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ORIGINAL ARTICLE

Shock index (SI) of patients with physical restraint (hand fixation) in patients with intensive care

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Abstract

Objective: Critically ill patients may experience a state of shock. Patients with critical conditions may experience agitation and also the need for an immobilization measure. Fixation or Restraint actions are carried out so that nursing and medical actions can be carried out and the aim is to improve the condition immediately. The purpose of this study was to look at the Shock Index (SI) in patients with physical restraint (hand fixation) in intensive care.

Materials and methods: The research method uses an Observational Description design. The population is patients who receive physical fixation interventions or physical restraint in the inpatient room at the Kediri Baptist Hospital. The study was conducted from June to July 2022. The sample size was 54 patients, using a purposive sampling technique with inclusion criteria namely total care patients, patients receiving restrain and having a RASS value > +1, patient exclusion i.e. patients receiving treatment less than twice 24 o'clock. The research variable is the shock index.

Results: The results showed that most of the respondents were female (64.8%) and male (35.2%). While the majority of respondents are over 60 years old (48.1%). Most of the respondents did not experience shock (70.4%) while those who experienced shock (29.6%). The results showed that there was no significant difference in terms of the index of shock in the control group and the experimental group (p=0.074).

Conclusions: There was no difference in the shock index in the experimental group and the control group in patients who were given restraint, so further research is needed regarding the factors that affect shck conditions in critical patients.

Keywords: Hand fixation, intensive care unit, physical restraint, shock index.

Introduction

Shock Index (SI) is a ratio combination of the two components Heart Rate (HR) and SBP, which is a comprehensive physiological variable that can be used to measure changes in physiological compensatory mechanisms in maintaining blood pressure from decreased circulating volume, stroke volume, and cardiac output. Clinical manifestations of shock begin with a decrease in stroke volume (stroke volume) caused by reduced preload, increased afterload, or impaired contraction and heart rate. In the pediatric population, stroke volume is usually expressed as an index value to body surface area, namely the stroke volume index. Tachycardia and peripheral vasoconstriction are compensatory mechanisms to maintain circulation, tissue perfusion and blood pressure (1,2). If shock is prolonged without proper treatment, compensatory mechanisms will fail to maintain adequate cardiac output and stroke volume, resulting in impaired circulation/tissue perfusion, hypotension, and organ failure. In these circumstances the patient's condition is very bad and the mortality rate is very high (3,4).

Early treatment of shock begins with rapid fluid resuscitation to improve tissue perfusion and oxygenation. The slower the shock is resolved, the worse the patient's prognosis. The success of fluid resuscitation can be seen in the patient's more stable condition, normal heart rate, and there is an increase in cardiac output and stroke volume (4,5). If shock continues, then other hemodynamic supporting drugs (vasopressors / inotropes) need to be given (6,7). Hemodynamic monitoring in shock patients is very important to determine the corrective action as soon as possible according to the current conditions. However, this is very difficult to do so a hemodynamic monitoring device is needed which can be invasive or non-invasive. Invasive hemodynamic monitoring, for example with moderate PATD (pulmonary artery thermodilution), which includes non-invasive, such as with USCOM (ultrasound cardiac output monitoring). Non-invasive hemodynamic monitoring is preferred in the management of shock in children.

Based on the pathophysiology of shock and hemodynamic changes, the ratio of heart rate to systolic blood pressure, which is known as the shock index, is negatively correlated with the degree of shock, which increases according to the severity of shock and decreases with improved circulation after fluid resuscitation (8). Shock index measurement is very simple, objective, and easy to do. Various studies in adults support the use of the shock index in assessing the severity of shock and the effectiveness of shock management. However, until now there has been no research regarding the use of the shock index in children/neonates who experience circulatory failure, especially in relation to changes in the stroke volume index (9).

Materials and methods

This study uses a quasi-experimental design. The population is patients who receive physical fixation interventions or physical restraint in the inpatient room at the Kediri Baptist Hospital. The study was conducted from June to July 2022. The sample size was 54 patients, using a purposive sampling technique with inclusion criteria, namely total care patients, patients receiving restrain and having a RASS value > +1, patient exclusion, namely patients receiving treatment less than twice 24 o'clock. Respondents were divided into two groups, namely the experimental group and the control group. The experimental group consisted of 27 respondents and the control group consisted of 27 respondents. Independent Variables are and Dependent Variables are EWS and SI. This research has obtained ethical clearance with No 047/13/EC/KEPK-3/STIKES RSBK/2022 from the Health Research Ethics Commission STIKES Baptist Hospital Kediri on June 13 2022. Informed consent was obtained from the patients.

Statistical analysis

SPSS-15 software (SPSS Inc., Chicago, Illinois, USA) was used for all statistical analyses. According to whether the distribution is normal or not, the mean value and standard deviation or median value and minimum and maximum values are used in numerical data. Frequency and percentage values were used for categorical data. The Mann-whitney test was used for compare the values.

Results

Based on Table 1 shows that most respondents are female (64.8%) and male (35.2%). While the majority of respondents are over 60 years old (48.1%). Most of the respondents did not experience shock (70.4%) while those who experienced shock (29.6%). The results showed that there was no significant difference in index shock in the control group and the experimental group (p=0.074).

Table 1: Frequency distribution and research statistical test

Variable	Frequency	Percent	Z value	P Value
Gender				
Male	19	35,2	-0.282	0.778
Female	35	64.8		
Age				
41-50 years	10	18,5	-0.263	0.792
51-60 years	18	33,3		
>60 years	26	48,1		
Occupation				
Civil servants	6	11,1		
Employee	15	27,8	-1.966	0.049
Entrepreneur	13	24,1		
Not Working	20	37		
Shock Index				
<0.7 (Normal)	38	70,4	-1.181	0.074
>0.7 (Shock)	16	29,6		

Discussion

Based on the research, the results showed that there was no significant difference in index shock in the control and experimental groups (p=0.074) and many respondents were female (64.8%) and male (35.2%). While the majority of respondents are over 60 years old (48.1%). Most of the respondents did not experience shock (70.4%) while those who experienced shock (29.6%). Shock Index and Modified Shock Index are non-invasive parameters that can be used in monitoring the patient's hemodynamic status to assess clinical outcomes and predict mortality in emergency department patients, so that they can assist management in a timely manner, especially in the implementation of triage in the emergency department.

This study aims to determine the use of the Shock Index and Modified Shock Index parameters in predicting the clinical outcomes of emergency department patients, to know the comparison of the use of the Shock Index parameter. Restraints are actions taken by health workers only during an emergency. Restraint measures are carried out if there is a patient who is at risk of endangering himself or others. Usually this action is carried out directly against individuals, without asking permission for prior approval of the procedure in order to limit the space for the individual's movements (10–12). This restraint action uses physical force which can come from human power, mechanical devices, or a combination of the two. However, it should be noted that the installation of restraints also has a negative impact that has a major impact on the patient, both physically and psychologically if the installation is done incorrectly. The physical effects that can occur after installing restraints are feeling unwell, aches, swelling, and blisters. SI is a value obtained from a simple calculation of Heart Rate (HR) divided by blood pressure Systolic Blood Pressure (SBP), used to evaluate hemodynamic stability of acute patients. Increased SI indicates decreased left ventricular output, if this continues it can cause mortality (13,14). A number of studies have revealed the benefits of using SI in assessing clinical outcomes and predicting mortality in trauma patients, predicting mortality in pneumonia, predicting ruptured ectopic pregnancy, categorizing pulmonary embolism patients, and predicting prognosis in acute myocardial infarction.

Conclusions

Based on the results of the study it was found that the results showed that there was no significant difference in the index of shock in the control group and the experimental group, and also in patients with restraint there were patients who experienced shock. Further research needs to identify the shock instruments needed in nursing care in inpatient rooms.

Conflict of interest:

The authors report no conflict of interest.

Funding source:

No funding was required.

Ethical approval:

This research has obtained ethical clearance with No 047/13/EC/KEPK-3/STIKES RSBK/2022 from the Health Research Ethics Commission STIKES Baptist Hospital Kediri on June 13 2022. Informed consent was obtained from the patients.

Contributions

Research concept and design: **HS**
Data analysis and interpretation: **SK**
Collection and/or assembly of data: **HS, SK**
Writing the article: **HS, SK**
Critical revision of the article: **HS, SK**
Final approval of the article: **HS, SK**

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