED visits in Ontario. The Registered Persons Database was used to identify all-cause mortality. The CIHI Discharge Abstract Database contains information on both acute and chronic hospitalizations and also on patient comorbidity. This was supplemented by data from the Ontario Diabetes Database and Ontario Hypertension Database. Both the CIHI Discharge Abstract Database and the Ontario Health Insurance Plan (OHIP) claims database were used to identify diagnostic or interventional procedures, and OHIP was used to identify billings for physician visits. To determine physician specialty, we used the ICES physician database. The Ontario Drug Benefit Program identified both prescribed and filled medications postdischarge in patients ≥ 65 years of age, for whom full medication coverage is provided for by the MOHLTC.

Cohort

We included patients ≥ 20 years of age who had an ED visit with a primary diagnosis of AF between April 1, 2005, and March 31, 2010, in Ontario, Canada. We used the *International Statistical Classification of Diseases, 10th Revision*, to identify patients who had an index ED visit with a primary diagnosis of AF (main diagnosis code I48) using the CIHI-NACRS database. The specificity of the code in CIHI-NACRS is 93.0% (95% CI 91.6-94.2), with a sensitivity of 96.6% (95% CI 94.1-98.2), based on comparison to chart abstraction.¹⁴

Figure 1



Summary of cohort of Ontario patients newly diagnosed with AF from an index ED visit.

All patients had valid health card numbers and were successfully linked. For patients with multiple ED visits during the study period, only the first (index) ED visit was included. Patients with a previous diagnosis of AF in the 3 years before the index visit (based on any AF diagnosis code in CIHI or OHIP) were excluded, as were patients who died during the index ED or hospitalization episode. We excluded these early deaths to have a final cohort of patients who would be potentially eligible for either admission or outpatient management. We also excluded patients who were seen at urgent care centers, as these are ambulatory only centers that do not have the capability to admit patients. Finally, we excluded very low-volume EDs (defined as <10 AF visits/year) from the analysis.

Admission versus discharged status

All AF patients were categorized as either having been admitted to hospital during the index ED visit or discharged from the ED to their place of residence. For each hospital in Ontario, we determined the proportion of total ED patients who were admitted to hospital over the period of the study.

Follow-up period

Outcomes were landmarked in that we defined time zero as the point at which patients in either the admitted or discharged groups transition to becoming outpatients. Our rationale for this choice of follow-up period was that

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