A Good Workman Never Blames His Tools: Appropriate Use of Severity of Illness Scoring Systems Determines Their Utility!

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Abstract

Scoring systems in intensive care units allow assessment of the severity of disease and predicting mortality. They also help in allocation of resources and benchmarking performance when compared to other units and hence to development of skills within a unit. Their use needs to go beyond just mortality prediction and unit statistics. The data collected are useful for resource allocation, unit audits, comparison with local units as well as for quality improvement programs and education.

Keywords: PELOD 2, PICU mortality, Quality improvement.

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Scoring systems in the intensive care units (ICUs) allow assessment of the severity of disease and predicting mortality. They also help in allocation of resources and benchmarking performance when compared to other units and hence to development of skills within a unit. Several scores are used with good correlation and validity. The choice often lies in ease of calculation and applicability and the number of parameters required for the scoring system. Geographical preferences also play a role. The pediatric logistic organ dysfunction scoring system (PELOD) score was developed in France in 1999[1] and updated to PELOD 2 in 2013 by the original authors[2] and is popular there, and the Pediatric Index of Mortality2 (PIM2)[3] was devised by Shann's group in Australia and is used in that subcontinent. Pediatric risk of mortality (PRISM) III[4] is probably the most cumbersome but widely used, especially in the American subcontinent.

It is highly unlikely that today a child will die in a pediatric ICU (PICU) without ventilation or inotropes and usually with both. Hence to say that intubated patients have a higher mortality is really irrelevant. What is more startling is the high mortality (17/23 i.e., 74%) reported by Deshmukh et al. in this issue of the journal.[5] This appears far too high by any standard. As ventilation itself gives a high score on the PELOD, these children would certainly have a higher score.

"Hematological illness had highest mortality" is a loose statement the authors make, as hematalogical could mean anything

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from a deranged coagulation profile to a background leukemia. They also describe the mortality associated with various systems. This would be a subanalysis of the group and not a commentary on the PELOD system itself.

All scoring systems correlate higher values with morbidity and mortality and that is the very premise on which they are devised, as the worse the values of any parameter, the higher the score value attached. So, it is disingenuous to conclude that "Mortality rate increases with increase in PELOD 2 score i.e., higher the PELOD 2 score, higher the mortality."[5] This is exactly what the scoring system is designed to tell you.

Table 1: Various scores calculated on admission to PICU[6]

	Outcome	Mean	SD	95% CI	p value	AUC
PRISM III	Died	12.9	±9.27	10.55–15.24	p < 0.0001	0.751
	Survived	5.73	±4.86	5.00–6.46		
PIM2	Died	0.22	±0.29	0.15–0.3	p < 0.0001	0.747
	Survived	0.06	±0.10	0.04–0.07		
PEMOD	Died	7.05	±3.88	6.07–8.03	p < 0.0001	0.732
	Survived	4.13	±2.82	3.70–4.55		
PELOD	Died	15.17	±14.25	11.56–18.77	p < 0.0001	0.762
	Survived	4.96	±8.31	3.71–6.20		
SOFA	Died	10.55	±4.50	9.41–11.69	p < 0.0001	0.765
	Survived	6.34	±3.47	5.82–6.86		

AUC, area under the curve; PELOD, pediatric logistic organ dysfunction scoring system; PEMOD, pediatric multiple organ dysfunction scoring system; PIM2, revised pediatric index of mortality score; PRISM III, pediatric risk of mortality score; SOFA, sepsis-related organ failure assessment; TISS, therapeutic intervention scoring system

In this comparison of five scoring systems[6] (Table 1), where score for each patient was calculated on all scoring systems, it was seen that there was very good correlation among all different systems used. Hence, it probably matters very little what system is used in a unit. What matters is how its interpreted and what the unit does with the data.

Using it as a quality improvement tool internally or by comparing its data with that of similar units nationally and internationally would be important. Predicting mortality as an end point in itself has very little meaning. We neither counsel the family based on the score and nor should we allow the score to guide our attitude toward further management lest a poor prognostic score should lead to a laxity in attitude and a self-fulfilling prophesy. This study would therefore have had greater meaning had it defined to what purpose the scoring was being done, as simple validation of the PELOD 2 score adds no new finding to the literature.

In conclusion, in PICUs in India, we should use standard scoring systems and preferably we should, as a body, agree upon one system so that we can pool and compare data and use the data for research and quality improvement.

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