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Dynamics of Cardiomarkers in Various Degrees of Severety of Acute Myocardial Infarction in Comorbidity

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A B S T R A C T
Emerging evidence suggests that systemic inflammation is a predictor of poor prognosis in acute myocardial infarction (AMI). In this study, we sought to assess whether inflammation-based prognostic scores are associated with in-hospital outcomes in elderly patients with AMI.

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In this retrospective study, patients who were over 75-years-old and met the diagnostic criteria for AMI were consecutively recruited from January 1, 2022, to March 3, 2023. Logistic regression and receiver-operating characteristic (ROC) analyses were performed to evaluate the predictive value of the inflammation-based Glasgow Prognostic Score (GPS), Prognostic Index (PI) and Prognostic Nutritional Index (PNI)Despite the extensive development of percutaneous coronary intervention (PCI) and other revascularization strategies, acute myocardial infarction (AMI) remains one of the leading causes of death worldwide. Numerous risk factors have been shown to be associated with mortality in AMI. Among these factors, systemic inflammation is gradually becoming recognized as a strong predictor of poor prognosis et al demonstrated that peak C-reactive protein (CRP) is an independent predictor of left ventricular dysfunction after acute myocardial infarction (AMI). Recently, al found a good correlation between the baseline inflammation-based Glasgow Prognostic Score (GPS) and the mortality of ST-segment elevation myocardial infarction (STEMI). However, few data are available on the relationship between inflammation and AMI prognosis in elderly patients. Frailty and malnutrition are common in the elderly population, and previous studies suggested that these two conditions could also lead to changes in the inflammation status.Thus, it is unclear whether the distinct spectra of inflammatory biomarkers in older people influence the predictive value of inflammation in AMI.

Several inflammation-based prognostic scores have been well established to date, which were initially used to predict the outcomes of cancer patients. As mentioned above, the inflammation-based Glasgow Prognostic Score (GPS), which is composed of serum CRP and albumin, has been shown to be associated with mortality in many malignant diseases. The Prognostic Index (PI), which is composed of serum CRP and the peripheral WBC count, was also reported to be a strong predictor for survival in advanced lung cancer patients. The Prognostic Nutritional Index (PNI), which is based on serum albumin and the peripheral lymphocyte count, is an independent predictor of poor outcome in patients with hepatocellular carcinoma.

In this study, we sought to use these three inflammation-based scores to evaluate the severity of inflammation in elderly patients with AMI and to assess whether these scores are associated with in-hospital cardiovascular adverse events and all-cause mortality.

In this study, we found that in elderly patients with AMI, those who had higher inflammation-based scores at admission were associated with an increased incidence of in-hospital MACEs and mortality. Multiple logistic regression and ROC analysis indicated that the GPS had the best predictive value among the three score systems (GPS, PI and PNI) for elderly AMI patients.

Systemic inflammation is a well-known risk factor for atherosclerosisand plays an important role in atherosclerotic plaque instability. On the other hand, inflammation is often a downstream pathological change of AMI, and excessive inflammation can lead to the aggravation of the original diseases, resulting in a vicious circle. In patients with AMI, several severe complications such as cardiac shock, heart failure and secondary infection can lead to increased inflammatory markers. Hence, higher inflammation-based scores at admission reflect the complex clinical baseline characteristics of patients. Meanwhile, severe inflammation can result in a larger infarction area and organ injury, which may lead to a worse outcome.

Our study was consistent with the work conducted. As mentioned above, frailty and malnutrition are common in elderly people. Previous studies demonstrated that both frailty and malnutrition are associated with higher inflammatory parameters, such as CRP, interleukin-6 (IL-6) and lower serum albumin. There may be an overall increase in the GPS in elderly patients. Thus, the predictive value of a high GPS for poor prognosis may be decreased.

The power of the GPS for outcome prediction was stronger than that of the other two scoring systems in this study, which may be attributed to the combined effects of the components of the GPS. Serum albumin is an important parameter of the GPS score system. Recent studies have demonstrated that a decreased serum albumin concentration was associated with poor prognosis in acute coronary syndromes. In the acute setting of AMI, inflammation can increase vascular permeability, which may increase the transfer of albumin out of the vascular compartment and result in a rapid decrease in the concentration of serum albumin. Meanwhile, hypoproteinaemia is also a manifestation of malnutrition. Decreased serum albumin is the result of the combined effects of inflammation and inadequate protein and caloric intake Therefore, the GPS system reflects both systemic inflammatory reactions and nutritional status.

Traditional prognostic scores for acute coronary syndrome (ACS), such as the Global Registry of Acute Coronary Events (GRACE) and Thrombolysis in Myocardial Infarction (TIMI) scores, do not consider inflammation-based components. Using traditional prognostic scores and inflammation-based prognostic scores in combination will be helpful for performing a comprehensive evaluation of patients with AMI.

There are some limitations in the present study. First, we only evaluated the in-hospital outcome of the patients. A long-term follow-up will provide a more thorough assessment of the predictive value of the inflammation-based prognostic scores. Second, this was a single centre study and may have selection bias. Finally, we did not record information on the medications that were used during hospitalization, which may have also influenced the outcome of the patients.

Conclusion

The severity of systemic inflammation is a strong predictor of poor prognosis in elderly patients with AMI. Among the three inflammation-based prognostic scores, the GPS has a better predictive value than the PI and PNI for in-hospital MACEs and mortality. Thus, the GPS score may represent a simple and useful tool for outcome prediction in elderly patients at the early stage of AMI.

References

1. Ibanez B, James S, Agewall S, et al. 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. *Rev Esp Cardiol (Engl Ed)*. 2017; **70:1082**. [PubMed] [Google Scholar]
2. Vanhaverbeke M, Veltman D, Pattyn N, et al. C-reactive protein during and after myocardial infarction in relation to cardiac injury and left ventricular function at follow-up. *Clin Cardiol*. 2018;**41**:1201–1206. doi: 10.1002/clc.23017 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

3. Jia Y, Li D, Cao Y, et al. Inflammation-based Glasgow Prognostic Score in patients with acute ST-segment elevation myocardial infarction: A prospective cohort study. *Medicine (Baltimore)*. 2018; **97:e13615**. doi: 10.1097/MD.0000000000013615 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

4. Zhang N, Zhu WL, Liu XH, et al. [A cross-sectional study on the association between frailty and muscular performances in hospitalized elder patients with coronary artery disease]. *Zhonghua Nei Ke Za Zhi*. 2019; **58:265**–269. doi: 10.3760/cma.j.issn.0578-1426.2019.04.006 [PubMed] [CrossRef] [Google Scholar]

5. Valls T, Mach N. [Risk of malnutrition in people older than 75 years]. *Med Clin (Barc)*. 2012; **139:157**–160. doi: 10.1016/j.medcli.2012.01.029 [PubMed] [CrossRef] [Google Scholar]

6. Kim DY, Kim CO, Lim H. Quality of diet and level of physical performance related to inflammatory markers in community-dwelling frail, elderly people. *Nutrition*. 2017;**38**:48–53. doi: 10.1016/j.nut.2016.12.023 [PubMed] [CrossRef] [Google Scholar]

7. Hubbard RE, Woodhouse KW. Frailty, inflammation and the elderly. *Biogerontology*. 2010;**11**:635–641. doi: 10.1007/s10522-010-9292-5 [PubMed] [CrossRef] [Google Scholar]

8. Douglas E, McMillan DC. Towards a simple objective framework for the investigation and treatment of cancer cachexia: the Glasgow Prognostic Score. *Cancer Treat Rev*. 2014;**40**:685–691. doi: 10.1016/j.ctrv.2013.11.007 [PubMed] [CrossRef] [Google Scholar]

9. Kasymjanova G, MacDonald N, Agulnik JS, et al. The predictive value of pre-treatment inflammatory markers in advanced non-small-cell lung cancer. *Curr Oncol*. 2010;**17**:52–58. doi: 10.3747/co.v17i4.567 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

10. Pinato DJ, North BV, Sharma R. A novel, externally validated inflammation-based prognostic algorithm in hepatocellular carcinoma: the prognostic nutritional index (PNI). *Br J Cancer*. 2012; **106:1439**–1445. doi: 10.1038/bjc.2012.92 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

11. Thygesen K, Alpert JS, Jaffe AS, et al. Third universal definition of myocardial infarction. *J Am Coll Cardiol*. 2012; **60:1581**–1598. doi: 10.1016/j.jacc.2012.08.001 [PubMed] [CrossRef] [Google Scholar]

12. Hansson GK. Inflammation, atherosclerosis, and coronary artery disease. *N Engl J Med*. 2005; **352:1685**–1695. doi: 10.1056/NEJMra043430 [PubMed] [CrossRef] [Google Scholar]

13. Zairis MN, Lyras AG, Bibis GP, et al. Association of inflammatory biomarkers and cardiac troponin I with multifocal activation of coronary artery tree in the setting of non-ST-elevation acute myocardial infarction. *Atherosclerosis*. 2005; **182:161**–167. doi: 10.1016/j.atherosclerosis.2005.01.039 [PubMed] [CrossRef] [Google Scholar]

14. Park M, Maciel AT, Noritomi DT, et al. Is persistent hypotension after transient cardiogenic shock associated with an inflammatory response? *Braz J Med Biol Res*. 2008;**41**:648–656. doi: 10.1590/s0100-879x2008000800002 [PubMed] [CrossRef] [Google Scholar]

15. Hartupee J, Mann DL. Positioning of inflammatory biomarkers in the heart failure landscape. *J Cardiovasc Transl Res*. 2013; **6:485**–492. doi: 10.1007/s12265-013-9467-y [PMC free article] [PubMed] [CrossRef] [Google Scholar]

16. Yang M, Chen J, Zhao J, Meng M, Calvert J. Etanercept attenuates myocardial ischemia/reperfusion injury by decreasing inflammation and oxidative stress. *PLoS One*. 2014;**9**:e108024. doi: 10.1371/journal.pone.0108024 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

17. Liu H, Xiao X, Sun C, Sun D, Li Y, Yang M. Systemic inflammation and multiple organ injury in traumatic hemorrhagic shock. *Front Biosci (Landmark Ed)*. 2015; **20:927**–933. [PubMed] [Google Scholar]

18. Carriere I, Dupuy AM, Lacroux A, Cristol J-P, Delcourt C. Biomarkers of inflammation and malnutrition associated with early death in healthy elderly people. *J Am Geriatr Soc*. 2008;**56**:840–

846. doi: 10.1111/j.1532-5415.2008.01677.x [PMC free article] [PubMed] [CrossRef] [Google Scholar]

19. Soysal P, Stubbs B, Lucato P, et al. Inflammation and frailty in the elderly: A systematic review and meta-analysis. *Ageing Res Rev*. 2016; **31:1**–8. doi: 10.1016/j.arr.2016.08.006 [PubMed] [CrossRef] [Google Scholar]
20. Xia M, Zhang C, Gu J, et al. Impact of serum albumin levels on long-term all-cause, cardiovascular, and cardiac mortality in patients with first-onset acute myocardial infarction. *Clin Chim Acta*. 2018; **477:89**–93. doi: 10.1016/j.cca.2017.12.014 [PubMed] [CrossRef] [Google Scholar]