

DOCTORAL THESIS SUMMARY

Impact of nutritional status and inflammatory response on the outcome of patients with acute myocardial infarction

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Introduction: Cardiovascular disease is the leading cause of death in the European Union, where 49% of deaths are due to this condition. Acute myocardial infarction (AMI) is an increasing burden on health systems as its incidence is steadily rising and is responsible for the majority of deaths, as well as for a diverse morbidities resulting in reduced quality of life. Malnutrition can adversely affect the clinical course of patients with acute myocardial infarction, increasing the risk of complications and death. Malnourished patients often have poorer cardiac function, reduced exercise capacity and longer recovery after a heart attack.

Objectives:

The aim of this thesis was to investigate the impact of nutritional status on the clinical prognosis of left ventricular function in patients with acute myocardial infarction, as well as to identify recurrent major cardiovascular events and the inflammatory response after acute myocardial infarction. In order to obtain the desired results and achieve the main objective of the paper, two complex studies with distinct objectives were conducted.

General Methodology:

This research aimed to conduct two complex studies. In the first research, the investigation used was a non-randomized, prospective, observational study, which included a total of 108 patients with acute myocardial infarction who were hospitalized and received emergency percutaneous treatment at the Cardiology Clinic, within the County Emergency Hospital of Targu Mures, between March 1, 2023 and May 15, 2023.

The second research was a non-randomized, prospective, observational study, conducted on a population of 73 patients who presented at the 3-month follow-up after acute myocardial infarction (AMI) and PCI procedure at the Cardiology Clinic, County Emergency Hospital Targu Mures between June 1 and August 15, 2023.

Study 1:

In the first study, we aimed to evaluate in detail the impact of nutritional status on the occurrence of major acute cardiovascular events (MACE) at 1 month and 3 months post-MI. Nutritional status was identified using the Controlling Nutritional Status (CONUT) score, and inflammatory status was assessed using several biomarkers such as N-terminal B-type natriuretic peptide (NTproBNP), highly sensitive C-reactive protein (hs-CRP), left ventricular ejection fraction (LVEF), with post-infarction follow-up.

Aim of study 1: This study aimed primarily to identify the impact of nutritional status on the occurrence of cardiovascular events at 1 month and 3 months after AMI.

Study 1 Conclusions: Following acute myocardial infarction, patients with poor nutritional status had more inflammatory status, frailty and cardiovascular events than those with normal nutritional status. Use of the CONUT nutritional score in conjunction with inflammatory biomarkers demonstrated an association between poor prognosis in malnourished patients and the occurrence of major acute cardiovascular events at both 1 and 3 months post-MI. The first study showed that cardiovascular events occurred more frequently in those with poor nutritional status (total major acute cardiovascular events: 46.9% versus 9.2% at 1 month follow-up and 68.8% versus 10.5% at 3 months follow-up), who experienced more frequent non-fatal myocardial infarction, stroke, revascularization, ventricular arrhythmia and cardiovascular death.

Aim of study 2:

For a thorough and detailed research, in order to complete and develop the findings of the first research, we conducted the second research, in which the main objective was to assess the impact of nutritional status on the evolution of ejection fraction at the time of myocardial infarction and at 3 months after acute myocardial infarction, taking into account the two nutritional status control tools, the CONUT score and the Geriatric Nutritional Risk Index (GNRI) score.

Study 2 Conclusions: The correlation between left ventricular dysfunction parameters and nutritional status calculated by the two scores showed that patients with impaired nutritional status have worse outcomes at the 3-month post-infarction assessment, and LVEF values are lower both at 1 day post-infarction and at 3 months in patients with impaired nutritional status. Malnutrition is one of the risk factors for cardiovascular disease and in our study it was independently associated with unfavorable outcomes at 3 months after MI.

Left ventricular ejection fraction had lower values in undernourished patients in both the CONUT and GNRI groups, and N-terminal B-type natriuretic peptide (NTproBNP) had lower values both at 1 day and 5 days post-infarction in the CONUT ≥ 3 group.

General conclusions: From the results of the two studies we found the following:

- Following an AMI, patients with poor nutritional status were more likely than those with normal nutritional status to have inflammatory status, frailty and cardiovascular events.
- Using the CONUT nutritional score in conjunction with inflammatory biomarkers demonstrated an association between poor prognosis in malnourished patients and the occurrence of acute cardiovascular events.
- The correlation between parameters of left ventricular dysfunction and nutritional status, calculated by the two scores, showed that patients with impaired nutritional status have worse outcomes at the 3-month post-infarction assessment, and LVEF values are lower both at 1 day post-infarction and at 3 months in patients with impaired nutritional status.
- Malnutrition is a risk factor for cardiovascular disease and in our study it was independently associated with unfavorable outcomes at both 1 month and 3 months after MI.

Following the presentation of the results of the two studies and considering the high prevalence of malnutrition and the repercussions in morbidity-mortality of patients with cardiovascular diseases and in healthcare costs, measures such as the calculation of nutritional scores should be prioritized as a first step in integrated nutritional care for patients during hospitalization and beyond.

There are numerous studies and publications demonstrating the correlation between nutritional status and unfavorable prognosis in patients with myocardial infarction, but to our knowledge there are no studies yet evaluating the parameters of left ventricular dysfunction and inflammatory status in relation to nutritional status post myocardial infarction.

The results of this research highlight that MACE in post AMI patients were associated with nutritional status, which could be characterized by increased inflammatory state and nutritional deficiency, and LVEF values that differed statistically significantly at 3 months post AMI follow-up, with lower values in patients with altered nutritional status.