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Care of Patients With Cardiovascular Disorder

Symptom clusters in patients presenting to the emergency department with possible acute coronary syndrome differ by sex, age, and discharge diagnosis

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ABSTRACT

Objectives: To identify classes of individuals presenting to the ED for suspected ACS who shared similar symptoms and clinical characteristics.
Background: Describing symptom clusters in undiagnosed patients with suspected ACS is a novel and clinically relevant approach, reflecting real-world emergency department evaluation procedures.
Methods: Symptoms were measured using a validated 13-item symptom checklist. Latent class analysis was used to describe symptom clusters.
Results: The sample of 874 was 37% female with a mean age of 59.9 years. Four symptom classes were identified: Heavy Symptom Burden (Class 1), Chest Symptoms and Shortness of Breath (Class 2), Chest Symptoms Only (Class 3), and Weary (Class 4). Patients with ACS were more likely to cluster in Classes 2 and 3. Women and younger patients were more likely to group in Class 1.
Conclusions: Further research is needed to determine the value of symptom clusters in the ED triage and management of suspected ACS.

Introduction

Background

Each year in the United States, 5.5 million patients are evaluated for acute coronary syndrome (ACS) in emergency departments (EDs), yet only 13.5% are ultimately ruled in for ACS.[1] Triage of these patients has been called one of the most challenging of diagnostic dilemmas.[2] Recent advances in rapid diagnosis of ACS include the use of serial measurements of high-sensitivity cardiac troponin,[3] computed tomography, angiography, and diagnostic decision tools such as the Chest Pain Choice Decision Aid.[4] In addition, many EDs have established chest pain units with protocols for accelerated risk stratification,[5] and referral of low risk patients for outpatient stress testing.[6] Despite these advances, current approaches still lack adequate sensitivity and specificity given the high costs of evaluation and serious consequences of a missed ACS diagnosis. Most triage protocols use a limited set of symptoms, often focusing on chest related complaints (pain, pressure, discomfort) to evaluate patients for potential ACS. However, patients can present with a variety of symptoms,[7] and there is a continuing need to improve ACS risk stratification strategies and protocols.

Reliance on chest pain symptoms alone is inadequate for patients to decide to seek care or for clinicians to determine appropriate diagnostic testing. In addition, chest pain severity is not related to the likelihood of myocardial infarction (MI)[8] and women with ACS are more likely to describe non-chest pain symptoms, including shortness of breath, weakness, and fatigue.[9] Over 80% of patients report more than one symptom[7] with several studies reporting an average of 7–8 symptoms.[9–11] Consequently, there has been increasing interest in describing symptom clusters in ACS.[12–15] Symptom cluster definitions have varied. Miaskowski

Abbreviations: ACS, acute coronary syndrome; AIC, Akaike Information Classification; BIC, Bayesian Information Classification; BMI, Body Mass Index; CCI, Charlson Comorbidity Index; DASI, Duke Activity Status Index; ECG, electrocardiogram; ED, emergency department; MACE, major adverse cardiac events; MI, myocardial infarction; No, number; NSTEMI, non-ST elevation myocardial infarction; RA, research assistant; SD, standard deviation; STEMI, ST elevation myocardial infarction.

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et al have defined symptom clusters in cancer as 3 or more symptoms that co-occur and are related to each other.[16] Kim et al defined symptom clusters as 2 or more symptoms.[17] Between 3 and 5 different symptom clusters have been described in previous studies of ACS patients.[12–15] Prior ACS symptom cluster studies included only patients with diagnosed ACS. In prior work, we found patients clustered in 4 groups which were labeled Heavy Symptom Burden, Chest Pain Only, Sweating and Weak, and Short of Breath and Weak.[12] The mean number of symptoms per cluster was six.[12] Ryan et al[15] reported that none of the clusters identified in a study of patients with MI included all typical symptoms; however, age, race, and sex were predictors of cluster membership. In the only study analyzing symptom clusters between black and white women, McSweeney et al[13] discovered that younger black women with ACS clustered in the group with the most distressing symptoms. Riegel et al[14] identified four symptom clusters in ACS patients and found that those experiencing a diffuse pattern of symptoms were older and had increased mortality over two years. However, to date no studies have described symptom clusters in patients evaluated for possible ACS in the ED. The current study is novel because it included patients presenting to the ED with symptoms that triggered a cardiac evaluation. The patient's diagnosis was unknown at the time of enrollment into the study and was subsequently obtained from the medical record following hospital discharge.

The ACS diagnostic dilemma is challenging because of the immense cost of evaluating millions of patients for ACS in EDs annually and the serious consequences of missed ACS for both the patient and the provider. Identification and analysis of symptom clusters in patients who present with potential ACS could assist clinicians in risk stratification, improve rapid evaluation, reduce costs associated with diagnostic testing and hospitalization as well as facilitate patients' decision-making and treatment seeking behavior. Describing symptom clusters in undifferentiated patients (i.e., those who arrive in the ED without a diagnosis) with suspected ACS is a novel and clinically relevant approach, reflecting the real-world scenario of ED triage and assessment. The majority of patients evaluated in the ED for ACS are undifferentiated on arrival.

Goals of the investigation

The purpose of this study was to identify classes of individuals presenting to the ED for suspected ACS who shared similar symptoms and clinical characteristics. We hypothesized that subgroups of patients with similar symptom clusters (latent classes) could be identified and that these classes would differ by sex, age and discharge diagnosis.

Methods

Study design

This analysis is part of a larger prospective, longitudinal study to examine the influence of sex on symptoms during ACS. The study was approved by the institutional review boards at all participating sites. Waiver of consent to complete initial screening from the medical record and to collect symptom data prior to enrollment was obtained. This was necessary given that the parent study's main aim was to assess symptoms as they were occurring on presentation to the ED.

Sample and setting

The convenience sample consisted of 960 patients who presented to the ED and were identified by the triage nurse as potentially having ACS; 874 with complete covariate data were included in the final analysis (Fig. 1). This protocol was designed to reflect the way patients are actually triaged and evaluated in the ED. Patients were included if they were high risk for ACS (abnormal electrocardiogram (ECG) or positive troponin), ≥21 years of age, English speaking, had telephone access, and intact cognition. A positive troponin was defined as a value exceeding the reference norm for the institution. Cognitive capacity was deemed acceptable if the patient was able to understand the purpose of the study and provided written informed consent. Patients were excluded if they had cardiac symptoms in conjunction with an exacerbation of heart failure (B-type natriuretic peptide >500 ng/mL), were referred to the ED from a hemodialysis center or were referred for cardiac dysrhythmia evaluation. The study sites included 4 academic medical centers and a large community hospital located in the Midwest, Southwest, Pacific Northwest, and Western regions of the United States (>250,000 annual ED visits combined). Patients were enrolled from January, 2011 through December, 2013.

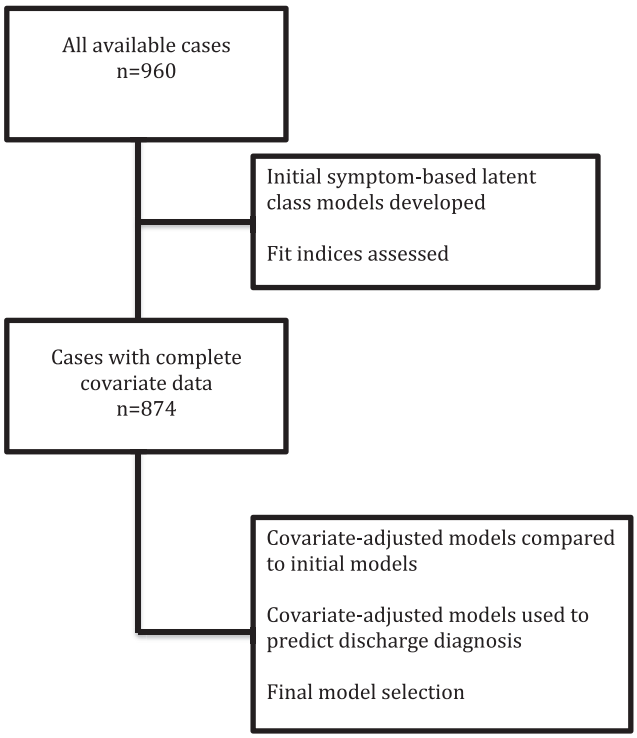

Fig. 1. Sample used in model selection.

Measures

ACS symptom checklist

Symptoms were measured with the validated 13-item ACS symptom checklist.[18] Participants indicate whether the symptom is present or absent. Symptoms not listed on the checklist can be recorded in a blank space marked "other." There is no summary score and each symptom is analyzed separately.

ACS Patient Information Questionnaire

Patient baseline characteristics were collected using the ACS Patient Information Questionnaire. This demographic and clinical questionnaire was designed using the standardized reporting guidelines recommended for studies of ED patients with potential ACS.[19]