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Evidence Based Medicine

Can I Send This Syncope Patient Home From the Emergency Department?

Lloyd Tannenbaum, MD,* Samuel M. Keim, MD, MS,† Michael D. April, MD, DPHIL,‡,§ Brit Long, MD,* Alex Koyfman, MD,‖ and Amal Mattu, MD¶

*Department of Emergency Medicine, Brooke Army Medical Center, Fort Sam Houston, Texas, †Department of Emergency Medicine, University of Arizona College of Medicine, Tucson, Arizona, ‡2nd Brigade Combat Team, 4th Infantry Division, Fort Carson, Colorado,, §Department of Military and Emergency Medicine, Uniformed Services University of the Health Sciences, Bethesda, Maryland, ||Department of Emergency Medicine, The University of Texas Southwestern Medical Center, Dallas, Texas, and ¶Department of Emergency Medicine, University of Maryland School of Medicine, Baltimore, Maryland

Reprint Address: Samuel M. Keim, MD, MS, Department of Emergency Medicine, University of Arizona College of Medicine, 5295 North Camino Real, Tucson, 85718, Arizona

□ **Abstract— *Background*: Syncope is a common presentation to the emergency department (ED). A significant minority of these patients have potentially life-threatening pathology. Reliably identifying that patients require hospital admission for further workup and intervention is imperative. *Clinical Question*: In patients who present with syncope, is there a reliable decision tool that clinicians can use to predict the risk of adverse outcome and determine who may be appropriate for discharge? *Evidence Review*: Four articles were reviewed. The first retrospective study found no difference in mortality or adverse events in patients admitted for further evaluation rather than discharged home with primary care follow-up. The next two articles examined the derivation and validation of the Canadian Syncope Risk Score (CSRS). After validation with an admission threshold score of –1, the sensitivity and specificity of the CSRS was 97.8% (95% confidence interval [CI] 93.8–99.6%) and 44.3% (95% CI 42.7–45.9%), respectively. The last article looked at the derivation of the FAINT score, a recently developed score to risk stratify syncope patients. A FAINT score of ≥ 1 (any score 1 or higher should be admitted) had a sensitivity of 96.7% (95% CI 92.9–98.8%) and specificity 22.2% (95% CI 20.7–23.8%). *Conclusions*: Syncope remains a difficult chief symptom to disposition from the ED. The CSRS is modestly effective at establishing a low probability of actionable disease or need for intervention. However, CSRS might not reduce unnecessary hospitalizations. The FAINT score has yet to undergo validation; however, the initial derivation study offers less diagnostic accuracy compared with the CSRS. © 2021 Elsevier Inc. All rights reserved.**

□ **Keywords—Syncope; score; risk; disposition**

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Case

A 68-year-old man presents to the emergency department (ED) after a syncopal event. He had been standing for an extended period waiting in line when he felt warm and lightheaded. He passed out and woke a short time later on the ground. He denies headache, chest pain, dyspnea, peripheral edema, focal neurologic deficits, urinary incontinence, or any other symptoms. Witnesses told the paramedics that he had no seizure activity. He has coronary artery disease (CAD) and hypertension, but no other pertinent medical history. He is on no anticoagulants. He denies any family history of sudden death or syncope. His examination reveals a blood pressure of 158/72 mm Hg, heart rate 68 beats/min, respiratory rate 16 breaths/min,

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temperature 98.2°F, and oxygen saturation 98% on room air. His fingerstick blood glucose is 94 mg/dL. Further examination includes no evidence of trauma, normal cardiac examination with normal heart sounds and no murmurs, and normal motor and sensory function. The rest of the examination is unremarkable. Bedside echocardiogram reveals no evidence of pericardial fluid, normal chamber size and normal wall thickness. His electrocardiogram (ECG) reveals a rate of 68 beats/min, normal QRS axis, normal QRS and QTc duration, and normal ST segments and T waves. You do not find any evidence of hypertrophic cardiomyopathy, shortened PR, delta waves, Brugada syndrome, epsilon waves, dysrhythmogenic right ventricular dysplasia, ischemia, or atrioventricular (AV) blockade. A troponin ordered at triage returns as normal. This patient is older with a history of CAD, but his history resembles a vasovagal event. With his age and comorbidities, does he require admission or can he be discharged with follow-up? Are there any tools that can assist in this decision?

CLINICAL QUESTIONClinical Question

In patients who present with syncope, is there a reliable decision tool that clinicians can use to predict the risk of adverse outcome and determine who may be appropriate for discharge?

Context

Syncope is a common ED symptom, accounting for up to 2% of total ED visits and approximately 1% of hospital admissions (1–4). Studies suggest prevalence rates as high as 41%, with recurrent episodes occurring in 13.5% (5,6). The definition of syncope is a brief, sudden, self-terminating loss of consciousness and failure to maintain postural tone (6,7).

Although it is common, it is also a challenging chief symptom to evaluate, as syncope is a nonspecific condition with causes ranging from a benign, self-limited etiology to a life-threatening disease requiring critical intervention, which can occur in 3–23% of patients, depending on the population and study setting (8–10). Most patients are well-appearing and asymptomatic in the ED on first evaluation, and physicians typically rely on history, physical examination, and ECG (6,10,11). Findings associated with adverse outcomes in patients with syncope include older age, exertional syncope, syncope associated with no prodrome, signs and symptoms of myocardial ischemia or valvular disease, ECG findings of ischemia or conduction disease, abnormal vital signs, and family history of sudden death (6,9). Such deadly etiologies include dysrhythmias, myocardial ischemia, vascular disorder (e.g., pulmonary embolism or aortic dissection), and cardiac obstruction.

With this risk of adverse outcomes in patients with syncope, many patients undergo hospitalization to evaluate for deadly conditions that cannot await outpatient evaluation, manage the underlying etiology, and monitor those at risk for sudden cardiac death (6). In fact, proportions of these patients undergoing admission can reach 75% in elderly patients, but adverse events and interventions for actionable pathology occur in $< 1\%$ of patients admitted for syncope (10,12,13).

To predict the need for hospitalization, a variety of scores exist that risk stratify patients. Many of these scores incorporate previously mentioned factors in the history, examination, and ECG. Such scores include the San Francisco Syncope Rule, Boston Syncope Rule, Risk Stratification of Syncope in the ED, Osservatorio Epidemiologico sulla Sincope nel Lazio, and many others (6,7,9,14–23). However, the literature evaluating these scores has many limitations, including inconsistent definition of syncope, predictors, serious outcomes, and time frames; use of composite outcomes that combine events with different etiologies; limited external validation; and small sample sizes (6,7,9,14–23). Since the introduction of these scores, several newer scores with appropriate validation have demonstrated promise.

Evidence Search

You seek studies evaluating the risk of adverse events in patients with syncope and the use of risk scores in predicting these adverse events. Prior to your search, you evaluate current consensus guidelines and find one from the American Heart Association, published in 2017. You exclude studies evaluating the etiology of syncope (i.e., pulmonary embolism or dissection). You search PubMed with the terms *syncope* AND *risk* or *adverse* or *disposition* or *hospitalization* or *admission*, which yields 179 studies. Review of the titles and abstracts reveals 25 studies. Four studies on human subjects evaluating patients with syncope and the risk of adverse outcome based on patient disposition. Reviewing the references of these studies yields no additional trials.

Evidence Review

Clinical Benefit of Hospitalization for Older Adults with Unexplained Syncope: A Propensity-Matched Analysis (10)

Population

The authors included patients older than 60 years who presented with syncope to 1 of 11 EDs with syncope or

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near-syncope. All 11 EDs were part of academic institutions and 10 were trauma centers. The final cohort consisted of 2492 patients from the initial 3686 patients who consented. Mean age was 72.6 years, 50.8% were women, and investigators followed up 2482 patients (99.6%) via telephone. The propensity matched cohort consisted of 1064 patients (532 per group).

Study design

This study was a secondary retrospective analysis from a multicenter, observational prospective study of older patients who presented to an ED with syncope or near syncope. Authors performed propensity score matching with 43 covariates to adjust for confounders. Patients obtained ECG and biomarkers in the ED, but further evaluation was per treating clinician discretion.

Primary outcome

The primary outcome was the rate of serious adverse events occurring within 30 days of the index ED visit. These serious adverse events included death from any cause, cardiopulmonary resuscitation, myocardial infarction, significant cardiac dysrhythmia, newly diagnosed structural heart disease, aortic dissection, stroke, pulmonary embolism, subarachnoid hemorrhage, internal hemorrhage or anemia that required transfusion, recurrent syncope or a fall causing major traumatic injury, or cardiac intervention.

Exclusion criteria

Authors excluded patients with symptoms attributed to intoxication, stroke, seizure, hypoglycemia, or head trauma. Any need for specific intervention to restore consciousness (defibrillation), new or worsening confusion, or inability to obtain informed consent were also reasons for patient exclusion. Finally, authors excluded patients with a serious diagnosis identified in the ED, including death, significant structural heart disease, pulmonary embolism, pneumonia, significant cardiac dysrhythmia, acute pulmonary edema, sepsis, acute renal failure, acute surgical illness, intracranial bleeding, myocardial infarction, and stroke.

Main results

Prior to propensity matching, a serious adverse event occurred in 7.4% (n = 138 of 1866) of admitted patients and 3.2% (n = 20 of 626) of discharged patients, for an absolute risk difference of 4.2% (95% confidence interval [CI] 2.38 to 6.02). The rate of serious adverse events was not significantly different after propensity matching, occurring in 4.89% (n = 24 of 532) of admitted patients and 2.8% (n = 15 of 523) of discharged patients, with an absolute risk difference of 2.1% (95% CI –0.24 to 4.38). Of note, the most common serious adverse event was cardiac dysrhythmia, most commonly supraventricular tachycardia. There was no significant difference in mortality, occurring in 0.75% (n = 14 of 1866) of admitted patients and 0.56% (n = 3 of 626) of discharged patients, for an absolute risk difference of 0.19% (95% CI –1.16 to 0.78). Length of time to serious adverse event was 7.5 days in those admitted and 13.8 days in discharged patients.

Development of the Canadian Syncope Risk Score to Predict Serious Adverse Events After Emergency Department Assessment of Syncope (24)

Population

Authors included patients older than 16 years presenting with syncope to one of six large Canadian teaching hospitals. Authors included both admitted and discharged patients. The initial patient population comprised 4322 patients, but 292 were lost to follow-up, leaving 4030 patients in the final analysis. Of those patients, the mean age was 53.6 years, 55% were female, 64% arrived at the hospital via ambulance, and 9.5% underwent admission to the hospital.

Study design

This derivation study was designed as a prospective cohort study from a multicenter observational study of adult patients who presented to the ED with syncope. On initial presentation, 43 different variables were collected to determine whether any of them could be markers for patients that would be high risk for discharge. Every patient enrolled in this study had all 43 variables assessed.

Primary outcome

The objective of this study was to define a clinical decision tool to identify adult patients with syncope who are at risk of the primary outcome of serious adverse event within 30 days after disposition from the ED. Adverse events included any serious condition related to syncope within 30 days after disposition from the ED. These conditions included death, dysrhythmia, myocardial infarction, serious structural heart disease, aortic dissection, pulmonary embolism, severe pulmonary hypertension, severe hemorrhage, subarachnoid hemorrhage, and any other serious condition causing syncope and procedural interventions for the treatment of syncope.

Exclusion criteria

Investigators excluded patients if they had prolonged loss of consciousness (more than 5 min), change in mental status, witnessed seizure, major trauma requiring hospitalization, intoxication with alcohol or illicit drugs, language barrier, or head trauma causing loss of consciousness. The authors also excluded patients who had a serious adverse event identified during their initial ED stay.

Main results

Of the 4030 patients involved with this study, 147 (3.6%) had an adverse event within 30 days after disposition from the ED. Of the 43 variables analyzed, the final model included 9. Those variables include predisposition

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to vasovagal syncope, heart disease, any systolic pressure reading in the ED < 90 or > 180 mm Hg, troponin level above 99th percentile for the normal population, abnormal QRS axis (< −30° or > 100°), QRS duration longer than 130 ms, QTc interval longer than 480 ms, ED diagnosis of cardiac syncope, and ED diagnosis of vasovagal syncope (C-statistic 0.88; 95% CI 0.85–0.90). The risk of a serious adverse event within 30 days ranged from 0.4% for a score of −3 to 83.6% for a score of 11. The sensitivity and specificity were 99.2% (95% CI 95.9–100%) and 25.4% (95% CI 23.9–26.8%) for a threshold score of −2 or higher and 97.7% (95% CI 93.5–99.5%) and 45.1% (95% CI 43.5–46.8%) for a threshold score of −1 or higher, respectively.

Multicenter Emergency Department Validation of the Canadian Syncope Risk Score (25)

Population

Authors included patients older than 16 years presenting with syncope to one of nine large Canadian teaching hospitals within 24 hours of the syncopal event. This study included both admitted and discharged patients. Of 4131 patients approached for study inclusion, the investigators excluded 312. Of those 312, one hundred and sixty had a serious outcome prior to discharge, and 152 were lost to follow-up, leaving 3819 patients included in the final analysis. The mean age of included patients was 53.9 years, 54.7% were female, and 62.7% arrived at the hospital via emergency medical services.

Study design

This study was a prospective cohort validation study of the Canadian Syncope Risk Score (CSRS) studying adult patients who presented to the ED with syncope. Patient enrollment occurred prior to and after the publication of the CSRS. Patients enrolled prior to the CSRS had all 43 variables recorded and patients enrolled after the development of the CSRS only had those variables necessary to calculate the CSRS.

Primary outcome

The primary outcome of this study was to validate the accuracy of CSRS to identify patients experiencing an adverse outcome 30 days after their syncopal event. Adverse outcomes included dysrhythmic conditions (serious dysrhythmias, pacemaker placement, defibrillator insertion, cardioversion, any other intervention to treat a dysrhythmia, or death due to unknown cause) and nondysrhythmic conditions (myocardial infarction, serious structural heart disease, aortic dissection, pulmonary embolism, severe pulmonary hypertension, significant hemorrhage, subarachnoid hemorrhage, or any other serious condition causing syncope).

Exclusion criteria

Investigators excluded patients who had prolonged loss of consciousness (more than 5 min), change in mental status, witnessed seizure, major trauma requiring hospitalization, intoxication with alcohol or illicit drugs, language barrier, or head trauma causing loss of consciousness. The authors also excluded patients who had a serious adverse event identified during their initial ED stay. They also excluded patients who were analyzed during the derivation of the CSRS.

Main results

Of the 3819 patients included in this study, 139 (3.6%) had a 30-day serious outcome and 13 patients (0.3%) died. Of these, 2885 patients scored in the low- (n = 1254) and very-low- (n = 1631) risk groups. There were no deaths in either group; however, adverse events occurred in 0.7% of patients in the low-risk group and 0.2% in the very-low-risk group of patients. In contrast, there were 245 patients in the high (n = 167) and very high (n = 78) risk groups. There were 5 patients who died in the high-risk and 7 patients who died in the very-high-risk group. Thirty-two patients (19.2%) in the high-risk group had a serious adverse outcome, and 40 patients (51.3%) of the very-high-risk had a serious adverse outcome. Using a threshold score of –1 (2145 of 3819 patients), the sensitivity and specificity of the CSRS was 97.8% (95% CI 93.8–99.6%) and 44.3% (95% CI 42.7–45.9%), respectively.

Risk Stratification of Older Adults Who Present to the Emergency Department With Syncope: The FAINT Score (8)

Population

Authors included adults 60 years and older who presented to 1 of 11 academic EDs in the United States with a chief symptom of syncope or near syncope. The initial cohort was composed of 3573 patients; however, 10 withdrew from the study, 103 were lost to follow-up, and 396 had a serious outcome identified during their initial ED visit, leaving 3177 patients in the final cohort. In this cohort, the mean age was 72.7 years and 50.6% were male. Of the included patients, 61.9% presented with syncope, and 38.1% presented with near syncope.

Study design

This derivation study is a multicenter, prospective, observational study of adults aged 60 years and older presenting to 1 of 11 different academic ED in the United States with a chief symptom of syncope or near syncope. Research assistants screened and approached patients in the ED meeting inclusion criteria and interviewed them regarding their syncopal or near syncopal event. A second, blinded, provider then interviewed the patient to assess for inter-rater agreement. Each patient also underwent N-terminal pro B-type natriuretic peptide (NT-proBNP) and fifth-generation, high-sensitivity cardiac troponin T (hs-cTNT) testing. The first obtained ECG was reviewed by

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a physician blinded to the clinical data; this physician categorized each ECG as either normal or abnormal. A risk stratification score was derived from the collection of these data.

Primary outcome

The primary outcome of this study was death within 30 days of syncopal event or serious cardiac outcome. Serious cardiac outcomes included significant cardiac dysrhythmia, myocardial infarction, new diagnosis of significant structural heart disease, or cardiac intervention. The authors further defined significant cardiac dysrhythmias as ventricular fibrillation, ventricular tachycardia, sick sinus disease, Mobitz II AV heart block, complete heart block, symptomatic supraventricular tachycardia, symptomatic bradycardia, and pacemaker malfunction. Structural heart diseases included aortic stenosis with valve area $\leq$ 1 cm^2, hypertrophic cardiomyopathy with outflow tract obstruction, severe pulmonary hypertension (mean arterial pressure $>$ 30 mm Hg), left atrial myxoma or thrombus with protrusion, and outflow tract obstruction. Cardiac interventions included placement of a pacemaker or automated internal cardiac defibrillator, coronary artery bypass graft, percutaneous transluminal coronary angioplasty, or any other invasive cardiac surgery.

Exclusion criteria

Exclusion criteria included symptoms attributed to intoxication, stroke, seizure, transient ischemic attack, head trauma, or hypoglycemia. Additional exclusion criteria were medical interventions, such as defibrillation, necessary for the patient to regain consciousness, the patient experienced new or worsening confusion, or if the patient could not provide informed consent. Investigators also excluded patients with a new adverse event in the ED, including significant cardiac dysrhythmia, myocardial infarction, significant structural heart disease, stroke, pulmonary embolism, aortic dissection, hemorrhage or anemia requiring blood transfusion, subarachnoid hemorrhage, cardiopulmonary resuscitation, or major traumatic injury.

Main results

Investigators enrolled 3177 patients. In this group of patients, the incidence of the primary outcome was 5.7%. Using Bayesian logistic regression, the authors derived the FAINT score. This score is an acronym where F stands for history of heart failure, A is for history of cardiac arrhythmia, I is for initial abnormal ECG, N is for elevated proBNP, and T is for elevated high sensitivity troponin. Each criterion of the FAINT score is worth 1 point, except for an elevated BNP, which is worth 2 points. A FAINT score of $\geq$ 1 had a sensitivity of 96.7% (95% CI 92.9–98.8%) and specificity 22.2% (95% CI 20.7–23.8%) to predict adverse outcomes. The authors conclude that a FAINT score of 0 has a high sensitivity for excluding death and serious cardiac outcomes 30 days after initial event.

Conclusions

Determining disposition of patients who present to the ED with syncope can be challenging. This review evaluates four studies that can assist emergency clinicians (8,10,24,25). The first study found no difference in the incidence of mortality or adverse events between hospitalized vs. discharged patients after controlling for confounders (10). This observational study highlights the challenge of reliably identifying those syncope patients who will benefit from hospitalization and further evaluation. The next two studies provided derivation and validation of the CSRS, respectively (Table 1) (24,25). The validation study shows that this score offers some promise for guiding the disposition of syncope patients, although at the authors' recommended threshold value, the score offers a negative likelihood ratio of 0.05 (25).

Table 1. Canadian Syncope Risk Score (24,25)

ED Evaluation	Scoring	Score Interpretation
No serious underlying conditions identified on initial focused evaluation	Vasovagal predisposition (–1) History of heart disease (+2) SBP $<$ 90 or $>$ 180 mm Hg (+2) Elevated troponin (+2) Abnormal QRS axis (+1) QTc $>$ 480 ms (+2) Vasovagal syncope (-2) Cardiac syncope (+2)	Low = –3 to 0 → 2 h of ED observation Medium = 1 to 3 → 6 h of ED observation and consider external cardiac monitoring for 15 d High/very high = 4 to 11 → 6 h of ED observation; consider admission. If discharged, external cardiac monitoring for 15 d

ED = emergency department. SBP = systolic blood pressure.

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Syncope – A common clinical syndrome with many possible causes that manifests as a transient loss of consciousness, most often the result of an abrupt decrease in systemic blood pressure. In the Emergency Department, determining the cause is important for disposition, extent of diagnostic testing and therapy decisions.

Reliability – A statistical term estimating the consistency of a measure. With a Clinical Decision Rule (CDR) or other diagnostic tool, reliability would refer to how often the same result would occur if administered repeatedly. Typically defined during the CDR validation study.

Clinical Decision Rule/Tool – A prediction tool used to estimate positive or negative health outcomes based on commonly available variables, such as elements from the history, physical and easily obtained diagnostic tests. High quality CDRs can aid with making appropriate disposition decisions, prevent unnecessary testing and improve patient quality outcomes. CDRs should not replace clinical judgement.

Derivation Study – Usually the first published study in the journey to create an accurate CDR. A representative sample of patients with the target condition or presentation is analyzed for associated and measurable features, e.g., history, physical, test results. Statistical methods such as regression analysis and recursive partitioning can be used to estimate the strength of association between the presenting feature and the outcome, e.g., death.

Validation Study – An important follow-up study done after the derivation study is finished to test the performance of the CDR in a new sample of patients. Validation is important to reduce the chance that the CDR associations are merely due to chance, not present in samples other than the derivation sample and not feasible to apply in practice.

Implementation Study – A study conducted to estimate the real-world impact of a CDR. Best conducted using a randomized cluster or a controlled clinical trial design and have more generalizability when conducted in as many different settings as possible.

Figure 1. Evidence-based medicine teaching points.

The score is modestly effective at establishing a low probability of actionable disease or need for intervention. Yet, the positive likelihood ratio is 1.8, so the score is unlikely to have a material impact on avoiding unnecessary hospitalizations. The FAINT score in derivation studies offers less diagnostic accuracy and has yet to undergo validation (8).

Taken together, these studies suggest that the CSRS can be useful if the clinicians plan to use a risk stratification tool to guide disposition for syncope patients. The studies reviewed provide several important insights into disposition of syncope. The CSRS assigns patients a score from –3 to 11 based on 9 variables that give patients their 30-day risk of a serious adverse event (24,25). Score calculation requires a troponin, an ECG, and a thorough history. The CSRS investigators recommend using a threshold of –1 to determine appropriate disposition. Using –1 as a cutoff, the sensitivity and specificity of the CSRS, after validation, was 97.8% (95% CI 93.8–99.6%) and 44.3% (95% CI 42.7–45.9%), respectively (25,26).

Although the FAINT score appears promising, further validation is needed. This score incorporates history, ECG, troponin, and proBNP. A score of ≥ 1 had a sensitivity of 96.7% (95% CI 92.9–98.8%) and specificity 22.2% (95% CI 20.7–23.8%) to predict adverse outcomes (8). This study compares the FAINT score against clinician gestalt; however, the score requires validation, which is the biggest shortcoming of this new scoring system. Syncope continues to be a common presenting symptom and frequent cause of admission among older adults. Although these risk scores provide promise, syncope is a complex condition with a variety of underlying etiologies, some of which are potentially deadly. Ultimately, risk scores cannot replace clinician judgment, but they can assist in determining patients who may be appropriate for discharge (see Figure 1).

Commentary by Amal Mattu, MD

I love syncope. It seems to be one of the few chief symptoms where dangerous conditions vs. benign conditions can still be parsed out based on a good clinical evaluation and common sense rather than a mindless, shotgun approach to testing. With a good history, a good

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physical examination, scrutiny of the ECG, and a couple hours of cardiac monitoring, we should be able to diagnose the cause of syncope in up to 80% of cases (26,27). The remaining patients should then be risk stratified such that patients with low risk of an early serious adverse outcome (SAO) can be discharged for an outpatient workup, and patients with higher risk are admitted to an observation unit or a telemetry unit for an expedited workup to diagnose and treat the cause of syncope.

Like most things in life, however, syncope evaluation and risk stratification are not as easy as it sounds. Studies continually show that we in the United States and in many other countries tend to admit far too many patients, resulting in fruitless workups and significant health care costs. Interestingly, studies also show that we tend to be quite good at predicting the risk of SAO (28). Nevertheless, we have a tendency to admit patients for urgent evaluation even when the risk is judged to be low. Why is it that we are afraid to discharge so many patients who we suspect are low risk? Is this fear due to a lack of confidence in our clinical gestalt, or is it fear of litigation, or is it a refusal to accept anything more than a 0% miss rate? Regardless of the reason, three things that the COVID-19 pandemic era has clearly taught us all is that health care resources are not limitless, an inpatient stay is not the right choice for a low-risk patient, and we need to get comfortable with the fact that making tough decisions is part of our job, and there is no way around that.

Making tough decisions is certainly a lot easier when there is good literature to inform us. In recent years, quite a few trials and decision instruments have been published, as listed earlier, which have attempted to provide us direction in risk stratifying those patients presenting with syncope, but without obvious diagnoses. Among the most promising are those that have been by Probst and colleagues and Thiruganasambandamoorthy and colleagues (8,10,24,25). All four of these publications have been discussed in some detail above, but I would highlight some key points.

The two papers by Probst and colleagues focused on older patients (older than 60 years) presenting with syncope, a group of patients generally presumed to be at relatively high risk for SAOs (8,10). In the first study, almost 30% of the cohort were identified as having a serious outcome during the ED visit and were excluded (10). This certainly reflects a high-risk population. Of the remaining patients, after propensity score matching on risk of hospitalization, there was no statistically significant difference in serious adverse events at 30 days between the discharged vs. the admitted patients, and the mortality rates for both groups were $< 1\%$. Also, of note, the length of time to serious adverse event was 13.8 days in discharged patients vs. 7.5 days in admitted patients. Given that most patients admitted for syncope are routinely discharged after 2–3 days, the adverse events in the admitted group are very unlikely to occur while in the hospital, which begs the question, "What purpose did the admission serve?" In their second study, Probst and colleagues derived the FAINT score, a decision instrument for older patients presenting with syncope (8). In this this study, 11% of the cohort were identified as having a serious outcome during the ED visit and were excluded. A FAINT score of < 1 predicted a $< 1\%$ risk of SAO at 30 days. Although the specificity of the score was low, the typical admission rate in older patients is very high, and so any admissions that can be safely prevented by using this score would be helpful. This decision instrument awaits external validation.

The two articles by Thiruganasambandamoorthy and colleagues are the derivation and validation of the CSRS (24,25). These two studies included lower-risk populations than in the Probst studies: $< 5\%$ of the cohorts were identified as having serious outcomes during the ED visits. Points were allotted for various factors with a net final score ranging from –3 to 11 points. Based on the total points, patients were assigned to very-low-risk, low-risk, medium-risk, high-risk, and very-high-risk groups with 30-day rates of SAOs in the validation study of 0.2%, 0.7%, 8.0%, 19.2%, and 51.3%, respectively. The authors suggest that patients in the lowest two groups could be discharged with a predicted risk $< 1\%$ and sensitivity and specificity for predicting 30-day serious adverse events of 97.8% and 44.3%, respectively. They also note that in the medium-risk group, despite the overall 8.0% risk of serious adverse events, the rate of death was significantly less than 1% and, therefore, discharge of the patient might be considered, perhaps using shared decision making with the patient. Although internally validated, the CSRS also awaits external validation.

Several key take home points can be made from these excellent studies. First, it should be noted that in each of these publications, patients with obvious evidence of SAOs were excluded from the studies. In other words, decision instruments should be used to aid decision making in the equivocal cases, but they should not be applied in obvious dispositions. Clinical judgment after a thorough, sensible evaluation should still take precedence; decision instruments are not decision replacements. Second, low-risk patients with syncope have a very low risk of mortality ($< 1\%$ in each of these studies), and it is not clear that SAOs in low-risk patients are lower even when the patient is admitted. We should be more comfortable discharging patients knowing this. Finally, pending external validation, these decisions instruments have the ability to reassure us clinicians and the patients that discharge of low-risk patients, using evidence-based criteria, truly is safe and also meets the standard of care.

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ARTICLE SUMMARY

1. Why is this Topic Important?

Syncope is a common presenting symptom in the emergency department, but a difficult symptom to appropriately disposition. There are many different scoring systems that have been derived to aid clinicians manage these patients.

2. What is the Clinical Question?

In patients who present with syncope, is there a reliable decision tool that clinicians can use to predict the risk of adverse outcome and determine who may be appropriate for discharge?

Search strategy: PubMed search using combined keywords of *syncope* and *risk score*.

Citations appraised: Clinical Benefit of Hospitalization for Older Adults With Unexplained Syncope: A Propensity-Matched Analysis (10).

Development of the Canadian Syncope Risk Score to Predict Serious Adverse Events after Emergency Department Assessment of Syncope (24).

Multicenter Emergency Department Validation of the Canadian Syncope Risk Score (25).

Risk Stratification of Older Adults Who Present to the Emergency Department With Syncope: The FAINT Score (8).

3. Are the Results Valid?

The Canadian Syncope Risk Score has undergone derivation and validation; however, the FAINT score has yet to be validated.

4. What Are the Results?

After validation and using a threshold score of –1, the sensitivity and specificity of the CSRS was 97.8% (95% CI 93.8–99.6%) and 44.3% (95% CI, 42.7–45.9%), respectively. A FAINT score of $\geq$1 had a sensitivity of 96.7% (95% CI 92.9–98.8%) and specificity 22.2% (95% CI 20.7–23.8%) but has yet to be validated.

5. Can I Apply the Results to My Practice?

Yes.

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