Rapid Emergency Medicine Score—Reinventing Prognostication in Emergency Care

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There is a great satisfaction in building good tools for other people to use.

–**Freeman Dyson**

In the era of predictive scoring systems utilized as an essential preventive safety-net to gauge outcomes; clinicians are experiencing a surge in the development, analysis, and implementation of prognostication tools in day-to-day clinical practice.

Emergency care unlike other patient fields is dynamic and unpredictable, considering the type of patient flow. Amid such volatile chaos and uncertain scenarios in ER, the clinician is responsible to meticulously triage and manage medical–surgical emergencies. The purpose of prognostication tools is to assist the clinicians to sieve, prioritize patients, and optimize necessary care approaches. The clinicians should be able to "do most for most" and simultaneously be able to identify and treat the "greatest threat to life," while evaluating the expected patient outcomes beyond emergency care as a follow-up. Such scenarios demand the use of validated prognostication tools to predict the outcomes from the most readily measured and available data, thus negating delay and complexity of tool application which is a common deterrent for the clinicians embarking on such tools.

With the advent of such a requirement, was the development of rapid emergency medicine score (REMS) system involving variables, including blood pressure, respiratory rate, pulse rate, and Glasgow coma scale [which encompassed—rapid acute physiology score (RAPS)], and additionally extending its paradigm to cover peripheral oxygen saturation and patient age, to arrive at a calculated score to predict the length of stay (LOS), mortality rate, etc., for the patients arriving at ER.

Literature review analysis resonated the findings which pointed that for every unit increase in REMS system, the duration of hospitalization and mortality was increased by 12% and 3%, respectively. Conversely, in the same study, 12% and 22% decrease in the duration of hospitalization and mortality was noted for every unit increase in SpO_2 and GCS levels, respectively, all of which corroborated REMS system as an effective predictive scale in predicting mortality and the duration of hospitalization in non-surgical ER patients.[1]

Literature analysis on REMS system reflected that REMS (AROCC 0.74; 95% CI 0.70–0.78) was found to be superior to RAPS (AROCC 0.64; 95% CI 0.59–0.69) as a predictor of in-hospital mortality. Although all the variables, except blood pressure, were associated with mortality, multivariate analysis showed that only age (odds ratio 1.74, $p < 0.001$), GCS (2.10, $p < 0.001$), and oxygen saturation (OR 1.36, $p = 0.01$) were independent predictors.[2,3]

A comparative study on REMS system and Worthing Physiological Scoring (WPS) system to gauge predictive impact for in-hospital mortality in non-surgical ER patients revealed a 30 %

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increase of 30-day mortality for each additional REMS unit (HR: 1.28; 95 % confidence interval (CI): 1.23–1.34) and a 60 % increase of 30-day mortality for each additional WPS unit (HR: 1.6; 95% CI: 1.5–1.7). The study inferred that AUC of the REMS was 0.71 (95 % CI: 0.67–0.76) which was significantly lower than that of the WPS (0.80; 95% CI: 0.76–0.83), concluding WPS system to have a better prognostic performance as compared to REMS system.[4]

Another interesting comparative analysis of ER scoring system including REMS, RAPS, and modified early warning score (MEWS) systems for sensitivity, specificity, and accuracy highlighted REMS system to be superior to RAPS and MEWS, namely 92.1% as compared to 89.3%, and 90.9% respectively.[5]

A good prognostic tool in the ER should be reliable, simple validated, and user-friendly, so that it does not complicate the working of an already overstretched emergency physician. The way forward would be to merge the REMS with the new early warning score (NEWS) by virtue of the inclusion of SpO_2, in assessment, triage, and prognosis of the COVID-19 pandemic menace.

The purpose of thinking about the future is not to predict it but to raise people's hopes.

–Freeman Dyson

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