

## Risk stratification of patients with syncope

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Syncope is a common symptom that is often ill defined. It has many causes, and the exact cause is often never known.<sup>1,2</sup> Syncope is usually a benign symptom, but can occasionally result in serious outcomes making the disposition of patients with syncope difficult. As a result, we undertook a multiphase study on nearly 1500 consecutive patients to prospectively derive and validate a set of risk factors that could help risk stratify patients.<sup>3,4</sup> We identified many risk factors in our derivation set and, using decision rule methodology, we came up with the 5 risk factors that best predicted short-term serious outcomes, called the San Francisco Syncope Rule (SFSR). Unfortunately, unlike other decision rules, we were not able to come up with a rule that was 100% sensitive with narrow confidence intervals that could be used to replace physician judgment. Thus, the rule cannot and should not be “strictly” applied without judgment; rather, it should be used as a risk stratification tool to augment physician judgment and improve clinical decision making.<sup>5</sup> It is unfortunate that the term “rule” tends to imply that it should be strictly enforced.

In this month’s issue of *CJEM*, Cosgriff and colleagues report on the performance of the rule in Australia.<sup>6</sup> I appreciate the efforts of the authors to prospectively validate the rule using our case definition for enrollment. Previous retrospective attempts using different case definitions for syncope yielded results discordant with our original work. The problems with retrospective enrollment are clear and are also illustrated in a subset of this study. During a patient interaction, some findings, such as a past history of congestive heart failure, shortness of breath or electrocardiogram (ECG) findings, may not be elicited or documented. It is problematic to assume that these variables were not present on a retrospective chart review because they were not elicited or documented. Further, ECG interpretation,

although explicitly defined in our work, is subjective and is a source of misclassification error. In Cosgriff and colleagues’ study, expert reviewers read the ECGs. This is not how the rule was developed or validated. It was unclear whether the reviewers were blinded to the patient and whether agreement was measured. Cosgriff and colleagues’ study is also very small and though most patients were prospectively enrolled, an unclear number of patients were retrospectively included; not all patients were followed and, as they stated in the limitations, this was not a consecutive cohort. One cannot help but wonder how the criteria were applied to the one 80-year-old patient with sick sinus syndrome that the rule apparently did not pick up. Were the criteria retrospectively applied for this patient? How were the ECG criteria applied? Was it truly normal? Regardless, it is irrelevant to debate the one patient this study may have missed. The rule is not infallible, and it is important to realize that owing to the small size, the 95% confidence intervals of the sensitivity and specificity are within the bounds of our original work; to infer otherwise is erroneous.

I believe that the most interesting finding in this study is the reported admission rate of 36%, which may be similar to other countries like Canada. In the United States, France and Italy, the admission rate is consistently reported in the 55%–60% range.<sup>3,4,7,8</sup> American physicians have also reportedly admitted 30% of syncope patients who they feel have less than a 2% risk of a serious outcome.<sup>9</sup> The inefficient use of hospitalization for this low-risk group accounts for a large portion of the estimated \$2 billion spent annually on syncope admissions in the United States.<sup>10</sup> We believe that the efficiency of admission can be improved through risk stratification of this low-risk group of patients. We previously found that although American physicians were very

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good at identifying low-risk patients, they did not trust their judgment and admitted a large number of these patients. In fact, our rule was not significantly better than physician judgment, just much better than their eventual decision making, which suggests that a rule to augment judgment may be beneficial.<sup>9</sup> It is no surprise that if “strictly” applied our rule would increase admission rates in Cosgriff and colleagues’ study, in which the admission was reported to be 36%.<sup>6</sup> It may not even be of value to identify low-risk patients to Australasian physicians who may already discharge low-risk patients and therefore do not need a rule to augment their decision making. That being said, physicians who discharge a large proportion of their patients may think twice before discharging patients at high risk (not all high-risk patients need admission, but they are 2.2 times more likely to have an adverse outcome) to avoid having them bounce back with an adverse outcome.<sup>5</sup>

The components of the SFSR are risk factors for serious outcomes in numerous other studies,<sup>11-14</sup> and we are confident in its performance in settings where it is prospectively applied on the right case definition. We have never claimed it was 100% sensitive and, as a result, we would never suggest it be used instead of physician judgment. Future research should determine what physicians do when they determine whether patients are high or low risk, and whether it affects their baseline judgment and the disposition rate that appears to vary greatly from country to country.

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