# Association Of Spot Urinary Albumin Creatinine Ratio (UACR) With Coronary Artery Disease

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Conflict of Interest: None

*Abstract: Background: Microalbuminuria has been recently found to be a marker of atherogenesis. It is associated with various risk factors of atherogenesis and damage of the vascular endothelium. There have been few studies in which it has been found that mortality in cardiovascular disease are increased with microalbuminuria. Urine is collected over 24 hours and this study has similar sensitivity as urinary albumin creatinine ratio. A urinary albumin to creatinine ratio is as sensitive as a 24 hours urine study even though it itself is a gold standard test. In patients with CAD other factors have been explored then urinary albumin has been recently identified.*

*Objectives:  To assess correlation between urinary albumin creatinine ratio with coronary artery disease and to correlate Urinary albumin creatinine ratio (UACR) with Framingham heart study Cardiovascular disease (FHS-CVD) score in all patients of coronary artery disease.*

*Methodology: In this study which is cross sectional, Subjects to be included in the study will be explained regarding the study and proper consent will be obtained.  A random urine sample will be collected. Urinary albumin concentration will be measured by auto analyser and urine albumin creatinine ratio will be calculated. The values of the same will be recorded and will be statistically analysed.*

*Expected Result: As per previous studies in Turkish population, we are expecting result suggestive of positive relationship between UACR with coronary artery disease.*
*Keywords: urine albumin to creatinine ratio, Coronary artery disease, ECG, Coronary angiography.*

**Introduction/Background:**
Males, increasing life expectancy, comorbidities such as HTN, DM type II, dyslipidaemia and smokers forms independent factors of Coronary Artery Disease , but the variation in cardiovascular diseases morbidity has not been completely explained (1). There are several factors which were explored to find patients who are prone to developing coronary artery disease. In such urinary albumin has been found to be a new risk factor.

Microalbuminuria is an atherogenesis marker, since there is relation between factors of atherosclerosis and damage in systemic vessels in endothelial lining(2). In different populations there is an increasing number of studies and reports suggestive that morbidity in heart patients with Diabetes mellitus, Hypertension and in common people is related with microalbuminuria inspite of having traditional risk factors (3).

Urine collected over 24 hours is as much similar as UACR. Even though for detecting of microalbuminuria the gold standard is 24 hour urine, urinary albumin to creatinine ratio is sensitive The increase in urine albumin excretion in diabetic patients is usually attributed to renal vascular damage; however, it is thought to be related to inflammation, increased glomerular permeability in renal vascular system, heart failure due to MI and increased aldosterone release (4). In hypertensives, microvascular damage takes place in the kidneys, and albuminuria is a product of this damage. Nevertheless, in the CAD patients without co-morbid diseases, the reason for the albuminuria is not clear. Albuminuria is thought to be an indicator of glomerular endothelial dysfunction and of macromolecular hyper-permeability (5). This hyper- permeability includes trans-vascular lipoprotein leakage, and may cause an accumulation of lipid molecules under the endothelium in the arterial cell wall. Increased endothelial permeability and endothelial dysfunction are the main pathologic changes in atherosclerosis. In patients with CAD other factors have been explored, urinary albumin has been recently identified (6-10). The aim in this study is to assess correlation between UACR and documented coronary artery disease.

**Objectives:-** To assess correlation between urinary albumin creatinine ratio with coronary artery disease and to correlate Urinary albumin creatinine ratio (UACR) with Framingham heart study Cardiovascular disease (FHS-CVD) score in all patients of coronary artery disease.

**Methods:**
This cross-sectional study, will be conducted in Medicine department, Jawaharlal Nehru medical college at central India after ethical clearance from ethical committee, from October 2019 to June 2021. Subjects to be included in study will be explained regarding the study and proper consent will be obtained. Exclusion criteria for this study is patients with hematuria, traumatic diseases, Congestive heart failure, Chronic renal disease, Macroalbuminuria (albuminuria above 300 mg/day). Patients who will be admitted in medicine department will get an ECG done. Blood samples for tests like CKMB and Troponin I will be sent. Coronary angiography will be performed by sending the patients to cardiology department. Patients in whom coronary artery disease is found, a random urine sample will be collected. Using

Beckman coulter by auto analyser albumin concentration will be measured. Urine albumin creatinine ratio will be calculated as mg/g creatinine.

**Data source/ measurement:**

A random urine sample will be collected. Concentration of urine albumin is measured by a Beckman Coulter AU 2700 auto-analyzer, using the turbimetric method. Urine albumin creatinine ratio is calculated. Normoalbuminuria will be defined as albumin levels less than 30mg/g of creatinine and microalbuminuria will be defined as patients with albumin levels 30 - 300 mg/g.

CAG will be done by the cardiologist in department of cardiology through right femoral/right radial artery. Reports of the coronary angiography will be collected. The number of vessels involved will be noted. For further need of primary coronary intervention or coronary artery bypass grafting SYNTAX score shall be used. Patients to be include under coronary artery disease are those with more than 505 stenosis or more than one major coronary artery involved.

**Expected outcome/ results:**

By conducting this study we will be gaining knowledge about the correlation between coronary artery disease and urinary albumin to creatinine ratio which will help to predict outcome. There was a positive correlation between UACR and CAD in Turkish population.

**Discussion:** Previous few studies were performed focussing on association between UACR and CAD. No study has been conducted yet to find the relationship between UACR and CAD in Indian population. Study done by Ulas Bildiric et al in turkey showed that UACR is associated with CAD. It also showed that UACR is a more valuable and reliable marker in CAD (6). Limited studies are available related to this topic and so this study intends to find out whether there is an association between UACR and documented CAD. Articles on different aspects of this study were reviewed (11-15). Goodman et al assessed the effects of Alirocumab on cardiovascular events after coronary bypass surgery(16). Jukema et al evaluated Alirocumab in patients with polyvascular disease and recent acute coronary syndrome odyssey outcomes trial (17). Effect of Alirocumab in various coronary artery conditions were assessed by Roe et al (18), Steg et al (19) and Bittner et al(20,21).

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