Specialized Syncope Evaluation

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The concept of specialized cardiovascular care is not new. Nearly 4 decades ago, Killip and Kimball1 reported the results of their study of the treatment of 250 patients with myocardial infarction in a coronary care unit. With continuous ECG monitoring at a centralized nursing station, defibrillators at each bedside, and nurses authorized to deliver precordial shocks if physicians did not respond fast enough, the mortality rate was reduced from 26% to 7%.1 A classification scheme for heart failure severity was developed, and the authors ultimately concluded that the coronary care unit was critical to the timely recognition and treatment of potentially lethal arrhythmias.

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During the ensuing decades, expert coronary care has been extended to the emergency department, where specialized units or critical pathways are used to provide expedited, high-quality care for a variety of cardiovascular symptoms and diagnoses, including chest pain, unstable angina, myocardial infarction, heart failure, and stroke. The goals of this specialized care are to provide more efficient, higher-quality health care for less money by reducing unnecessary hospital admissions, hastening diagnosis, increasing diagnostic yield, and decreasing adverse outcomes. For a specialized plan of care to be realistic, the diagnosis should be relatively common, require immediate evaluation, and have significant associated morbidity, mortality, or both if left untreated or misdiagnosed.

As an example, critical pathways for the management of acute chest pain have succeeded at improving care for patients at low or intermediate risk for myocardial ischemia. A strategy of early diagnostic testing including the measurement of serum cardiac enzymes and the performance of exercise testing in selected patients within 6 hours of presentation can lead to clinically important reductions in admission rates and number of hospital days without increasing adverse outcomes.2,3 Like chest pain, syncope is a common symptom among patients presenting to the emergency department. In fact, syncope accounts for 3% of all emergency department visits and 1% to 6% of hospital admissions while affecting >6/1000 people each year.4,5 It is important to recognize that syncope may be a harbinger of sudden death. Untreated patients with cardiac syncope can have 6-month mortality rates that exceed 10%.5 As in patients with chest pain, the prognosis of patients with syncope can be stratified on the basis of clinical factors. Unlike in patients with chest pain, syncope risk stratification cannot be facilitated by the use of a simple, rapid, inexpensive blood test, and no simple, noninvasive, inexpensive, sensitive, and specific test akin to exercise testing can be performed to reliably diagnose the cause of syncope.

Because of the potential for sudden death, most physicians take a conservative approach to the diagnosis and management of high- and intermediate-risk patients with syncope. Hospital admission has been advised generally for patients with syncope perceived to be at high risk for adverse cardiovascular outcomes, such as patients with a previous history of myocardial infarction, heart failure, or ventricular arrhythmia; patients with physical signs of significant valve disease, heart failure, or stroke; patients with ECG findings of ischemia, arrhythmia, increased QT interval, or bundle-branch block; and patients with syncope associated with injury, rapid heart action, chest pain, or exertion.6 Intermediate-risk patients, such as those older than 60 to 70 years, those with a history or suspicion of coronary artery disease or congenital heart disease, and those with a family history of premature sudden death are also often strongly considered for hospitalization.7 Although the rationale for this approach is that selected patients with syncope are at risk for substantial early mortality, the presumption that hospital admission reduces a patient’s risk has not been demonstrated.

In this issue of Circulation, Shen et al8 challenge the tenet that intermediate-risk syncope patients require inpatient hospital evaluation. They performed a prospective, randomized, single-center study of patients presenting with syncope to a tertiary care hospital emergency department. Intermediate risk patients were randomized to “standard” care or to evaluation in a designated “syncope unit” within the emergency department. Patients randomized to the syncope unit received continuous cardiac telemetry for up to 6 hours, hourly vital signs and orthostatic blood pressure checks, and echocardiography for patients with an abnormal cardiovascular examination or ECG. Tilt-table testing and electrophysiology consultation were performed in selected patients at the treating physician’s discretion. Compared with patients evaluated in the standard fashion, patients randomized to evaluation in the syncope unit demonstrated improved diagnostic yield during the emergency department evaluation, reduction in the hospital admission rate and total number of hospital days, and no untoward effect on the rate of recurrent syncope or all-cause mortality.

The opinions expressed in this article are not necessarily those of the editors or of the American Heart Association.

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Given that the cost of diagnosis and treatment for patients with syncope exceeds $1 billion annually, the development of an accurate, timely, and cost-effective method for the evaluation of patients with syncope would have important economic consequences for the healthcare system. Several study-related matters, however, are worthy of discussion, including issues related to patient selection, diagnostic evaluation, and follow-up.

In Shen and associates’ study, only 103 patients were enrolled, representing 2.9% of the 3502 patients with syncope who were screened. Patients were excluded if they had an identified cause of syncope in the emergency department before enrollment; if they required hospital admission for documented arrhythmia, acute coronary syndrome, stroke, or other significant medical comorbidity; or if a patient’s altered consciousness was not thought to represent true syncope. Of the 262 patients that met study entry criteria and consented to randomization, 40% were considered to be at “intermediate” risk. As such, this was a study of a highly selected syncope patient population, and the results are not necessarily applicable to many of the patients presenting with syncope.

Among the diagnostic tests used in the study, tilt-table testing was relied on heavily. For patients with suspected neurally mediated syncope, tilt testing can be used to promote venous pooling in the lower extremities and to provoke a vasovagal spell via a Bezold-Jarisch mechanism. The role of tilt-table testing in establishing the cause of syncope remains controversial because of the high false-positive and high false-negative rates of the test. Passive tilt testing (in the absence of concurrent pharmacological stress), although >90% specific, yields a “positive” test in as few as 20% of patients with known neurally mediated syncope (ie, an 80% false-negative rate). Most tilt protocols therefore include pharmacological stress, such as the addition of isoproterenol, which is more likely to elicit an abnormal test result but can provoke a “positive” result in up to 50% of “healthy” volunteers with no history of syncope (ie, a 50% false-positive rate). It is therefore often not possible to definitively establish a diagnosis of vasovagal syncope with a positive tilt-table test, nor is it possible to exclude the diagnosis with a negative test.

Because of the suspect sensitivity and specificity of tilt testing, overreliance on it can lead to a false sense of security and to an inaccurate diagnosis. In the trial conducted by Shen et al, tilt testing was performed more often in patients randomized to the syncope unit than to the standard care group (73% versus 25%). Not surprisingly, neurally mediated syncope was more often the final diagnosis in patients in the syncope unit than it was in patients under standard care (53% versus 31%), despite the fact that 2 groups were randomized. Because of the questionable diagnostic utility of tilt testing, many insurers will not reimburse for the test or will reimburse only for selected uses such as the evaluation of recurrent syncope in patients with an otherwise negative assessment. In general, tilt testing is recommended for patients without structural heart disease who have recurrent syncope of uncertain cause and for patients with high-risk occupations (eg, pilots) after a single syncopal episode. For patients with underlying structural heart disease, tilt-table testing may be used as an adjunct to a thorough evaluation that often includes electrophysiology testing.

Electrophysiology studies were employed with surprising infrequency in Shen and colleagues’ study (only 7 of 103 patients despite their “intermediate” risk). Although patients with normal hearts and normal ECGs rarely require electrophysiology testing, syncope of uncertain cause in a patient with significant structural heart disease is a Class I indication for electrophysiology study. The diagnostic yield is ~30% to 50% in this selected patient population. Diagnostic testing is of low utility for the detection of bradyarrhythmias, which often are transient and infrequent in nature. Implantable loop recorders may be more effective for diagnosing the underlying cause of syncope than either tilt-table testing or electrophysiology studies in certain patients.

Given the shortcomings of the available diagnostic tools, a definitive diagnosis often cannot be conclusively determined in the time frame available in the emergency department. This does not necessarily preclude the use of a specialized syncope unit or syncope critical pathway. Strategies that focus on risk stratification (asking “Is it safe to discharge for outpatient evaluation?”) rather than diagnosis may be more effective. A normal exercise test result in the patient presenting with chest pain is reassuring to the physician, even though it does not determine the cause of the discomfort. Similarly, a noninvasive test or combination of clinical characteristics that reliably predicted a benign prognosis in the “intermediate-risk” syncope patient would permit safe outpatient evaluation even in the absence of a definitive diagnosis.

Does such a test or combination of tests exist? The shortcomings of tilt-table testing have been discussed sufficiently. Other potential candidates such as signal-averaged ECG, heart rate variability, baroreceptor sensitivity, and microvolt T-wave alternans are all troubled by inadequate sensitivity and specificity for predicting events (or lack of events) in syncope patients when used in isolation. Whether these or other tests prove to be useful adjuncts to the emergency department evaluation of patients with syncope remains to be seen.

Although efficiency and accuracy of diagnosis are important, safety is clearly the most meaningful metric by which a specialized syncope evaluation should be measured. The high early mortality associated with cardiac syncope is at the core of the rationale for in-hospital evaluation. Indeed, the study conducted by Shen et al demonstrated no significant difference in actuarial survival at 2 years between the 2 groups, and no sudden deaths were reported. It is important to recognize, however, that this study was underpowered to detect even a 2-fold increase in mortality (eg, from 5% in the standard group to 10% in the syncope unit group). As such, the overall safety of this expedited syncope assessment cannot be reliably evaluated, although certainly the initial results are promising.

Despite the importance of Killip and Kimball’s landmark publication in 1967, not everyone was convinced of the effectiveness and necessity of the coronary care unit. Debate continued throughout the ensuing decade and led to improved diagnostic and treatment strategies as well as to the identification of “appropriate” patients who would benefit...
most from the specialized care. Similarly, Shen et al. have challenged the long-standing paradigm that patients with syncope at intermediate risk for adverse cardiovascular outcome should be hospitalized for evaluation. Although additional studies powered to evaluate appropriate safety end points should be performed, these study results offer the promise of a future with specialized, efficient, high-quality, cost-effective care for the intermediate-risk syncope patient.

References

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