ORIGINAL RESEARCH PAPER

General Medicine

HIGH SENSITIVITY C-REACTIVE PROTEIN AS A PREDICTOR OF TRIPLE VESSEL DISEASE IN STEMI PATIENTS

KEY WORDS: hsCRP, STEMI, triple vessel disease, coronary artery disease, biomarker

Dr. Togaru Abhilash* Junior Resident, Department Of General Medicine, Sri Siddhartha Medical College,Tumakuru, Karnataka, India*Corresponding Author

Dr. Sharath kumar d shah Professor And Hod, Department Of General Medicine, Sri Siddhartha Medical College,Tumakuru, Karnataka, India

ABSTRACT

Background: Coronary artery disease (CAD) remains a leading cause of mortality worldwide, with ST-elevation myocardial infarction (STEMI) representing a severe clinical manifestation. High sensitivity C-reactive protein (hsCRP), a marker of systemic inflammation, has been implicated in the pathogenesis and severity of atherosclerotic disease. This study assesses the predictive value of hsCRP levels for the presence of triple vessel disease (TVD) among STEMI patients.**Methods:** A cross-sectional analytical study was conducted among 58 STEMI patients admitted to the Department of General Medicine at Sri Siddhartha Medical College and Hospital, Tumakuru, between July 2023 and June 2024. Anthropometric data, biochemical parameters, and coronary angiographic findings were recorded. Serum hsCRP levels were classified into three categories: <1 mg/dL, 1-3 mg/dL, and >3 mg/dL. The presence and extent of CAD were classified as single vessel disease (SVD), double vessel disease (DVD), or triple vessel disease (TVD).**Results:** Among 58 patients, 15 (25.9%) had SVD, 29 (50%) had DVD, and 14 (24.1%) had TVD. hsCRP levels >3 mg/dL were found in 9 patients (15.5%), and of these, 7 (77.8%) had TVD. A significant association was observed between hsCRP levels and the severity of CAD (p<0.00001). Bivariate logistic regression showed that hsCRP >3 mg/dL was associated with significantly increased odds of TVD (OR = 19.8; 95% CI: 2.7-145.6; p = 0.003).**Conclusion:** Elevated hsCRP levels (>3 mg/dL) serve as a significant predictive biomarker for triple vessel disease in STEMI patients. Early assessment of hsCRP may aid clinicians in risk stratification and management of severe CAD.

INTRODUCTION:

Coronary artery disease (CAD) is a significant cause of morbidity and mortality globally, particularly in developing nations like India. ST-elevation myocardial infarction (STEMI), a critical manifestation of CAD, results from complete thrombotic occlusion of a major coronary artery, usually over a ruptured atherosclerotic plaque [1]. Inflammation plays a crucial role in the initiation and progression of atherosclerosis. High sensitivity C-reactive protein (hsCRP), an acute-phase reactant, has emerged as a reliable biomarker for systemic inflammation and cardiovascular risk stratification [2-4].

Recent evidence suggests that elevated hsCRP levels are associated with adverse cardiovascular outcomes and may correlate with angiographic severity of CAD [5]. However, the specific predictive value of hsCRP for triple vessel disease (TVD) in patients with STEMI remains under-investigated. This study aims to evaluate the association between hsCRP levels and the presence of TVD in STEMI patients, thereby exploring its utility as a prognostic tool in clinical practice.

MATERIALS AND METHODS:

Study Design and Setting:

This hospital-based, cross-sectional analytical study was conducted in the Department of General Medicine, Sri Siddhartha Medical College and Hospital, Tumakuru, between July 2023 and June 2024.

STUDY POPULATION:

The study included 58 patients aged 40-85 years, diagnosed with STEMI and admitted for coronary angiography. Patients with NSTEMI, valvular heart disease, cardiomyopathy, hepatic, renal, or respiratory diseases were excluded.

DATA COLLECTION:

Data were collected using a structured proforma. Anthropometric measurements (BMI, waist circumference, WHR), biochemical parameters (lipid profile, HbA1c, hemoglobin), and hsCRP levels were recorded. hsCRP levels were measured using a high-sensitivity assay and categorized into three groups: <1 mg/dL, 1-3 mg/dL, and >3 mg/dL.

Angiographic Assessment:

All patients underwent coronary angiography. CAD was categorized as single vessel disease (SVD), double vessel disease (DVD), or triple vessel disease (TVD) based on the number of major coronary arteries involved.

Statistical Analysis:

Data were analyzed using OpenEpi v3.0. Descriptive statistics were used for baseline characteristics. Association between hsCRP levels and TVD was assessed using Chi-square test and bivariate logistic regression. A p-value <0.05 was considered statistically significant.

RESULTS:

Of the 58 patients, majority were males (63.8%) and in the age group of 50-59 years (44.8%). The distribution of CAD severity was as follows: SVD - 15 (25.9%), DVD - 29 (50.0%), and TVD - 14 (24.1%).

- hsCRP <1 mg/dL: 20 patients (34.5%), of whom 3 had TV
- hsCRP 1-3 mg/dL: 29 patients (50.0%), of whom 4 had TVD
- hsCRP >3 mg/dL: 9 patients (15.5%), of whom 7 had TVD (77.8%)

A significant association was found between hsCRP levels and the severity of CAD (p<0.00001).

Bivariate Logistic Regression Analysis:

- Patients with hsCRP >3 mg/dL had 19.8 times higher odds of having TVD (95% CI: 2.7-145.6; p = 0.003)

DISCUSSION:

This study demonstrates a strong and statistically significant association between elevated hsCRP levels and the presence of triple vessel disease in patients with STEMI. Among patients with hsCRP >3 mg/dL, a remarkable 77.8% had TVD. These findings support the hypothesis that inflammation, as evidenced by elevated hsCRP, plays a key role in the severity of coronary artery involvement.

Similar findings were reported by Hasnat et al. [6], who observed a significant correlation between hsCRP levels and the vessel score. Hawezy et al. [7] and Rezk et al. [8] also found

hsCRP levels to be predictive of angiographic severity. In contrast, Bouzidi et al. [9] and Rashid et al. [10] reported no significant association, which may be attributed to different cut-off values or smaller sample sizes.

This study's findings advocate for the inclusion of hsCRP as a non-invasive prognostic biomarker in the initial evaluation of STEMI patients. Its utility lies in its ability to identify patients at higher risk for extensive coronary involvement, thereby influencing clinical decision-making.

CONCLUSION:

Elevated hsCRP levels (>3 mg/dL) significantly predict the presence of triple vessel disease in patients presenting with STEMI. Incorporating hsCRP measurement into routine risk assessment protocols can enhance early identification of high-risk patients and guide timely interventions.

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