

**THE IMPACT OF ALTERED NUTRITIONAL STATUS, INFLAMMATION AND
SYSTEMIC VULNERABILITY ON CLINICAL EVOLUTION IN PATIENTS DIAGNOSED
WITH ACUTE MYOCARDIAL INFARCTION UNDERGOING PERCUTANEOUS
CORONARY REVASCULARIZATION**

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Introduction. It is well known that cardiovascular risk factors are influenced by the overall nutritional status. Malnutrition may have severe health consequences and is associated with a higher mortality risk in patients with cardiovascular diseases. In acute settings, malnutrition increases patient vulnerability, being associated with poorer outcomes, higher risk of complications and increased mortality. While the relationships between inflammation and AMI on one hand, and between inflammation and malnutrition, on the other, have been well documented, the role of the complex interaction between these three factors in acute cardiac conditions is less known. In this context, malnutrition may serve as a reliable indicator of an exacerbated inflammation in AMI, however its role in predicting outcomes of patients with AMI is still unknown.

Aim. The main objective of this doctoral thesis was to evaluate the impact of altered nutritional status, inflammation and systemic vulnerability on the occurrence of in-hospital complications, clinical evolution and on the duration of hospitalization in patients diagnosed with acute myocardial infarction undergoing percutaneous coronary revascularization.

This objective was achieved by carrying out two different studies, the first study sought to identify the relationship between deteriorated nutritional status and in-hospital complications as well as the clinical profile and period of hospitalization in patients with IMA who were hospitalized in an intensive care unit tertiary and in the second study the main objective was to investigate the correlations between the quality of nutritional status, inflammation and systemic vulnerability in patients with acute myocardial infarction undergoing percutaneous coronary revascularization.

Material and Methods. The collection of patients data was done through two different studies: For the first study, the research method used was a prospective observational study on a total population of 56 patients diagnosed with STEMI acute myocardial infarction and NSTEMI hospitalized in the cardiac intensive care unit of the Cardiology Clinic of the County Emergency Clinical Hospital Targu Mureş, a tertiary intensive care unit. The second study was non-randomized, prospectively observational, which included a total of 86 consecutive acute myocardial infarction patients who underwent percutaneous urgent revascularisation of the artery that caused the infarction in the County Emergency Clinical Hospital Târgu Mureş, between 1 January 2018 and 28 February 2018. The data collected in both investigations included information on

demographics, medical history, lifestyle and vulnerability risk factors, cardiovascular risk factors, clinical status, smoking habits, anthropometric indices, length of stay in hospital and cardiac intensive therapy, myocardial infarction complications, laboratory tests (blood count, ionogram, albumin, troponin, hsCRP, glycemia, urea, creatinine, triglycerides, total cholesterol, uric acid, transaminases etc.). All patients were subjected to invasive coronary angiography, coronary revascularization and transthoracic echocardiography for left ventricular function. Nutritional status was assessed by computing the CONUT, PNI and GNRI indices of both patient populations.

Results. The results of the first study showed that patients with a moderate to severe deficiency in the nutritional status assessed by the CONUT score have a high risk of hemodynamic instability and therefore inotropic therapy is needed. Similarly, patients with a $\text{CONUT} \geq 3$ score were more likely to experience rhythm or conduction abnormalities as well as life-threatening complications such as cardiac arrest in the hospital, but the results did not reveal statistical significance, most likely due to the low number of patients enrolled in the assay ($n = 56$). Also, the first study demonstrated that subjects with modified nutritional status pose a major risk of developing acute heart failure and hemodynamic instability compared to patients without nutritional deficiency, and the inpatient analysis revealed that undernourished patients requiring both a longer observation time in the cardiac intensive care unit and a longer hospital stay. Regarding the proportion of malnourished patients, the second study identified that more than 20% of the patients evaluated by the CONUT score had a poor nutritional state and 26% evaluated patients by calculating the GNRI index. Patients with malnutrition, identified by both scores, had a higher level of inflammatory status, showed increased blood vulnerability, results and clinically significant improvement in post-IMA. Our data indicate that high inflammatory status is associated with lower cardiac output after an acute myocardial infarction because hs-CRP levels on day 1 and day 5 were higher in patients requiring hemodynamic support. It is documented that a significant increase in systemic inflammatory response is triggered in the acute phase of myocardial infarction, yet this study demonstrated for the first time that patients who develop hemodynamic damage after acute myocardial infarction exhibit an overexpressed increase in inflammatory response on day 5 post-AMI.

Conclusions. Given the results of the two studies and in order to hope for optimal therapeutic outcomes, nutritional status should be assessed under acute cardiac conditions to identify patients predisposed to an unfavorable clinical development and computational tools such as CONUT, GNRI, PNI, CCI can be successfully used to identify malnutrition of hospitalized patients. Also, the results of this thesis highlight the need to implement a nutritional status screening program as well as an interdisciplinary approach by integrating the dietitian into the medical team to ensure the active management of malnutrition of hospitalized patients, which can improve the results both in the short term, both in the long term. Malnutrition screening in hospitalized patients for the diagnosis of acute myocardial infarction could reduce the occurrence of adverse events in the hospital, shorter periods of hospitalization, and thereby reduce costs and increase the quality of care.