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Original Contributions

APPLYING THE BOSTON SYNCOPE CRITERIA TO NEAR SYNCOPE

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☐ **Abstract—Background: We recently demonstrated that near-syncope patients are as likely as syncope patients to experience adverse outcomes. The Boston Syncope Criteria (BSC) identify patients with syncope unlikely to have adverse outcomes and reduce hospitalizations. It is unclear whether these guidelines could reduce hospitalization in near syncope as well. Objective: To determine if BSC accurately predict which near-syncope patients require hospitalization. Methods: A prospective observational study enrolled from August 2007 to October 2008 consecutive emergency department (ED) patients (aged > 18 years) with near syncope. BSC were first employed assuming that any patient with risk factors for adverse outcomes should be admitted, and then utilized using a modified rule: if the etiology of near syncope is dehydration or vasovagal, and ED work-up is normal, patients may be discharged even with risk factors. Outcomes were identified by chart review and 30-day follow-up calls. Results: Of 244 patients with near syncope, 111 were admitted, with 49 adverse outcomes. No adverse outcomes occurred among discharged patients. If BSC had been followed strictly, another 41 patients with risk factors would have been admitted and 34 discharged, a 3% increase in admission rate. However, using the modified criteria, only 68 patients would have required admission, a 38% reduction in admission, with no missed adverse outcomes on follow-up. Conclusion: Although near-syncope patients may have risk factors for adverse outcomes similar to those with syncope, if the etiology of near syncope is dehydration or vasovagal, and ED work-up is normal, these patients may be discharged even with risk factors.**

☐ **Keywords—near syncope; risk factors; hospitalization; adverse outcomes**

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INTRODUCTION

Although the literature describing syncope is extensive, minimal data are available regarding the management of near syncope. Near syncope is often excluded from syncope studies or excluded due to difficulty in characterizing near syncope as well as a lack of uniform terminology (1–3). Other studies, in contrast, have not differentiated between syncope and near syncope (4–7). It has been postulated that near syncope is associated with fewer comorbidities and perhaps should be considered less ominous (1). However, we have recently demonstrated that if a uniform definition of near syncope is used, patients with near syncope are as likely as patients with syncope to experience adverse outcomes (1).

Syncope accounts for approximately 1–3% of emergency department (ED) visits and up to 6% of all hospital admissions across the United States (8,9). Hospitalization for syncope has been estimated at $5300 per stay for a total cost of over $2 billion per year nationally (8–14). As near syncope is often excluded or bundled together with syncope data, the true incidence and cost per

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hospitalization of near syncope is difficult to know and can only be estimated based on the outcome of syncope patients. In an environment of soaring health care costs and dwindling resources, the need for evidence-based criteria for hospitalization decision-making has become increasingly important (11). The Boston Syncope Criteria and modified Boston Syncope Criteria were designed to identify patients with syncope unlikely to have adverse outcomes and reduce hospital admission (2,15). These criteria, as part of a clinical pathway, were able to effectively reduce hospital admissions without adverse events (2,15). It is unclear whether these guidelines could reduce hospital admission of patients with near syncope. Given that patients with near syncope are as likely as patients with syncope to experience adverse outcomes, the objective of this study was to determine whether predefined decision criteria to reduce admission could accurately predict which patients with near syncope require hospitalization.

METHODS

Study Design

We conducted a prospective, observational, cohort study of consecutive patients presenting with near syncope between November 2007 and August 2008. This design was similar to the design used when studying the syncope cohort (2). Institutional review board approval was received before initiation of the study, with waiver of informed consent.

Study Setting and Population

All patients presenting consecutively to the ED of a large urban teaching hospital with an annual ED census of 55,000 visits were eligible for enrollment. Inclusion criteria included age 18 years or older and documented near syncope. Near syncope was defined in keeping with Scharenbrock's description of near syncope, as an episode in which the patient felt he might lose consciousness, but did not actually pass out when presenting to the ED (16). Exclusion criteria were persistent altered mental status, alcohol- or illicit drug-related near loss/loss of consciousness, seizure, hypoglycemia, or near loss/loss of consciousness caused by head trauma.

Interventions

The Boston Syncope Criteria were developed and validated a priori using evidence-based criteria to identify patients at risk for an adverse outcome or critical intervention if they had any of eight symptom categories (Table 1). These criteria can be categorized as follows: 1) Signs and symptoms of an acute coronary syndrome; 2) Signs of conduction disease; 3) Worrisome cardiac history; 4) Valvular heart disease by history or physical examination; 5) Family history of sudden death; 6) Persistent abnormal vital signs in the ED; 7) Volume depletion such as persistent dehydration, gastrointestinal bleeding, or hematocrit < 30; and 8) Primary central nervous system event. The criteria suggest that patients with risk factors should be admitted, whereas patients without risk factors should be safe for discharge. The modified Boston Syncope Criteria state that if syncope is clearly dehydration or vasovagal in etiology and the ED work-up is otherwise normal, then these patients may be discharged even with risk factors.

This was an observational study and the criteria were not used to modify treatment. Using a standardized definition for near syncope, we gathered outcome data in patients found to have this complaint and then applied the Boston Syncope Criteria hypothetically to this patient population. Although the study did not mandate testing, all patients had a complete history, physical examination, and electrocardiogram performed as part of routine care. Patients were admitted to the hospital solely at the discretion of the treating physician.

Key Outcome Measures

The primary outcome was an adverse outcome or a critical intervention noted during the ED stay, hospitalization, or upon follow-up telephone call within 30 days after the initial visit. Adverse outcome was defined a priori as: death, cardiac arrest, pulmonary embolus, stroke, severe infection/sepsis, ventricular dysrhythmia, atrial dysrhythmia (including supraventricular tachycardia and atrial fibrillation with rapid ventricular response), intracranial bleed, hemorrhage, myocardial infarction, congestive heart failure, acute renal failure, or life-threatening sequelae of syncope (i.e., rhabdomyolysis, long bone or cervical spine fractures). Critical intervention was defined as implantable/implantable cardioverter defibrillator placement, percutaneous coronary intervention or surgery, cardiopulmonary resuscitation (CPR), alterations in anti-dysrhythmic therapy, endoscopy with intervention, blood transfusion, or correction of carotid stenosis.

All enrolled patients had at least one episode of near syncope meeting the above definition to be eligible for enrollment. All adverse outcomes or clinical interventions, such as CPR, stroke, or cardiac arrest, were noted after spontaneous recovery from the initial near-syncope episode. Outcomes were determined by inpatient diagnosis, 30-day follow-up phone call, and subsequent medical record review.

Study Protocol

A trained research assistant prospectively screened patients presenting to the ED with a chief complaint of