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RESEARCH

ACUTE CORONARY SYNDROME IN GERIATRIC PATIENTS IN AN INTENSIVE CARE UNIT

Abstract

Objective: The advancing age of acute coronary syndrome and the ageing population are leading to an increase in the number of elderly patients with acute coronary syndrome in our clinical practice.

In our study, we aimed to investigate the effect of acute coronary syndrome in the geriatric patient group.

Materials and Method: We retrospectively included geriatric patients who were in intensive care units because of different diagnoses, who also showed an acute coronary syndrome, and who had been diagnosed using the sequential organ failure assessment score. This score is used to describe the condition of a patient with sepsis and the extent of organ damage during treatment in an intensive care unit. We reviewed patients who were at Baskent University Faculty of Medicine between 25 March 2015 and 12 March 2020.

Results: We included 63 patients aged 77.27±7.65 years. There were 40 (63.5%) males and 23 (36.5%) females. A total of 42 (89.4%) patients died in the first 5 months, one (2.1%) died between the 6th and 10th months, two (4.3%) between the 11th and 20th months, and two (4.3%) between the 21st and 30th months. We found a significant relationship between the sequential organ failure assessment score and mortality rate ($p<0.05$). The sequential organ failure assessment score was reliable in predicting mortality in geriatric patients with acute coronary syndrome, with 57% sensitivity and 75% specificity.

Conclusion: Mortality of geriatric patients with acute coronary syndrome can be significantly determined using the sequential organ failure assessment scores.

Keywords: Geriatrics; Acute coronary syndrome; Intensive Care Units; Mortality.

INTRODUCTION

A simple but effective method for describing organ dysfunction or organ failure in critically ill patients is the sequential organ failure assessment (SOFA) score. The SOFA score was designed to provide insights into the acute morbidity of intensive care patients at the population level, but its use has expanded considerably in recent years. The SOFA score is now used at the individual patient level as a key criterion for diagnosing sepsis syndrome (1-4). Due to good medical treatment, the age of the population is increasing, which implies that acute coronary syndrome is now more common in geriatric patients (5).

Despite improvements in patient care and advanced treatment modalities, mortality remains a significant problem in geriatric patients. Elderly patients have a high risk of bleeding (6,7) and ischemic complications (8), among other conditions. For this reason, careful risk stratification for ischemic risk and bleeding risk must be carried out, taking into account the assessment of frailty, quality of life, care goals, and individual preferences (9). With the help of the SOFA score, we aimed to identify the survival of elderly patients with acute coronary syndrome who were treated in the intensive care unit of our clinic.

MATERIALS AND METHOD

We retrospectively included geriatric patients who were in the intensive care unit because of different diagnoses and who also showed an acute coronary syndrome at Baskent University Faculty of Medicine between 25 March 2015 and 12 March 2020.

We analysed the demographic, clinical and biochemical data of these patients. We also applied the SOFA score to the patients. The sequential organ failure assessment score (SOFA score) is used to monitor a person's condition or failure rate to determine the extent of organ function during a person's stay in the intensive care unit (ICU). The score is based on six different scores, each for the respiratory, cardiovascular, liver, coagulation, kidney, and neurological systems. The SOFA score helps healthcare providers estimate the risk of morbidity and mortality from sepsis.

Statistics

We examined various demographic and clinical factors, including age, sex, age, coronary artery disease, hyperlipidaemia, diabetes, hypertension, and this was followed by a ROC curve and Fisher's Exact Test analysis to determine the independent predictors of mortality.

This study was approved by Baskent University Institutional Review Board (Project no: KA21/23) and supported by Baskent University Research Fund.

RESULTS

We included 63 patients aged 77.27±7.65 years. There were 40 (63.5%) males and 23 (36.5%) females. The demographic and clinical properties of the study population are presented in Table 1. A total of 47 (75.0%) patients died at a mean follow-up duration of 3.0±7.0 (range 0–30) months. Thirty-two (68.1%) of these patients died in the hospital, while 15 (31.9%) died outside the hospital.

In the first 5 months, 42 (89.4%) patients died, whereas one (2.1%) patient died in the 6th to 10th month (2.1%), two (4.3%) between the 11th and 20th month, and two (4.3%) between the 21th and 30th months.

The cut-off value was determined as 6.5 in the diagnosis of individuals with low and high SOFA. Based on this, we examined patients in two groups (SOFA low and SOFA high). For the cut-off value of SOFA of 6.5, the sensitivity value was 0.76.

In our study, we found a significant relationship between SOFA score and mortality rate ($p < 0.05$). The SOFA score was reliable for predicting mortality in geriatric patients with acute coronary syndrome, with 57% sensitivity and 75% specificity.

Table 1. Demographic and clinical properties of the study population

Characteristic	Results
Sex (Male,%)	63.5%
Age (years, mean ± SD)	77.27 ± 7.65
Time to death (month, mean ± SD)	3.0±7.0 mean±SD
Death (%)	
- Total %	47 (75%)
- In hospital %	32 (68.1%)
- Outside the hospital %	15 (31.9%)
Coronary artery disease (n,%)	28 (44.4 %)
HT (n,%)	45 (71.4%)
HL (n,%)	21 (33.3%)
DM (n,%)	22 (34.9%)
Smoker (n,%)	8 (12.7%)

We also found that there was no significant relationship between SOFA score and troponin values (p >0.05). ROC analysis was performed to compare the diagnosing predictability of SOFA score and troponin values obtained as metric. According to ROC analysis, the usefulness of troponin values in distinguishing between individuals with low and high SOFA was not found to be significant (area under the curve = 0.529 p = 0.710), as shown in Figure 2.

Sensitivity value was set as the rate of accurately diagnosing individuals in the low-SOFA group based on troponin measurement. Similarly, the specificity value was set as the rate at which individuals in the high-SOFA group can be correctly diagnosed. The cut-off value of troponin values in the diagnosis of individuals with low and high SOFA was 1.30. At this cut-off value, the sensitivity of troponin was 0.71. Thus, the diagnosing rate of individuals

Figure 1. The SOFA score sensitivity and specificity.

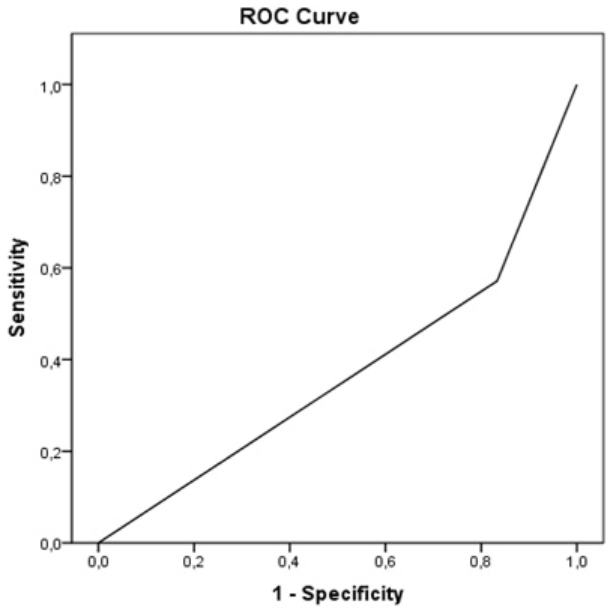
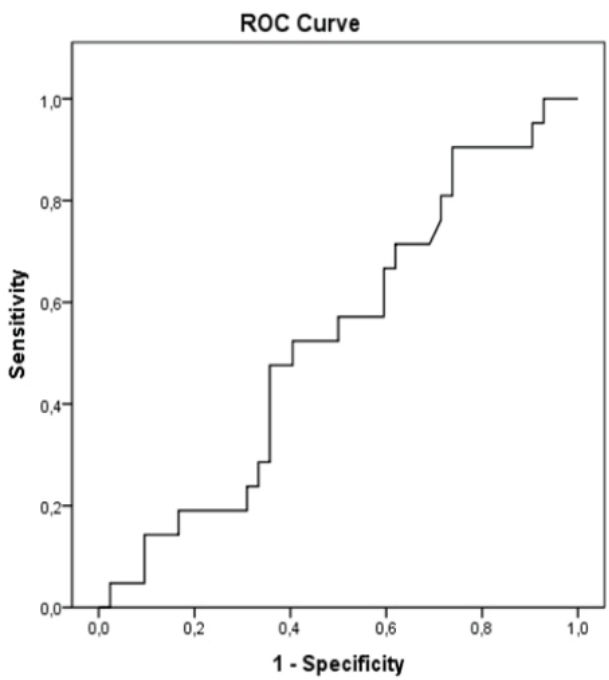


Figure 2. Roc analysis of troponin success



whose troponin measurement was lower than 1.30 was 71%.

Further, we found no significant relationship between SOFA scores and CK-MB values ($p > 0.05$). In this case, the sensitivity value was set as the rate of correctly diagnosing individuals in the low-SOFA based on CK-MB measurement. The specificity value was set as the rate at which individuals in the high-SOFA group could be correctly diagnosed. The cut-off value of CK-MB values was determined as 2.45 in the diagnosis of individuals with low and high SOFA. At this cut-off value, the sensitivity of CK-MB was 0.71. This indicates that the rate of diagnosing individuals whose CKMB value was lower than 2.45, who were diagnosed as SOFA-low, was 71%.

DISCUSSION

Geriatrics refers to the medical care of older adults, who are patients older than 65 years and have chronic illnesses, physical impairments and/or cognitive impairments. With the high quality of current medical treatment, the mean age of geriatric patients has increased, with concurrent increases in the age of patients with acute coronary syndrome. For this reason, the treatment of very old patients has steadily increased (10,11) and has become common practice.

Due to changes and the physiology of ageing, comorbidities, and expectations increase in the elderly. Geriatric patients must be assessed individually, as there can be significant differences between their chronological and biological ages (12). In this context, the SOFA score can be used to assess life expectancy. A simple but effective method for describing organ dysfunction or organ defects for critically ill patients (13).

In our study, we found a significant relationship between SOFA score and mortality rate ($p < 0.05$). The SOFA score showed that it is reliable for predicting mortality in geriatric patients with acute coronary syndrome, with 57% sensitivity and 75% specificity.

Jones et al. (14) also showed that the SOFA score provides valuable prognostic information on survival in hospital. Machado et al. (15) showed that a mean SOFA average above 5 was associated with mortality in elderly patients with severe sepsis and septic shock. Janssens et al. (16) showed that SOFA scores provide important information on the degree and progression of organ dysfunction in medical and cardiovascular patients.

ACS refers to a range of acute ischemic myocardial conditions. It includes unstable angina and myocardial infarction with or without ST segment elevation. ACS can lead to an increase in cardiac enzymes (17), with an increase in the values of troponin and CK-MB. As part of our study, we carefully examined the relationship between the troponin value and SOFA score and between the CK-MB value and SOFA score. We found that there was no significant relationship between SOFA score and troponin values or CK-MB values ($p > 0.05$).

However, Mannam et al. (18) showed that the mortality in troponin-positive septic patients was significantly higher (45.4% versus 7.7%, $p < 0.04$). Kang et al. (19) showed that elevated troponin levels were significantly associated with short-term and long-term mortality in patients with end-stage kidney disease with sepsis. For this reason, elevated troponin levels should be carefully considered and monitored for undesirable results. Oliveira et al. (20) showed that the severity of septic disease was the only variable that was significantly associated with death. Mehta et al. (21) showed that cardiac troponin is an independent predictor of hospital mortality.

Nevertheless, a skilful clinical assessment remains essential in every patient with suspected ACS and is particularly important in elderly patients who present with specific diagnostic challenges that need to be systematically considered.

CONCLUSION

The mortality of geriatric patients with acute coronary syndrome can be significantly determined by their SOFA scores. The SOFA scores showed reliability in predicting mortality in geriatric patients with acute coronary syndrome, with 57% sensitivity and 75% specificity. The SOFA score thus provides potentially valuable prognostic information on the survival of geriatric patients in the hospital. It is therefore very well suited for the risk stratification of patients in intensive care units.

Study Limitations

The limitations of our study are its retrospective design and the relatively low number of patients.

In addition, patients who were not followed up in our hospital were not included in our study.

Conflict of Interest

The authors declare no conflict of interest regarding the publication of this manuscript.

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