International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 9, September 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.9.2024.107

Original Research

SOFA score to predict outcome in critically ill patients

Dr. Nitin Rathi

Associate Professor, Department of TB & Chest, Santosh Medical College, Ghaziabad, U.P, India

Corresponding Author
Dr. Nitin Rathi
Associate Professor, Department of TB & Chest, Santosh Medical College, Ghaziabad, U.P, India

Received Date: 14 July, 2024 Accepted Date: 20 August, 2024

ABSTRACT

Background: For improved management, outcome prediction is crucial in both clinical and administrative intensive care units (ICUs). The present study assessed SOFA score to predicting outcome in critically ill patients.

Materials & Methods:95 critically ill patients of both genders were enrolled. At the time of admission and every 48 hours until release, the SOFA score was recorded. The lowest values for each parameter over the 24-hour period were used to calculate the score.

Results: Out of 95 patients, 52 were males and 43 were females. Type of admission was medical in 60 and surgical in 35. The difference was significant (P< 0.05). The mean SOFA score correlated most closely with mortality followed by the highest score and the initial score (P< 0.01).

Conclusion: For critically ill patients in intensive care units, the mean and highest SOFA values are especially helpful indicators of outcome.

Key words: Critical ill, Predictor, SOFA

Introduction

For improved management, outcome prediction is crucial in both clinical and administrative intensive care units (ICUs).[1] It is necessary to compare the performance of ICUs and use the performance of each ICU as a predictor of ICU performance.[2] Additionally, outcome prediction can help guide resource allocation and treatment decision-making by providing family of critically ill patients with information on expected patient outcomes.[3,4]

Acute physiology and chronic health evaluation (APACHE), simplified acute physiology score (SAPS), and mortality probability models (MPM) are a few examples of outcome prediction models that make predictions based on data collected during the first 24 hours of an intensive care unit stay.[5]

The majority of ICU patients have organ dysfunction, which increases morbidity and mortality. Organ failure scores, such the sequential organ failure assessment (SOFA) scoring system, have been introduced and are helpful in assessing morbidity and identifying organ dysfunction or failure over time.[6]The present study assessed SOFA score to predicting outcome in critically ill patients.

Materials &Methods

The present study was conducted among 95 critically ill patients of both genders. The written consent was obtained from family members/relatives.

Clinical and laboratory results, as well as the patient's details, were documented. At the time of admission and every 48 hours until release, the SOFA score was recorded. The lowest values for each parameter over the 24-hour period were used to calculate the score. The mean of the sum of the outcomes right before and after the missing value was used to determine a replacement for a single missing value. The Glasgow Coma Score Scale was used to evaluate the neurological condition. The mean score was the ratio of the total score to the length of stay (LOS) in the intensive care unit, and the total SOFA was the sum of all daily SOFA values during the stay. Also noted is the highest SOFA score. Results were subjected to analysis.

P value less than 0.05 was considered significant.

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Results

Table: I Baseline parameters

Characteristics	Variables	Number	P value
Gender	Male	52	0.75
	Female	43	
Admission type	Medical	60	0.01
	Surgical	35	

Table I, graph I shows that out of 95 patients, 52 were males and 43 were females. Type of admission was medical in 60 and surgical in 35. The difference was significant (P< 0.05).

Graph: I Baseline parameters

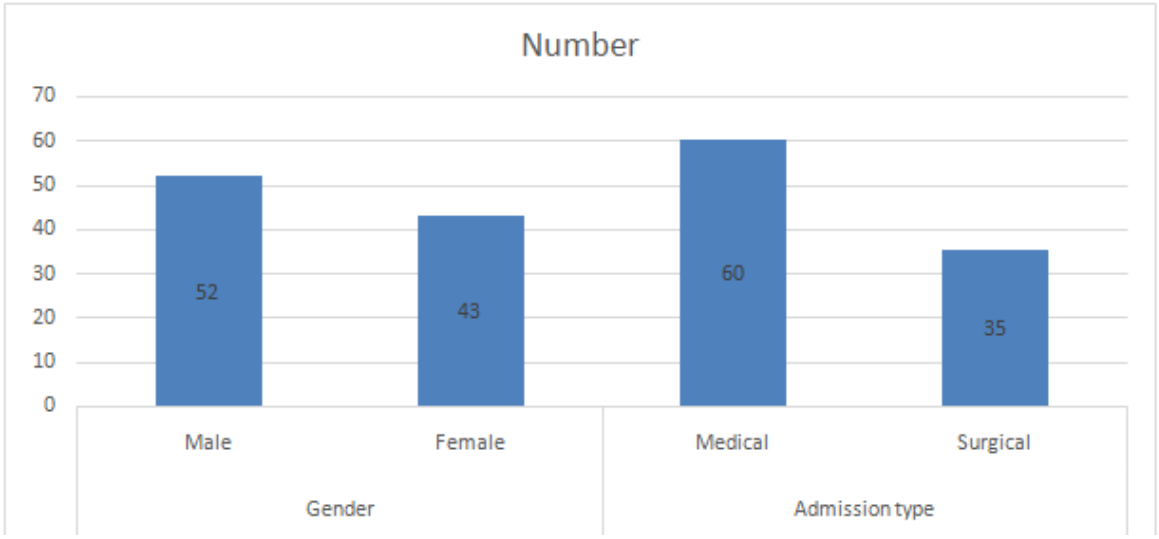

Table: II Univariate Logistic Regression Analysis of Length of Stay and (SOFA) Derived Parameters as Predictors of Mortality

Variables	Coefficient	Odd ratio	P value
Mean SOFA score	1.17	3.02	0.01
Highest SOFA score	0.43	1.63	0.04
Initial SOFA score	1.32	1.49	0.03
SOFA score at 48 hours	1.34	1.42	0.05
SOFA score at 96 hours	0.36	1.45	0.02
Length of stay	0.07	1.02	0.01
Total SOFA score	0.04	1.08	0.01

Table III shows that the mean SOFA score correlated most closely with mortality followed by the highest score and the initial score (P< 0.01).

Discussion

Many crucial aspects must be taken into consideration when creating a scoring system, like SOFA, for identifying and tracking organ dysfunction.[7] Organ failure is a continuum of changes in organ function from normal function rather than an all-or-nothing situation. Organ dysfunction has been shown to be dynamic.[8] A scoring system must be able to account for the reality that it will change over time.[9,10] Compared to traditional outcome prediction models at the time of ICU admission, the ability to perform serial SOFA scores allows for a more effective portrayal of the dynamics of illness, including the impact of therapy. Even though the APACHE II score has been utilized by various researchers over the years.[11]The present study assessed SOFA score to predicting outcome in critically ill patients.

We found that out of 95 patients, 52 were males and 43 were females. Type of admission was medical in 60 and surgical in 35. Ferrieraet al[12] examined 352 consecutive patients who had been in the intensive care unit (ICU) for longer than 24 hours. The SOFA score was determined for each patient upon admission and every

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48 hours until they were discharged. There was a strong correlation between mortality and the first, highest, and mean SOFA values. Mortality of over 80% was associated with initial and maximum scores of over 11 or mean scores of over 5. The length of ICU stay has no bearing on the mean score's predictive value. The largest link with mortality in univariate analysis was seen between mean and highest SOFA levels, followed by Δ-SOFA and starting SOFA scores. For the highest scores, the receiver operating characteristic curve's area under the curve was the biggest. Regardless of the starting score, the mortality rate was less than 27% when the score dropped, 27% to 35% when it stayed the same, and at least 50% when it rose when the SOFA score varied during the course of the first 96 hours. In the first 48 hours, differences in mortality were more accurately predicted than in the next 48 hours. The duration of stay did not differ significantly between these groups. A decreasing score during the first 48 hours was linked to a mortality rate of less than 6%, while an unchanged or increasing score was linked to a mortality rate of 37% when the initial score was 2 to 7 and 60% when the initial score was 8 to 11, with the exception of initial scores of more than 11 (mortality rate >90%).

We observed that the mean SOFA score correlated most closely with mortality followed by the highest score and the initial score ($P< 0.01$). Jain et al[13]determined the accuracy of sequential organ failure assessment (SOFA) score in predicting outcome of patients in Intensive Care Unit (ICU).Forty-four consecutive patients between 15 and 80 years admitted to ICU over 8 weeks period were studied prospectively. Three patients were excluded. SOFA score was determined 24 h postadmission to ICU and subsequently every 48 h for the first 10 days. Patients were followed till discharge/death/transfer from the ICU. Initial SOFA score, highest and mean SOFA scores were calculated and correlated with mortality and duration of stay in ICU.The mortality rate was 39% and the mean duration of stay in the ICU was 9 days. The maximum score in survivors (3.92 ± 2.17) was significantly lower than nonsurvivors (8.9 ± 3.45). The initial SOFA score had a strong statistical correlation with mortality. Cardiovascular score on day 1 and 3, respiratory score on day 7, and coagulation profile on day 3 correlated significantly with the outcome. Duration of the stay did not correlate with the survival ($P = 0.461$).

It is crucial to understand that the SOFA score describes a series of difficulties in critically ill patients rather than forecasting an outcome. The SOFA is not only intended to characterize organ dysfunction or failure based on mortality, even if any evaluation of morbidity must be something connected to mortality. Therefore, the SOFA score enhances rather than replaces the current severity measures.[14]Although there has been a recent trend to reevaluate severity indices in order to assess the disease's progression over time, their primary purpose was to assess the probability of mortality from an initial assessment. Most significantly, the severity indices now in use do not permit assessing each organ's function independently.

Conclusion

Authors found thatfor critically ill patients in intensive care units, the mean and highest SOFA values are especially helpful indicators of outcome.

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