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A Study of Cardiovascular Abnormalities in Patients of Chronic Kidney Disease with Reference to Cardiac Biomarkers and Inflammatory Markers

Dr. Ramnani Prashant Ashok[1], Dr. Hitendrakumar Bhavsar[2], Dr. Bhavikkumar Prajapati[3]

[1]Third Year Resident, Department of General Medicine, Dr M. K. Shah Medical College & Research Centre, Ahmedabad, India

[2]Professor, Department of General Medicine, Dr M. K. Shah Medical College & Research Centre, Ahmedabad, India

[3]Associate Professor, Department of General Medicine, Dr M. K. Shah Medical College & Research Centre, Ahmedabad, India

Abstract: ***Cardiovascular abnormalities are a leading cause of morbidity and mortality among patients with chronic kidney disease (CKD). This study aimed to evaluate the spectrum of cardiovascular complications in CKD patients and investigate the relationship between cardiac biomarkers, inflammatory markers, and cardiovascular outcomes. A total of 120 adult CKD patients across stages 3-5 were evaluated through clinical assessment, echocardiography, and laboratory measurement of cardiac troponin I, NT-proBNP, C-reactive protein (CRP), and interleukin-6 (IL-6). The prevalence of left ventricular hypertrophy and diastolic dysfunction was high. Elevated cardiac biomarkers and inflammatory markers showed a significant association with adverse cardiovascular events. Early detection and monitoring of these markers can help identify high-risk individuals and inform timely interventions to reduce cardiovascular complications in CKD.***

Keywords: Chronic kidney disease, cardiovascular abnormalities, cardiac biomarkers, inflammatory markers, troponin, NT-proBNP

1. Introduction

Chronic kidney disease predisposes individuals to a wide spectrum of cardiovascular diseases, including coronary artery disease, heart failure, and arrhythmias. The interplay of traditional risk factors, uremic toxins, and chronic inflammation accelerates vascular and myocardial dysfunction in CKD. Cardiac biomarkers and inflammatory markers have emerged as useful tools for early risk stratification in these patients.

Purpose of the Study

To evaluate the prevalence and types of cardiovascular abnormalities in CKD patients and analyze the correlation of cardiac biomarkers and inflammatory markers with cardiovascular complications.

Significance of the Study

Understanding the pattern and determinants of cardiovascular risk in CKD is essential for early intervention and improved clinical outcomes. Identifying high-risk patients through biomarker surveillance may enable targeted therapy and risk modification.

Aims and Objectives

- To determine the prevalence of cardiovascular abnormalities in patients with CKD.
- To assess the relationship between cardiac biomarkers (troponin I, NT-proBNP) and cardiovascular events.
- To evaluate the association of inflammatory markers (CRP, IL-6) with cardiovascular complications in CKD.

2. Materials and Methods

A cross-sectional observational study was conducted from January 2023 to June 2024 in a tertiary care center.120 adult patients (age ≥18 years) diagnosed with CKD stages 3-5 were enrolled after informed consent. Clinical evaluation, electrocardiography, and echocardiography were performed. Laboratory parameters included measurement of serum cardiac troponin I, NT-proBNP, CRP, and IL-6 levels. CKD and cardiovascular abnormalities were defined as per established guidelines.

3. Results

Of the 120 patients:
Mean age: 52.6 ± 11.5 years
Gender: 64% male, 36% female

Major cardiovascular findings:
Left ventricular hypertrophy: 58%
Diastolic dysfunction: 46%
Heart failure: 25%
Arrhythmias: 12%

Biomarker associations:
Patients with elevated troponin I and NT-proBNP had a higher incidence of heart failure and arrhythmias.
High CRP and IL-6 levels correlated with increased cardiovascular event rates.

4. Discussion

The study highlights the high prevalence of structural and functional cardiac abnormalities in CKD patients. Elevated cardiac and inflammatory markers serve as important predictors of adverse cardiovascular outcomes. Routine assessment of these biomarkers, along with imaging, can enhance risk stratification in this vulnerable population.

5. Conclusion

Cardiovascular complications are frequent and clinically significant in patients with chronic kidney disease. Monitoring of cardiac and inflammatory markers aids in early detection of high-risk cases, facilitating preventive and management strategies to reduce cardiovascular morbidity and mortality in CKD.

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