SHOCK INDEX VS GLASGOW COMA SCALE: COMPARISON BETWEEN TWO CLINICAL METRICS AS PREDICTORS OF NEED FOR INTENSIVE CARE (ICU) IN THE ADMISSION OF TRAUMA VICTIMS

ÍNDICE DE CHOQUE VERSUS ESCALA DE COMA DE GLASGOW: COMPARAÇÃO ENTRE DUAS MÉTRICAS CLÍNICAS COMO PREDITORAS DA NECESSIDADE DE TERAPIA INTENSIVA (UTI) NA ADMISSÃO DE VÍTIMAS DE TRAUMA

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ABSTRACT: Predicting the severity of admitted patients and the need for ICU admission is a frequent issue in a hospital to better allocate human and material resources. The objective of this study was to compare the shock index (SI) criterion) as a predictor of severity in relation to the Glasgow Coma
Scale. The studied sample consisted of 47 trauma victims and compares the outcome with or without the need for ICU admission. It was observed that despite the measurable increase in shock index means, there was no statistical significance with the outcome (p = 0.3992). On the other hand, there was a strong association between the drop in the ECG and the ICU outcome (p <0.0001). Considering 1.2 as the most recent SI cutoff point, sensitivity drops to 22.2%, but specificity rises to 97.4%. In conclusion, it is possible to conclude that the ECG is a better predictor of the need for intensive care than the SI. However, with a larger sample in future research, it may be possible to infer a more reliable cutoff point for CI.

**KEYWORDS:** Glasgow Coma Scale, Shock Index, ICU, Admission.

**1. Introduction**

The Shock Index (CI) is a relatively new tool for assessing accident victims. It is defined as the ratio of heart rate (HR) to systolic blood pressure...
(SBP). The normal CI range being 0.5-0.7 and a CI > 0.9 was associated with higher mortality. Also called the shock index (SI), it is a severity predictor widely used in the trauma sector, with controversial scientific validation and scarce literature. This tool has been studied as an alternative prognosis to the simple analysis of traditional vital signs in states and subgroups of patients with specific diseases.

On the other hand, the Glasgow Coma Scale (GCS), published for the first time in 1974², is a tool widely used worldwide in the admission of patients to any secondary or tertiary service, being a predictor of the need for intensive care, in addition to having international protocols already well established to define behaviors in emergency rooms. However, the Glasgow Coma Scale is an examiner-dependent form of assessment that connects the context of the patient's severity to the clinical analysis of the medical evaluator present at the scene, which may vary depending on experience or subjective forms of assessment. The shock index, on the other hand, is a more simplified metric, with qualitative criteria obtained by direct monitoring of the patient, which can make it a more objective criterion and with less conduct bias.

The present study aims to encourage new research on these predictors of clinical severity, in order to establish criteria and better demarcations of when and where to use such methods in the future. In this way, to optimize the allocation of hospital resources, and create greater predictability for future interventions based on previous clinical data.

2. Objectives

The main objective of this study was to determine the probability of admission of trauma patients to the ICU during hospitalization in order to delineate a possible new predictor of severity. Thus, the Shock Index (CI) and the Glasgow Coma Scale (GCS) were compared on the admission of
trauma victims as predictors of the need for an Intensive Care Unit (ICU) during hospitalization.

3. Methods

This was a prospective cohort study that analyzed data from trauma victims admitted to the Emergency Room of the Hospital de Clínicas of the Federal University of Triângulo Mineiro (PS-HC-UFTM). Data were collected between the end of September 2020 and the beginning of June 2021. To avoid bias, patients who had been intubated before admission were excluded, in order to avoid a biased analysis of the ECG. During patient admission, data on systolic blood pressure and heart rate were collected using standardized digital monitors in order to calculate the CI. The ECG was established by the general surgeon on duty and the preceptor in charge. Soon after, he was monitored via electronic medical record to determine the outcome that would be the need or not for admission to the intensive care unit. The study was previously approved by the Research Ethics Committee of the HC-UFTM under opinion nº 3,189,909. Data were plotted and analyzed using the GraphPad Prism 8.0 program. Results with p<0.05 were considered statistically significant.

4. Results

The data obtained in the final survey were from 47 trauma victims admitted to the UFTM HC. Among them, 38 (80.9%) did not progress to ICU admission during hospitalization. Another 9 (19.1%) required intensive care.

Considering the specificities of the patients, they are mostly male (n=38; 86.3%), with a mean age of 38.3 years, victims of traffic accidents (n=32; 72.3%) and half being multiple trauma patients (n=24; 51.1%).
In the group that did not progress to ICU admission, an average CI of 0.75 on admission and an average GCS of 14.13 were observed. In the group that went to the ICU, the CI on admission was, on average, 0.83 and the ECG was, on average, 7.67. It was observed that despite the measurable increase in means, there was no statistical significance between CI elevation and the ICU outcome \((p = 0.3992)\). On the other hand, there was a strong association between the drop in the ECG and the ICU outcome \((p <0.0001)\).

Furthermore, considering the traditional CI cutoff\(^1\) of 0.7, the sensitivity as a predictor of UTI was 66.7% and the specificity 50%. Considering 1.2 as the most recent CI cutoff point, sensitivity drops to 22.2%, but specificity rises to 97.4%. On the other hand, considering the GCS less than or equal to eight, the cutoff point considered for critically ill patients, sensitivity is located at 66.7% and specificity at 97.4%.

5. Conclusions

Therefore the ECG is considered more reliable than the CI as a predictor of the need for intensive treatment. We can clearly perceive this perspective by the statistical association, as well as considering these parameters as diagnostic tests, in which the ECG was superior to the CI in both.

On the other hand, it can be seen that there is a good relation between the severity of the clinical picture and the need for intensive care when the cut-off point is changed. Thus, it is possible to infer that there may be a new cutoff point with more adequate sensitivity and specificity between 0.7 and 1.2 to be evaluated in a survey with a more robust and stratified sample of patients.

In conclusion, the CI is not yet well established as a predictor of severity, but there are indications that it may become so in the future, with cutoff points with better support, and help emergency physicians to take
more rapid and assertive actions, in addition to creating a less subjective criterion of severity predictor.
References


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