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Predictive Value of Naples Prognostic Score and CONUT Scores for Contrast-induced Acute Kidney Injury After Percutaneous Coronary Intervention in Acute Coronary Syndrome

Perkütan Koroner Girişim Uygulanan Akut Koroner Sendrom Hastalarında Kontrast İlişkili Akut Böbrek Hasarının Öngörülmesinde Naples ve CONUT Skorlarının Prediktif Değeri

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Abstract

Objective: Contrast-induced acute kidney injury (CI-AKI) is a significant complication in acute coronary syndrome (ACS) patients undergoing percutaneous coronary intervention (PCI). This study evaluates the predictive value of the Naples prognostic score (NPS) and controlling nutritional status (CONUT) score for CI-AKI risk.

Method: The data of 520 ACS patients who underwent PCI between January 2019 and December 2022 were retrospectively analyzed. Patients were stratified by NPS and CONUT scores, based on blood markers including serum albumin, cholesterol, and inflammatory cell counts. CI-AKI was defined as an acute post-contrast renal function decline. Logistic regression and ROC analyses assessed the predictive value of NPS and CONUT scores.

Results: CI-AKI occurred in 142 (27.3%) patients. Higher NPS and CONUT scores were significantly associated with increased CI-AKI risk (p<0.001). Multivariate analysis identified NPS and CONUT as independent predictors of CI-AKI (odds ratio: 0.060, p=0.002; odds ratio: 0.442, p=0.008). ROC analysis showed high predictive accuracy (AUC: 0.950 for NPS; AUC: 0.930 for CONUT).

Conclusion: NPS and CONUT scores effectively predict CI-AKI risk in ACS patients undergoing PCI. Their routine use may enhance risk stratification and preventive strategies.

Keywords: Acute coronary syndrome, contrast-associated acute kidney injury, CONUT score, Naples prognostic score, percutaneous coronary intervention

Öz

Amaç: Kontrast maddeye bağlı akut böbrek hasarı (CI-AKI), perkütan koroner girişim (PKG) uygulanan akut koroner sendrom (AKS) hastalarında önemli bir komplikasyondur. Bu çalışma, CI-AKI riskini öngörmede Naples prognostik skoru (NPS) ve beslenme durumunun kontrolü (CONUT) skorlarının prediktif değerini değerlendirmeyi amaçlamaktadır.

Yöntem: Ocak 2019-Aralık 2022 tarihleri arasında, PKG uygulanan 520 AKS hastasının verileri retrospektif olarak analiz edilmiştir. Hastalar, serum albümin, kolesterol ve enflamatuvar hücre sayımlarına dayalı olarak NPS ve CONUT skorlarına göre sınıflandırılmıştır. CI-AKI, kontrast sonrası böbrek fonksiyonlarında akut bozulma olarak tanımlanmıştır. Lojistik regresyon ve ROC analizleri ile NPS ve CONUT skorlarının prediktif değerleri değerlendirilmiştir.

Bulgular: CI-AKI, 142 hastada (%27,3) gelişmiştir. Yüksek NPS ve CONUT skorları, CI-AKI riskinde anlamlı artış ile ilişkili bulunmuştur (p<0,001). Çok değişkenli analizde, NPS ve CONUT skorları CI-AKI için bağımsız prediktörler olarak belirlenmiştir (olasılık oranı: 0,060, p=0,002; olasılık oranı 0,442, p=0,008). ROC analizi, yüksek prediktif doğruluk göstermiştir (NPS için AUC: 0,950; CONUT için AUC: 0,930).

Sonuç: NPS ve CONUT skorları, PKG uygulanan AKS hastalarında CI-AKI riskini etkili şekilde öngörebilmektedir. Bu skorların rutin kullanımı, risk sınıflandırması ve önleyici stratejilerin geliştirilmesine katkı sağlayabilir.

Anahtar kelimeler: Akut koroner sendrom, CONUT skoru, kontrast ilişkili akut böbrek hasarı, Naples prognostik skoru, perkütan koroner girişim

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Introduction

Contrast-induced acute kidney injury (CI-AKI) is characterized by a rapid decline in renal function that manifests subsequent to the administration of contrast media during diagnostic or interventional procedures (1). This pathological condition poses a considerable clinical obstacle, particularly in individuals diagnosed with acute coronary syndrome (ACS) who are subjected to percutaneous coronary intervention (PCI) (2). The incidence of CI-AKI results in prolonged hospitalization, increased healthcare costs, and correlates with heightened risks of morbidity and mortality (3,4). Conventional risk determinants for CI-AKI include pre-existing renal dysfunction, diabetes mellitus, and administration of substantial quantities of contrast agents (5-7). Preliminary evaluation of risk in individuals with ACS undergoing PCI has significant clinical relevance.

Inadequate or unbalanced nutrition, classified as malnutrition, has been correlated with unfavorable prognoses in conditions such as heart failure (HF), ACS, and various malignancies (8-10). Malnutrition and systemic inflammation are interrelated, and elevated inflammatory biomarkers are frequently observed during nutritional deficiency (11). Systemic inflammation is associated with increased concentrations of circulating biomarkers, including interleukin-6 (IL-6), C-reactive protein, and tumor necrosis factor-alpha (TNF-α) (12). Moreover, previous research has validated the relationship between inflammation-associated parameters and CI-AKI (13,14).

The Naples prognostic score (NPS) and controlling nutritional status (CONUT) scores were initially established as pivotal prognostic instruments for individuals diagnosed with malignancies; however, they have also been demonstrated to correlate with adverse outcomes in patients presenting with ACS and HF (15,16). Both scoring systems can be readily computed utilizing various biomarkers, including serum albumin concentration, total cholesterol levels, lymphocyte enumeration, neutrophil-to-lymphocyte ratio (NLR), and lymphocyte-to-monocyte ratio (LMR), which collectively reflect the inflammatory and nutritional status of the patient (17).

This study aimed to determine whether NPS and CONUT scores independently predict CI-AKI in ACS patients undergoing PCI. By incorporating inflammatory and nutritional assessments, the goal was to enhance early risk stratification. Our findings suggest that higher scores are associated with increased CI-AKI risk and may support individualized prevention strategies in clinical care.

Materials and Methods

Study Design and Population

A retrospective cohort study was conducted between January 2019 and December 2022. A total of 584 patients diagnosed with ACS and treated with PCI using contrast media were assessed. Individuals aged ≥18 years with a confirmed diagnosis of ACS who received contrast agents during PCI were included (18). Patients with epidermal growth factor receptor (eGFR) <30 mL/min/1.73 m², infectious diseases, active malignancy, cardiogenic shock, or pregnancy were excluded. Renal disease was defined as chronic kidney disease stage 4 or higher, corresponding to an eGFR <30 mL/min/1.73 m². In addition, 64 patients were excluded because of incomplete data (n=16), renal disease (n=17), cardiogenic shock (n=12), systemic infection (n=9), hepatic disorders (n=5), or malignancy (n=5), resulting in a final cohort of 520 patients (Figure 1).

This article contains human participants, so Institutional Review Board approval was required for this research article and was obtained from the İstanbul Medipol Mega Hospital's Local Ethical Committee (E-10840098-202.3.02-6647, date: 24.10.2024, number: 986).

Data Collection

Venous blood specimens were obtained prior to PCI at the time of admission by using conventional methods. Hematological parameters were measured within 30 minutes using an automated hematology system (BC-6800 Plus, Mindray, Shenzhen, China). The NLR and LMR were computed based on these indicators, whereas the established scoring framework derived the NPS (Table 1). The subjects were categorized into three separate cohorts predicated on their NPS: Group 0 (NPS score of 0), group 1 (NPS score of 1-2), and group 2 (NPS score of 3-4). The CONUT score, representative of nutritional status, was computed utilizing the serum albumin concentration, total cholesterol level, and lymphocyte enumeration (spanning from 0 to 12). CONUT scores categorized as 0-1, 2-4, and ≥5 correspond to normal nutritional status (group 0), mild nutritional deficiency (group 1), and moderate-to-severe malnutrition (group 2), respectively (19).

Procedures

All patients received dual antiplatelet therapy consisting of aspirin (300 mg loading dose, followed by 100 mg daily), combined with either prasugrel (60 mg loading, 10 mg maintenance), ticagrelor (180 mg loading, 90 mg twice daily), or clopidogrel (600 mg loading, 75 mg maintenance). An intravenous dose of 5,000 IU of

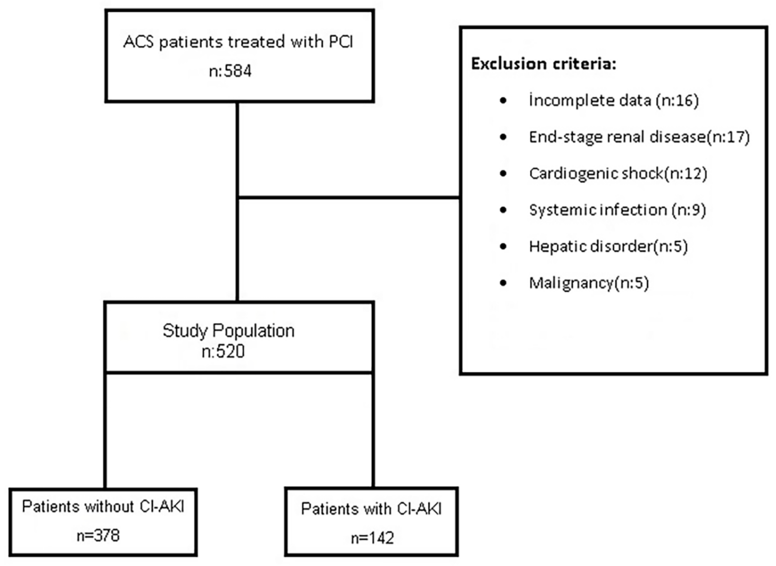

Figure 1. Flowchart illustrating the study process for evaluating the predictive value of the NPS and CONUT score for CI-AKI in ACS patients undergoing PCI

NPS: Naples prognostic score, CONUT: Controlling nutritional status, PCI: Percutaneous coronary intervention, CI-AKI: Contrast-induced acute kidney injury, ACS: Acute coronary syndrome

Table 1. Baseline characteristics of patients with and without CI-AKI

	Patients without CI-AKI n=378	Patients with CI-AKI n=142	p
Age (years)	58.54±11.5	62.09±13.4	0.003
Body mass index (kg/m^2)	27.3±3.5	27.8±3.4	0.158
Gender (female/male)	85/293	32/110	0.991
Systolic BP (mmHg)	131.08±17.73	127.03±17.79	0.048
Diastolic BP (mmHg)	79.07±12.27	77.58±12.32	0.295
Heart rate (bpm)	82.2±12.3	82.3±12.9	0.972
Smoking, n (%)	177 (46.8%)	49 (34.5%)	0.017
Diabetes, n (%)	163 (43.1%)	65 (45.8%)	0.587
Hypertension, n (%)	190 (50.3%)	90 (63.4%)	0.008
Hyperlipidemia, n (%)	87 (23%)	23 (16.2%)	0.09
Family history, n (%)	40 (10.6%)	9 (6.3%)	0.14
Previous ACS, n (%)	24 (6.3%)	15 (10.6%)	0.104
Previous stroke, n (%)	7 (1.9%)	5 (3.5%)	0.259
Peripheral artery disease, n (%)	6 (1.6%)	4 (2.8%)	0.363
ACS type (NSTE-ACS/STE-ACS)	174/204	57/85	0.228
No reflow after PCI n (%)	11 (2.9%)	12 (8.5%)	0.006
Mutivessel disease n (%)	154 (40.7%)	64 (45.1%)	0.373
LV ejection fraction (%)	45.8±8.5	43.6±9.4	0.012
Contrast volume (mL)	182.2±85.5	203.3±89.3	0.032
Duration of procedure (min)	38.8±16.1	42.5±15.5	0.044
Total stent length (mm)	29.9±14.3	30.1±14.2	0.866
Number of stents	1.34±0.56	1.39±0.6	0.406
In hospital ACEI or ARB use (n, %)	359 (95%)	113 (79.6%)	<0.001
In hospital statin use (n, %)	371 (98.1%)	139 (97.9%)	0.501

BP: Blood pressure, BPM: Beat per minute, ACS: Acute coronary syndrome, NSTE: Non-ST elevation, STE: ST elevation, PCI: Percutaneous coronary intervention, LV: Left ventricular, ACEI: Angiotensin converting enzyme inhibitors, ARB: Angiotensin receptor blockers, CVA: Cerebrovascular accident, CI-AKI: Contrast-induced acute kidney injury unfractionated heparin was administered in line with European clinical guidelines (18). In addition, patients were initiated on beta-blockers, ACE inhibitors, and high-intensity statin therapy unless contraindications were present, consistent with international recommendations. Upon admission, two-dimensional echocardiography was performed as part of the routine cardiovascular assessment. PCI procedures were carried out via femoral or radial artery access using 6-7 Fr sheaths under standard interventional protocols.

Statistical Analysis

All statistical methodologies were executed utilizing IBM SPSS Statistics software (version 21.0; SPSS Inc., Chicago, IL, USA). The normal distribution of continuous variables was analyzed using the Shapiro-Wilk test. Data demonstrating a normal distribution were articulated as mean ± standard deviation, whereas non-normally distributed variables were outlined as median values along with interquartile ranges (IQR, 25^{th}-75^{th} percentiles). Between-group discrepancies were scrutinized employing either the independent samples t-test or Mann-Whitney U test, contingent upon data distribution. Categorical data were delineated as frequencies (percentages) and compared utilizing Pearson's chi-square test or Fisher's exact test when deemed appropriate. The discriminatory efficacy of NPS and CONUT scores for forecasting CI-AKI was examined through receiver operating characteristic (ROC) curve analysis, with area under the curve (AUC) values computed distinctly for each. To ascertain independent predictors of CI-AKI, multivariable logistic regression analysis was executed employing a stepwise backward elimination methodology. Findings were expressed as odds ratios (OR) accompanied by 95% confidence intervals (CI). A p-value <0.05 (two-tailed) was adjudged statistically significant.

Results

A cohort of 520 patients was included in the investigation, of whom 142 (27.3%) manifested CI-AKI after PCI. Baseline characteristics showed CI-AKI patients were older (62.1 vs. 58.5 years, p=0.003), had more hypertension (63.4% vs. 50.3%, p=0.008), and had lower left ventricular ejection fraction(43.6% vs. 45.8%, p=0.012). Significant differences were also noted in systolic blood pressure (127.0 vs. 131.1 mmHg, p=0.048) and contrast volume used (203.3 vs. 182.2 mL, p=0.032) (Table 1). CI-AKI patients exhibited lower hemoglobin (13.2 vs. 14.2 g/dL, p<0.001) and lymphocyte counts (1.7 vs. 2.4, p<0.001), along with higher white blood cell (11.9 vs. 10.8, p=0.004) and neutrophil counts (9.4 vs. 7.6, p<0.001). Baseline creatinine levels were elevated (0.99 vs. 0.85 mg/dL, p<0.001), while total cholesterol (154.4 vs. 194.3 mg/dL, p<0.001) and LDL cholesterol (95.9 vs. 112.9 mg/dL, p<0.001) were lower. There was a significant difference in NPS and CONUT scores between patients with and without CI-AKI. In the NPS, 94.4% of the patients with CI-AKI were in group 2, compared to only 8.7% of those without CI-AKI (p<0.001). Similarly, 38% of patients with CI-AKI had moderate-to-severe CONUT scores, while only 0.3% of those without CI-AKI were in this category (p<0.001) (Table 2).

Independent determinants of CI-AKI were determined using multivariate logistic regression analysis. Age was significant, with older patients showing a higher risk (OR: 0.832; 95% CI: 0.712-0.972; p=0.021), likely due to declining renal function with age. Baseline creatinine (OR: 0.001; 95% CI: 0.000-0.855; p=0.045) and lower GFR (OR: 0.868; 95% CI: 0.787-0.957; p=0.005) also emerged as significant predictors, emphasizing the role of renal function. A higher NPS significantly increased the risk of CI-AKI (OR: 0.060, 95% CI: 0.010-0.344, p=0.002). CONUT score similarly predicted CI-AKI (OR: 0.442; 95% CI: 0.242-0.805, p=0.008) (Table 3).

ROC analysis demonstrated excellent predictive accuracy for NPS (AUC: 0.950; 95% CI: 0.927-0.972) and CONUT scores (AUC: 0.930; 95% CI: 0.902-0.956), highlighting their utility in stratifying the risk of CI-AKI. These findings support their potential use in clinical decision-making (Figure 2).

Discussion

This investigation elucidated that NPS and CONUT indices serve as autonomous prognosticators of CI-AKI in individuals undergoing PCI following ACS. Our results underscore the pivotal significance of nutritional and inflammatory conditions in renal outcomes among these individuals, indicating that nutritional deficiency and systemic inflammation markedly elevate the likelihood of CI-AKI.

Prior examinations have illustrated that undernutrition constitutes a considerable risk determinant for unfavorable outcomes in individuals with cardiovascular ailments, particularly in subjects subjected to invasive procedures, such as PCI (20-22). Undernutrition has been correlated with deteriorated outcomes, encompassing CI-AKI, especially in individuals undergoing PCI (23). The CONUT score has been consistently correlated with elevated

Table 2. Laboratory variables of patients with and without CI-AKI

	Patients without CI-AKI n=378	Patients with CI-AKI n=142	p
Hemoglobin (g/dL)	14.2±1.8	13.2±2.5	<0.001
White blood cell count	10.8±3.4	11.9±4.6	0.004
Platelet count (10^9/L)	263.6±72.7	265.6±86.8	0.791
Neutrophils (10^9/L)	7.6±3.3	9.4±4.48	<0.001
Lymphocyte (10^9/L)	2.4±1.06	1.7±0.88	<0.001
Monocyte (10^9/L)	0.68±0.36	0.72±0.44	0.266
Baseline creatinine (mg/dL)	0.85±0.23	0.99±0.51	<0.001
Total cholesterol (mg/dL)	194.3±41	154.4±38	<0.001
LDL cholesterol (mg/dL)	112.9±39	95.9±35	<0.001
HDL cholesterol (mg/dL)	38.9±10.3	38.5±12.6	0.704
Triglyceride (mg/dL)	182.95±103	157.03±80	0.01
Glucose (mg/dL)	158.9±77.1	175.6±88.7	0.036
Hemoglobin A1c (%)	7.3±2.4	7.85±2.4	0.144
NPS	1.52±0.87	3.46±0.67	<0.001
NPS group 0	54 (14.3%)	0 (0%)	
NPS group 1	291 (77.0%)	8 (5.6%)	
NPS group 2	33 (8.7%)	134 (94.4%)	
CONUT score	0.65±0.96	3.82±1.88	<0.001
CONUT group 0	314 (83.1%)	14 (9.9%)	
CONUT group 1	63 (16.7%)	74 (52.1%)	
CONUT group 2	1 (0.3%)	54 (38%)	

LDL: Low density lipoprotein, HDL: High density lipoprotein, NPS: Naples prognostic score, CONUT: Controlling nutritional status, CI-AKI: Contrast-induced acute kidney injury

Table 3. Multivariate logistic regression analysis to determine the independent predictors of CI-AKI

Variable	p	Odds ratio	95% CI	
			Lower	Upper
Age	0.021	1.202	1.028	1.404
Systolic BP	0.527	0.981	0.924	1.041
Smoking	0.873	0.869	0.155	4.886
Hypertension	0.550	1.986	0.209	18.859
Hyperlipidemia	0.606	0.576	0.071	4.694
Final TIMI 3 flow	0.878	0.551	0.005	11.25
LVEF	0.920	0.994	0.891	1.110
Contrast volume	0.459	1.005	0.992	1.018
Duration of procedure	0.280	1.036	0.972	1.105
Hemoglobin	0.136	0.665	0.388	1.138
WBC count	0.750	1.044	0.800	1.364
LDL cholesterol	0.710	0.995	0.969	1.021
Triglyceride	0.540	0.997	0.986	1.007
Glucose	0.541	1.004	0.992	1.016
C-reactive protein	0.826	1.002	0.985	1.020
eGFR	0.005	0.868	0.787	0.957
Creatinine	0.045	14.84	1.170	188.30
NPS	0.002	16.692	2.909	95.778
CONUT score	0.008	2.265	1.243	4.126

BP: Blood pressure, TIMI: Thrombolysis in myocardial infarction, LVEF: Left ventricular ejection fraction, WBC: White blood cell, LDL: Low density lipoprotein, eGFR: Estimated glomerular filtration rate, NPS: Naples prognostic score, CONUT: Controlling nutritional status, CI-AKI: Contrast-induced acute kidney injury, CI: Confidence interval

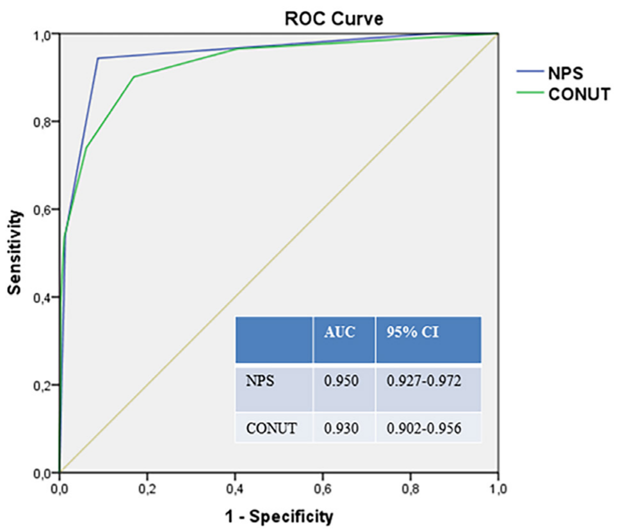

Figure 2. ROC curve analysis to determine predictive value of NPS and CONUT score for occurrence of CI-AKI

NPS: Naples prognostic score, CONUT: Controlling nutritional status, CI-AKI: Contrast-induced acute kidney injury, CI: Confidence interval, ROC: Receiver operating characteristic, AUC: Area under the curve

mortality and poorer clinical outcomes in patients with ACS. Our investigation corroborates these observations by demonstrating that individuals with heightened CONUT scores are at a markedly increased risk of developing CI-AKI. The underlying mechanisms may include reduced albumin levels, which lower oncotic pressure and compromise renal perfusion, and decreased lymphocyte counts, which reflect a weakened immune response and a state of systemic inflammation (1,23,24). The exact mechanism linking CONUT score to CI-AKI development is not yet fully understood; however, its individual components have been consistently associated with kidney damage. Among these, serum albumin, the highest component in the CONUT score, plays a vital role. Research has suggested that diminished serum albumin concentration functions as a notable prognostic marker for both acute renal impairment and mortality subsequent to cardiac interventions. A comprehensive meta-analysis elucidated that decreased albumin levels independently forecasted adverse outcomes in individuals undergoing cardiac surgical procedures or coronary interventions (25). Another investigation fortified its predictive significance by demonstrating that patients undergoing PCI who developed CI-AKI exhibited significantly lower serum albumin concentrations compared to those who did not (26).

Although elevated cholesterol levels have historically been identified as a significant cardiovascular risk determinant within the broader population, diminished cholesterol concentrations in individuals exhibiting renal impairment have been correlated with unfavorable clinical outcomes (27). One study showed that survival rates in AKI patients were significantly better in those with cholesterol levels above 150 mg/dL than in those with cholesterol levels below (28). Supplementary investigations have demonstrated that consistently diminished total cholesterol concentrations are significantly correlated with inferior survival prognoses in individuals suffering from chronic renal impairment (29). Another noteworthy facet of the CONUT score, the lymphocyte enumeration, serves as a parameter of immune functionality and systemic inflammation, which are crucial in the etiology of CI-AKI. Empirical research has demonstrated that diminished lymphocyte counts correlate with unfavorable prognosis in individuals diagnosed with coronary artery disease (30). Moreover, an elevated NLR, signifying an intensified inflammatory response, has been associated with an augmented risk of CI-AKI in individuals undergoing PCI (31). These findings suggest that the CONUT score not only encompasses nutritional deficiencies, but also represents the magnitude of the inflammatory load, thereby establishing it as a pivotal instrument for the early detection of patients predisposed to CI-AKI.

Inflammatory reactions and heightened prothrombotic states are fundamentally implicated in the pathogenesis of CI-AKI. Biomarkers that signify these inflammatory reactions may be pivotal for the detection of CI-AKI. The pathogenesis of CI-AKI is markedly linked with inflammatory mechanisms, featuring pro-inflammatory cytokines, including IL-6 and TNF-α, which are acknowledged as factors contributing to the exacerbation of renal endothelial dysfunction and impairment of renal autoregulation (32,33). Many studies have demonstrated a substantial correlation between inflammatory processes and AKI.

NPS is a novel scoring system designed to simultaneously evaluate inflammation and malnutrition. Initially introduced by Galizia et al. (34), it has been widely employed in assessing cancer prognosis, including gastric and esophageal squamous cell carcinoma. For example, a 2021 study demonstrated that NPS could independently predict survival in patients undergoing surgery for gastric cancer (35). Similarly, this scoring system has also been validated as an independent prognostic indicator in individuals undergoing surgical treatment for esophageal squamous cell carcinoma (36).

In cardiology, NPS has been recognized as a reliable indicator of in-hospital mortality in individuals with HF and has been linked to unfavorable outcomes in various chronic conditions (15). Among its components, NLR has been notably associated with long-term clinical endpoints such as infarct size, mortality, and prognosis in ACS (37). Additionally, NLR has demonstrated predictive value for CI-AKI in ACS patients undergoing PCI. Likewise, LMR has been identified as an independent predictor of CI-AKI in this population (38).

Unlike the CONUT score, which primarily assesses nutritional status, NPS comprehensively evaluates the inflammatory process. In accordance with preceding investigations, our results elucidated that individuals with elevated NPS values, signifying a heightened inflammatory load, are at a considerably increased susceptibility to CI-AKI. Elevated concentrations of inflammatory indicators have persistently been associated with poorer renal outcomes in subjects undergoing PCI, underscoring the pivotal role of inflammation in the pathogenesis of CI-AKI (39).

Our study highlights that nutritional and inflammatory markers independently predict CI-AKI risk and traditional factors, such as age, diabetes, and baseline renal function (40). While these conventional factors remain relevant, our findings suggest that incorporating nutritional and inflammatory assessments could provide more comprehensive risk stratification. Patients identified as high-risk based on NPS or CONUT scores could benefit from targeted preventive strategies such as aggressive hydration, minimizing contrast exposure, or nutritional interventions. Recent investigations have examined the capacity of preprocedural dietary assistance in diminishing the prevalence of CI-AKI, yielding encouraging outcomes.

In our cohort, the overall elevated HbA1c and glucose levels likely reflect the high prevalence of diabetes mellitus and the occurrence of acute stress hyperglycemia in patients presenting with ACS. Although mean glucose levels were significantly higher in the CI-AKI group in univariate analysis, they were not identified as independent predictors in multivariate logistic regression analysis. Stress hyperglycemia represents a neuroendocrine and inflammatory response to acute illness, leading to increased catecholamine and cortisol release, insulin resistance, and enhanced oxidative stress. These mechanisms may contribute to renal microvascular injury and functional impairment, thereby increasing susceptibility to CI-AKI regardless of baseline glycemic status (41).

Furthermore, amalgamating the NPS and CONUT indices into standard clinical praxis presents pragmatic benefits. Both indices are comparatively straightforward to compute utilizing routine hematological assessments and can be effortlessly integrated into extant risk prognostication frameworks. This would enable medical practitioners to discern patients at heightened risk with greater efficacy and execute prompt interventions to alleviate the likelihood of CI-AKI. The incorporation of these indices into established risk frameworks, such as the Mehran risk score, could further augment the precision of CI-AKI forecasting and refine clinical decision-making.

Study Limitations

Notwithstanding the advantages of our examination, which encompassed a relatively considerable sample size and the application of multivariate analysis to alleviate the impact of confounding variables, it is crucial to acknowledge several constraints. Primarily, the retrospective framework of the inquiry obstructs the capacity to establish causal connections between malnutrition, inflammation, and CI-AKI. Prospective studies are vital to authenticate these observations and to evaluate the efficacy of interventions aimed at enhancing nutritional status and diminishing inflammation. Furthermore, our study was restricted to a unique institution, which might limit the external validity of the outcomes to a heterogeneous population. Subsequent inquiries should strive to replicate these results in a more comprehensive multicenter framework.

Conclusion

In this study, evaluating the predictive power of NPS and CONUT scores in predicting the development of contrast nephropathy in patients with ACS undergoing PCI is a clinically important contribution. These scores offer a novel approach to risk stratification by incorporating nutritional and inflammatory statuses, which are increasingly recognized as important determinants of clinical outcomes. The routine use of these scores may guide preventive strategies and improve patient outcomes. Prospective studies are needed to confirm these results and to assess whether nutritional or anti-inflammatory strategies can help reduce the risk of CI-AKI.

Ethics

Ethics Committee Approval: Institutional Review Board approval was required for this research article and was obtained from the İstanbul Medipol Mega Hospital’s Local Ethical Committee (E-10840098-202.3.02-6647, date: 24.10.2024, number: 986).

Informed Consent: The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Footnotes

Authorship Contributions

Surgical and Medical Practices: Ö.B., Concept: Ö.B., A.K., Design: Ö.B., Data Collection or Processing: Ö.B., A.K., Analysis or Interpretation: A.K., Literature Search: Ö.B., A.K., Writing: Ö.B.

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