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Original Research Article

A Hospital Based Study on Profile of Non-Diabetic Patients with Microalbuminuria in Acute Coronary Syndrome

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Abstract:

Background: Microalbuminuria (MA) is a recognized marker of micro and macrovascular damage in patients with diabetes mellitus and is used as a stand-in for endothelial dysfunction in both diabetic and non-diabetic patients. It is defined as urinary albumin excretion of 30 to 299 mg/d in a 24-hour collection or 30 to 299 µg/mg creatinine in a spot collection. This investigation into the prevalence of microalbuminuria in non-diabetic Acute Coronary Syndrome (ACS) patients was undertaken.

Methods: A cross-sectional study was conducted at a hospital with 100 non-diabetic ACS patients in a row. The relationship between Microalbuminuria in study participants and traditional risk factors for coronary artery disease (such as smoking, hypertension, dyslipidemia, and obesity) was investigated. All cases underwent investigations in accordance with the Proforma, which were then entered into the SPSS program for analysis.

Results: In the study, there were 73% of non-diabetic ACS patients with microalbuminuria, which was statistically significant (p=0.04). The prevalence of microalbuminuria was statistically significantly greater throughout ACS presentations, peaking in NSTEMI (81.96%), STEMI (63.15%), and unstable angina (55%). With a history of smoking (81.25%, p=0.013) and hypertension (82.25%, p=0.013), it was discovered to be significant. Age, BMI, and dyslipidemia did not seen to be significantly associated. With an increase in risk variables, a statistically significant increased prevalence of microalbuminuria was observed.

Conclusion: The prevalence of microalbuminuria is higher in ACS patients. A statistically larger number of cases with a history of smoking, hypertension, and the presence of more risk factors were related with MA.

Keywords: Acute Coronary Syndrome, Microalbuminuria, Traditional risk factors.

Introduction

A urine albumin excretion increase of 30 to 299 mg/d in a 24-hour collection or 30 to 299 µg/mg creatinine in a spot collection is referred to as microalbuminuria (MA) [1]. Albumin Creatinine Ratio (ACR) enhanced clinical prediction above and beyond the baseline traditional multivariable risk models, according to evidence, and early urine albumin elevation in acute myocardial infarction is a robust independent predictor of long-term unfavourable clinical outcome [2]. The "Relationship between MA and the Presence and Extent of Coronary Atherosclerosis" study discovered that MA is a standalone predictor for the occurrence and severity of CAD. They concluded a strong relationship between MA and the severity of CAD3. Some studies show patients with higher proteinuria are at risk of developing higher degrees of ACS with adverse outcomes [3,4]. There is a study on outcomes in ACS patients that just considers ACS patients (while taking into account all the risk variables) [5]. We are aware that diabetes is a recognized factor in endothelial dysfunction (ED), and that its existence is equated to coronary artery disease. Therefore, we intended to eliminate diabetes in order to reduce confounding bias (other risk factors as hypertension and dyslipidemia are included).

Material and Methods

A cross-sectional observational study was conducted. In this study, 100 Acute Coronary Syndrome patients who were hospitalized to the department of medicine at the Ram Manohar Lohia Hospital and the Atal Bihari Vajpayee Institute of Medical Sciences in New Delhi from January 2022 to December 2022 were included. Patients included in this study were: Acute Coronary Syndrome included patients with 1. ST Elevation Myocardial Infarction (STEMI) 2. Non ST Elevation

Myocardial Infarction (NSTEMI). 3. Unstable Angina (UA).

The diagnostic criteria used for each were as under: 1) ST Elevation Myocardial Infarction (STEMI): Cases fulfilling two of the following three criteria- a) History of prolonged chest discomfort or angina equivalent (30 minutes). b) ST-elevation 1mm or more in two consecutive leads or new onset Left Bundle Branch Block (LBBB). c) Presence of elevated cardiac biomarkers. 2) Non ST Elevation Myocardial Infarction (NSTEMI): Severe chest discomfort having at least one of three features along with evidence of myocardial necrosis as reflected by abnormally elevated levels of biomarkers of cardiac necrosis. i) Occurring at rest (or with minimal exertion), lasting for > 10 minutes ii) Recent onset (i.e. within the prior 2 weeks) iii) Occurring with crescendo pattern (i.e. distinctly more severe, prolonged, or frequent than previous episodes. 3) Unstable Angina (UA): Angina pectoris or equivalent ischemic discomfort with at least one of three features: i) Occurring at rest (or with minimal exertion), lasting for > 10 minutes ii) Recent onset (i.e. within the prior 2 weeks) iii) Occurring with crescendo pattern (i.e. distinctly more severe, prolonged, or frequent than previous episodes.

The following cases were excluded: 1. Known cases of diabetes mellitus. Cases showing random blood sugar ≥200mg/dl. 2. MA >300mg µg/mg creatinine. 3. Serum Creatinine >1.5mg/dl. 4. Patients showing pyuria with urine microscopy showing ≥8WBC/hpf. 5. Patients with history of preexisting congestive cardiac failure.

All patients underwent a urine examination. Routine testing and microscopy, and the MA by Nyocard kit test. The process of collecting urine samples was described to the patients. A urine spot test was chosen to evaluate the viability of MA. After cleaning the penile area in males and the perineal area in females in the early morning, a midstream specimen was taken. All urine samples were collected aseptically in clearly labeled, universal screw-cap containers, and they were quickly sent to the lab for routine testing, microscope analysis, and MA estimate.

SPSS software version 20 was used to analyze the data, which was entered into an excel spreadsheet. Whenever necessary, percentages and mean values were generated, along with Pearson's correlation coefficient, the chi square test, t-tests, odds ratio, etc. P values were deemed significant at a predetermined alpha level of 5%.

Results

In this investigation, a total of 100 patients were examined. 32 of them were females and 68 were male, making the male to female ratio 2:12. Sixty-one percent (n=61) of the patients had NSTEMI, while 19% (n=19) had STEMI and 20% (n=20) had UA. In our investigation, the overall prevalence of MA was 73% (p=0.04); Table 1.

Table 1: Overall prevalence of microalbuminuria in Acute Coronary Syndrome

Urine	No. of patients	Percentage	p-value
Microalbuminuria	73	73.0%	0.04
No microalbuminuria	27	27.0%	

Out of 68 males and 32 females, 47 (69.11%) of the males and 26 (81.25%) of the females tested positive for MA (p=0.202); Table 2).

Table 2: Prevalence of microalbuminuria among Male and Female Patients

Urine	Male (n=68) [%]	Female (n=32) [%]	Odds ratio	p-value
Microalbuminuria	47 (69.12%)	26 (81.25%)	1.97	0.202
No microalbuminuria	21 (30.88%)	6 (18.75%)		

NSTEMI patients had the greatest MA prevalence, at 81.96%. The equivalent numbers for STEMI and Unstable Angina were respectively 63.16% and 55%. (p=0.035) The difference was statistically significant.

Table 3: Prevalence of microalbuminuria in different presentation of Acute Coronary Syndrome

Presentation of ACS	Total (n=100)	Microalbuminuria (n=73) [%]	No microalbuminuria (n=27) [%]	p-value
STEMI	19	12 (63.16%)	7 (36.84%)	0.035
NSTEMI	61	50 (81.86%)	11 (18.03)	
Unstable Angina	20	11 (55.0%)	9 (45.0%)	

Table 4: Prevalence of microalbuminuria with risk factors

Risk factors (n)	Microalbuminuria	No microalbuminuria	p-value
Smoking			
• Yes (64)	52	12	0.013
• No (36)	21	15	
Hypertension			
• Yes (62)	51	11	0.014
• No (38)	22	16	
Obesity (BMI>25kg/m^2)			
• Yes (59)	45	14	0.221
• No (41)	28	13	
Dyslipidemia			
• Yes (61)	47	14	0.254
• No ()39	26	13	

One or more risk variables were being evaluated in 98 out of 100 ACS patients. In patients without any risk factors, 50% had MA, 40% with one risk factor had MA, 75% with two risk factor had MA, and 86% with three or more risk factors had MA. A statistically significant difference existed (p=0.001).

Table 5: Relative Prevalence of microalbuminuria in Acute Coronary Syndrome according to Number of risk factors

Risk factors	Total (n=100)	Microalbuminuria (n=73) [%]	No microalbuminuria (n=27) [%]	p-value
None	2	1 (50%)	1 (50%)	0.001
One	20	8 (40%)	12 (60%)	
Two	28	21 (75%)	7 (25%)	
Three or more	50	43 (86%)	7 (14%)	

Discussion

In this study, there were 73% of non-diabetic ACS who had micro-albuminuria generally, which was statistically significant (p=0.04).

The results of research conducted elsewhere, which range from 58 to 92%, are also similar.6–10 F Aziz et al. study indicated that 56.5% of angiographically proven severe CAD patients (luminal narrowing > 70%) had MA. [11], In a similar vein, Silva et al. study on the prevalence of MA in 39 patients with angiographically verified serious lesions (stenosis > 70%) in at least one coronary artery reported that 33% of cases were statistically significant and had MA. [12] Due to varying inclusion criteria, the results of the aforementioned studies cannot be compared to those of our investigation, but they nonetheless demonstrate that MA is present in a statistically substantial proportion of instances with coronary artery disease.

According to this study, there was no difference in MA between the sexes (p=0.202). A few studies [13,14] also have comparable findings, although Basu et al. case control study discovered that there were statistically significantly more males (83.33%) than females (40%) in the study [6]. The prevalence of MA was found to be 23% in the age group 56 years and above and 5% in the age group 55 years and below in the study conducted by Silva et al on determination of MA in hypertensive patients and in patients with coronary artery disease. This difference was statistically significant. [12] NSTEMI patients had the greatest MA prevalence, at 81.96%. The equivalent numbers for STEMI and Unstable Angina were respectively 63.15% and 55%. (p=0.035) The difference was statistically significant. In their study on acute coronary syndrome named MA as atherosclerotic risk factors and its connection, Zeeshan A, Ahmad Z, Tahir GA, and Yaqoob Y discovered MA in 20.4% of patients of STEMI. NSTEMI and unstable angina had similar rates of 21.3% and 25.3%, respectively. [15] In Hyderabad, Pakistan, Abdul Ghaffar Memon and Mubashir Kolachi identified MA in 53.17 percent of STEMI cases and 15.8 percent of NSTEM cases in their investigation on the connection of MA in non-diabetic and non-hypertensive patients with acute myocardial infarction. [18]

In our series, MA was present in 52 (81.25%) of the 64 patients with a history of smoking, compared to 21 (58.33%) of the 36 non-smokers. (p = 0.013) The difference was statistically significant. In their investigation of 50 non-diabetic, non-hypertensive ACS patients, Basu A et al. discovered MA was present in 92% (23 out of 25) of the patients who smoked, but MA was only discovered in 10 (40%) of the 25 non-smokers. Statistics showed that the difference was substantial (p< 0.001)6. However, Bhalabhi Vaishali and Ghanekar Gayatri discovered MA in 50% (6 out of 12) of patients who smoked, which was not statistically significant (p>0.05) in their research of the connection between MA and numerous risk factors in acute coronary syndrome. However, their

study [7] also included instances of diabetes mellitus. Since smoking and MA have long been recognized to be associated, additional, extensive research is needed to ascertain how smoking and MA relate to patients with acute coronary syndrome.

In our investigation, MA was present in 51 (82.25%) of the 62 hypertension patients in our series, compared to 22 (57.89%) of the 38 normotensive individuals. ($p = 0.013$) The difference was statistically significant. In their research on the relationship between microalbuminuria and several risk factors in acute coronary syndrome, Bhalabhi Vaishali and Ghanekar Gayatri discovered that 8.82% of hypertension cases had microalbuminuria, which was not statistically significant ($p > 0.05$). They also included diabetic mellitus cases in their investigation [7]. Al-Saffar et al. discovered that microalbuminuria was present in 8 (22%) of the 37 cases of hypertension, compared to 13 (39% in 33 normotensive patients), in their study of non-diabetic patients with unstable angina/non-ST elevation myocardial infarction. ($p = 0.1$) The outcomes were not statistically significant. ST segment elevation MI cases were not included in their study [14].

In our study, the relationship between microalbuminuria and dyslipidemia and obesity was not significant; nevertheless, a few other studies have found a substantial relationship. [6,15–18]. In our study, 98 out of 100 ACS patients had one or more risk factors. In patients with no risk factors, microalbuminuria was prevalent in 50% of cases, 40% in cases with one risk factor, 75% in cases with two risk factors, and 86% in cases with three or more risk factors. It was statistically significant that there was a difference ($p = 0.001$). In their investigation on the relationship between microalbuminuria and multiple risk factors in ACS, Bhalavi Vaishali and Ghanekar Gayatri discovered that there was a statistically significant difference between the proportion of people with microalbuminuria who had multiple risk factors and those who did not. Massimo Cirillo et al. study, "Microalbuminuria in Non-Diabetic Adults: Relationship of Blood Pressure, Body Mass Index, Plasma Cholesterol Levels, and Smoking," found that, when it comes to non-diabetic middle-aged patients, blood pressure, BMI, and smoking all have positive relationships with the prevalence of microalbuminuria and the rate of urinary albumin excretion. These research' findings support the findings of our investigation.

Conclusion

In our study, there were 73% of non-diabetic ACS patients who had microalbuminuria overall. Males and females experience the same prevalence of microalbuminuria. In patients with NSTEMI, microalbuminuria was more common. A statistically increased number of instances of microalbuminuria were found to have a history of smoking, hypertension and an increase in risk factors.

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