EDITOR'S PAGE

The Proliferation of Scoring Systems

Trying to Keep Our Heads Out of *The Clouds*

Valentin Fuster, MD, PhD

As many of you know, I record audio summaries and commentary for every original investigation and review article that appears in the *Journal*. As part of my preparation process, I thoroughly study each paper. After reading so many papers that focus on the numerous scoring systems available for cardiovascular clinicians, I started to think about Aristophanes' *The Clouds* (1), where he condemns the Ancient Greek philosophers for confusing students by presenting multiple, conflicting points of view and arguments. Thus, their philosophies cease to provide clarity but rather introduce additional noise and misunderstanding to Greek culture and education. In the play, Strepsiades even says: "How's an old man like me...to learn precise, hair-splitting arguments?" (1). I can relate when considering how seasoned clinicians could even begin to consider if and how these scoring systems should be introduced into the busy practices.

In general, most of us agree that the proliferation of scoring systems for cardiovascular disease—for both risk assessment and the inpatient setting—has reached a feverous pitch. Some have even reported that there are >100 different cardiovascular risk scores developed for use in the general population (2,3). Each week, more papers are published proposing variations to these scores, including new biomarker, genetic, and imaging information, as well as proposals for entirely new scores (2). The constant iterations make it very impractical for adopting them into practice. Even though they primarily use adverse events for risk stratification, these scoring systems claim to have significant predictive and prognostic implications for

the outcomes in multiple patient populations. How can only 1 score be appropriate, whereas the others are dismissed? Conversely, there are several scoring systems that have not changed at all in the past 10 to 20 years, which is equally disconcerting considering all the new data that are published each week. In general, when treating our patients, we shouldn't be too reactive to new trends, nor be unwilling to change our methods.

For example, a group of authors whom I respect and who are respected globally recently published a paper in *JACC* that adeptly demonstrated that clinicians have to assess the anatomy of the patient, as well as the clinical setting, with regard to the SYNTAX (Synergy Between Percutaneous Coronary Intervention With Taxus and Cardiac Surgery) II scores (4). Their findings may question what was found in the FREEDOM (Comparison of Two Treatments for Multivessel Coronary Artery Disease in Individuals With Diabetes) trial (5), wherein patients with diabetes benefited from coronary artery bypass surgery compared with medical therapy, regardless of the patient's SYNTAX score. Although the SYNTAX investigators have made important contributions to the field, the SYNTAX II score does not include diabetes among the prognostic considerations for risk. To imply that diabetes is unimportant in the predictive outcomes for these patients could leave room for question in the SYNTAX II score, as it is in conflict with prior meta-analyses (6,7).

Importantly, there are well established scoring systems that we use each day, such as the Framingham risk score and the EuroSCORE, which remain unwaveringly critical for cardiovascular clinicians. However, these tools were developed among thousands of patients over the course of 30+ years. The EuroSCORE, for example, was developed from

From the Zena and Michael A. Wiener Cardiovascular Institute, Icahn School of Medicine at Mount Sinai, New York, New York.

studying nearly 20,000 consecutive patients from 128 hospitals in 8 European countries, where the researchers collected information on 97 risk factors in all patients (8). Likewise, the Framingham risk score is built on data from patients who were recruited beginning in 1948, and has included multiple generations of these families in their cohorts (9). However, these scores are not just impressive due to their breadth and scope, but because they only add single variables every 5 to 10 years to ensure the accuracy of that new recommendation. Additionally, the CHA_2DS_2-VASc (Congestive Heart failure, Hypertension, Age ≥ 75 years, Diabetes, previous Stroke, Vascular disease, Age 65 to 74, and female Sex) score, which originated over the past 10 years from the $CHADS_2$ (Congestive heart failure, Hypertension, Age >75 years, Diabetes mellitus, Stroke) score, has methodically become a solid system as well. After careful consideration, the CHA_2DS_2-VASc score included some common stroke risk factors that the original score did not. These are examples of scores that will remain important to cardiovascular care delivery due to the methodic and careful nature of the researchers who developed them.

As I was recording audios for 2 recent papers with newer scoring systems—rightly or wrongly—2 thoughts came into my mind:

1. Are my colleagues actually using these rather weak, rapidly changing scores in their practices? Mostly, I doubt it.
2. Is the proliferation of these new scores evolving for the good of the authors—under the guise of "personalized or precision medicine"—rather than for the good of the patient? This remains an open question.

In conclusion, I return to Aristophanes' play *The Clouds,* wherein the author is concerned that the philosophers' inconsistent, theoretical approach to education will ultimately confuse students: "How can I study from below, that which is above?" (1). Cardiovascular medicine is not meant for those with their heads in the clouds. Clinicians and investigators, with their feet on the ground and their minds focused on patients, should rely on well-established, long-term tools—and to continue to work to perfect those, with due caution about what variables should be included or dismissed.

ADDRESS FOR CORRESPONDENCE: Dr. Valentin Fuster, Zena and Michael A. Wiener Cardiovascular Institute, Icahn School of Medicine at Mount Sinai, One Gustave L. Levy Place, New York, New York 10029. E-mail: valentin.fuster@mountsinai.org.

REFERENCES

1. Aristophanes. Clouds. In: Hickie WJ, translator. The Comedies of Aristophanes. London: Bohn, 1853.

2. Beck DL. Score! Tallying the risk and rewards of risk scoring. CardioSource WorldNews 2016;5:25–32.

3. Pell JP. Almanac 2012: cardiovascular risk scores. The national society journals present selected research that has driven recent advances in clinical cardiology. Heart 2012;98:1272–7.

4. Ikeno F, Brooks MM, Nakagawa K, et al. SYN-TAX score and long-term outcomes: the BARI-2D trial. J Am Coll Cardiol 2017;69:395–403.

5. Farkouh ME, Domanski M, Sleeper LA, et al. Strategies for multivessel revascularization in patients with diabetes. N Engl J Med 2012;367:2375–84.

6. Hlatky MA, Boothroyd DB, Bravata DM, et al. Coronary artery bypass surgery compared with percutaneous coronary interventions for multivessel disease: a collaborative analysis of individual patient data from ten randomised trials. Lancet 2009;373:1190–7.

7. Verma S, Farkouh ME, Yanagawa B, et al. Comparison of coronary artery bypass surgery and percutaneous coronary intervention in patients with diabetes: a meta-analysis of randomised controlled trials. Lancet Diabetes Endocrinol 2013; 1:317–28.

8. What Is Euroscore? Available at: http://www.euroscore.org/what_is_euroscore.htm. Accessed February 21, 2017.

9. National Heart, Lung, and Blood Institute. About the Framingham Heart Study. Available at: https://www.framinghamheartstudy.org/about-fhs/index.php/ Accessed February 21, 2017.