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Brief Report

Thirty-day mortality in ED patients with new onset atrial fibrillation and actively treated cancer☆,☆☆,★

Thomas Lardaro, MD, MPH, Wesley H. Self, MD, MPH, Tyler W. Barrett, MD, MSCI *

Department of Emergency Medicine, Vanderbilt University Medical Center, Nashville, TN

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ABSTRACT

Objectives: Studies suggest that inflammatory, autonomic, and coagulation alterations associated with cancer may increase incident atrial fibrillation (AF). New-onset AF is associated with increased mortality in other nonneoplastic disease processes. We investigated the association of active cancer with 30-day mortality in emergency department (ED) patients with new-onset AF.

Methods: We conducted an analysis within an observational cohort study at a tertiary care hospital that included ED patients with new-onset AF. The exposure variable was presence of active cancer. We defined *active cancer* as the patient received chemotherapy, radiotherapy, or recent cancer-related surgery within 90 days of the ED visit. The primary outcome was 30-day mortality. Logistic regression was used to analyze the association between cancer status and 30-day mortality adjusting for patient age and sex.

Results: During the 5.5-year study period, 420 patients with new-onset AF were included in our cohort, including 37 (8.8%) with active cancer. Patients with active cancer had no clinically relevant differences in their hemodynamic stability. Among the 37 patients with active cancer, 9 (24%) died within 30 days. Of the 383 patients without active cancer, 11 (3%) died within 30 days. After adjusting for age and sex, active cancer was an independent predictor of 30-day mortality, with an adjusted odds ratio of 10.8 (95% confidence interval, 3.8-31.1).

Conclusions: Among ED patients with new-onset AF, active cancer appears to be associated with 11-fold increased odds of 30-day mortality; new-onset AF may represent progressive organ dysfunction leading to an increased risk of short-term mortality in patients with cancer.

1. Introduction

In the United States, between 3 and 6 million individuals have atrial fibrillation (AF) and the prevalence is expected to double by 2050 [1–3]. Among individuals 40 years and older, the lifetime risk for developing AF is estimated to be 1 in 4 [3–5]. Atrial fibrillation is associated with many adverse sequelae, including heart failure [6], a 5-fold increase in the risk of cerebrovascular accident representing an estimated 4 to 13 percent annual risk [4,6,7], and a nearly 2-fold increase in mortality [6,8,9]. Atrial fibrillation has been found to occur more frequently in patients with cancer [10,11]. Studies have suggested that the increased inflammation, autonomic, and coagulation alterations associated with cancer may increase patient risk for developing AF [10]. New-onset AF is associated with increased mortality in patients with other disease processes such as severe sepsis and chronic kidney disease [9,12]. Hu et al [11], using a large Taiwanese population database and *International Classification of Diseases, Ninth Revision* code definitions for exposures and outcomes, previously reported that new-onset AF did not impact long-term mortality among cancer patients. Although AF increases an individual's lifetime risk of death and stroke

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* Corresponding author at: Department of Emergency Medicine, Vanderbilt University School of Medicine, 703 Oxford House, 1313 21st Ave South, Nashville, TN 37232-4700. Tel.: +1 615 936 0253; fax: +1 615 936 1316.
E-mail address: tyler.barrett@vanderbilt.edu (T.W. Barrett).

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[4,6,7], the 30-day risk following an emergency department (ED) evaluation for AF is relatively low with a combined incidence of 1% to 3% [13–16]. We have previously identified several factors that are associated with 30-day adverse events in patients with AF [14,15]. To our knowledge, no prior study has evaluated whether a preexisting diagnosis of active cancer is associated with increased short-term mortality among patients diagnosed as having new-onset AF. We investigated the association of active cancer with 30-day mortality in ED patients with new-onset AF.

2. Methods

We conducted an analysis within an observational cohort study. The cohort combined 2 databases of patients who presented to our adult ED for evaluation of symptomatic AF. The Risk Estimator Decision aid for Atrial Fibrillation (RED-AF) database was a retrospective cohort of adult ED patients presenting to our center for symptomatic AF or atrial flutter between August 1, 2005, and July 31, 2008 [14]. The Atrial Fibrillation and Flutter Outcomes and Risk Determination (AFFORD) database

Table 1
Baseline characteristics of the cohort (n = 420)

Variable	Active cancer (n = 37)	No active cancer (n = 383)
Age (y)	67 (62, 78)	64 (52, 76)
Female	7 (19%)	145 (38%)
White, non-Hispanic	32 (87%)	322 (84%)
Black	4 (11%)	53 (14%)
White, Latino or Hispanic	0	3 (1%)
Asian	0	1 (0.3%)
Native American	0	1 (0.3%)
History of cancer	37 (100%)	63 (16%)
Chemotherapy within 90 d of diagnosis of AF	26 (70%)	0
Radiation therapy within 90 d of diagnosis of AF	9 (24%)	0
Cancer related surgery within 90 d of diagnosis of AF	8 (22%)	0
Type of cancer		
Bladder	2 (5%)	0
Brain	0	1 (0.3%)
Breast	1 (3%)	7 (2%)
Colorectal	3 (8%)	1 (0.3%)
Gynecologic	1 (3%)	6 (2%)
Liver	1 (3%)	1 (0.3%)
Lung	10 (27%)	3 (1%)
Lymphoma	4 (11%)	4 (1%)
Melanoma	5 (14%)	0
Oropharyngeal	1 (3%)	1 (0.3%)
Pancreas	0	1 (0.3%)
Prostate	3 (8%)	7 (2%)
Skin	0	13 (3%)
Thyroid	0	4 (1%)
Height (meter)	1.8 (1.7, 1.8)	1.8 (1.7, 1.8)
Weight (kg)	78 (69, 92)	84 (71, 100)
BMI	25.4 (22.8, 28.4)	27.5 (23.8, 32.2)
Stroke/Transient ischemic attack	3 (8%)	49 (13%)
Coronary artery disease	8 (22%)	92 (24%)
Heart failure	2 (5%)	55 (14%)
Hypertension	22 (60%)	236 (62%)
Chronic obstructive pulmonary disease	6 (16%)	45 (12%)
Vascular disease	4 (11%)	37 (10%)
Diabetes mellitus	7 (19%)	82 (21%)
CHA_2DS_2-VASc	3 (1, 4)	3 (1, 4)
Warfarin use	2 (5%)	16 (4%)
β-Blocker use home medication	11 (30%)	121 (32%)
Calcium-channel blocker home medication	3 (8%)	44 (12%)
Statin home medication	13 (35%)	116 (30%)
Smoker, Current	2 (5%)	65 (17%)
Smoker, Former	10 (27%)	39 (10%)
Triage ventricular rate at index ED visit (beats/min)	120 (108, 154)	118 (96, 142)
Systolic blood pressure at index ED visit (mm Hg)	126 (101, 141)	134 (119, 154)
Total white blood cell count ($\times 10^3/\mu L$) on index ED visit	9.0 (6.1, 16.2)	8.2 (6.7, 10.7)
Hematocrit (%) on index ED visit	35 (31, 40)	42 (38, 45)
Sodium (mmol/L) on index ED visit	137 (132, 140)	139 (136, 141)
Potassium (mmol/L) on index ED visit	4.3 (3.8, 4.5)	3.9 (3.6, 4.3)
Blood urea nitrogen (mg/dL) on index ED visit	20 (13.5, 31.5)	17 (13, 24)
Creatinine (mg/dL) on index ED visit	1.1 (1.0, 1.5)	1.1 (0.9, 1.3)
Admitted to floor bed on index ED visit	30 (81%)	299 (78%)
Admitted to intensive care unit bed on index ED visit	3 (8%)	24 (6%)
Diagnosed with sepsis on index ED visit	0	2 (<1%)
Anemia listed as a contributing diagnosis on index ED visit	1 (2.7%)	5 (1.3%)
Discharged home on index ED visit	4 (11%)	60 (16%)
Palliative care/hospice consultation within 30 d of index ED visit	11 (30%)	16 (4%)
Median (IQR) days until death	17 (12, 23)	6 (4, 11)
Death within 30 d	9 (24%)	11 (3%)

Categorical data are presented as number of nonmissing values (percentage). Continuous variable data are presented as median (IQR). IQR, interquartile range; CHA2DS2-VASc, Congestive heart failure (1 point), Hypertension (1 point), Age 75 or older (2 points), Diabetes (1 point), Previous Stroke or transient ischemic attack (2 points), Vascular Disease (1 point), Age 65-74 y (1 point), and Sex (Female 1 point).

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