Association Between Serum BUN Levels and Hospital Mortality in Patients with ST-Segment Elevation Myocardial Infarction Undergoing Primary Angioplasty

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ABSTRACT

Introduction: Ischemic heart disease is the leading cardiovascular disease and a primary cause of death around the world. Recent studies have shown that kidney dysfunction is associated with increased mortality in acute coronary syndrome and other heart diseases. While renal dysfunction is commonly evaluated through creatinine-based tests, there is limited available data on the prognostic significance of blood urea nitrogen (BUN) in patients with acute coronary syndrome. This study aims to evaluate the impact of serum BUN levels on mortality and complications in patients with ST-segment elevation myocardial infarction (STEMI) who underwent primary angioplasty.

Methods and Materials: In this cross-sectional study, 240 patients diagnosed with STEMI and treated with primary angioplasty at Shahid-Madani Cardiovascular Hospital in Tabriz between 2013 and 2017 were selected. Data on demographics, risk factors, vital signs, electrocardiogram and echocardiographic results, laboratory tests, total ischemic time, medication history, angiographic details, hospital mortality, six-month mortality, and hospital complications were collected and analyzed. Patients were divided into groups based on BUN levels: those with BUN more significant than 25 mg/dL and those with BUN less than 25 mg/dL.

Results: Among the 240 patients, 211 (87.9%) had BUN levels below 25 mg/dL, while 29 (12.1%) had above 25 mg/dL. The group with higher BUN levels had a significantly higher proportion of women ($p = 0.003$) and were older on average ($p = 0.001$). This group also showed adverse laboratory results, including anemia, leukocytosis, elevated creatinine, hyponatremia, hyperkalemia, and hypertension. Additionally, these patients had higher rates of tachycardia ($p = 0.022$) and left ventricular dysfunction ($p = 0.006$). Hospital complications (10.3% vs. 0.5%) and six-month mortality (6.9% vs. 0.9%) were significantly higher in the high BUN group, though the difference in-hospital mortality was not statistically significant despite its higher percentage.

Conclusion and Discussion: This study demonstrates that STEMI patients with elevated BUN levels (BUN 25 mg/dL) who undergo primary percutaneous coronary intervention (PCI) exhibit a higher risk profile and poorer response to mechanical reperfusion than patients with normal renal function. Furthermore, these patients experienced significantly more hospital complications and higher six-month mortality rates than those with normal kidney function.

Keywords: Hospitals, Mortality, ST elevation Myocardial Infarction