

STUDY THE ASSOCIATION BETWEEN MICROALBUMINURIA AND INHOSPITAL COMPLICATIONS OF ACUTE ST SEGMENT ELEVATION MYOCARDIAL INFARCTION (STEMI) IN NONDIABETIC PATIENTS

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Abstract:

Background: Microalbuminuria occurs in diabetic patients with acute myocardial infarction but it has been reported that microalbuminuria occurs in non diabetic patients with acute myocardial infarction also. We want to study the association of microalbuminuria with non diabetic patients as indicator of in hospital complications.

Aims and objectives: To study whether microalbuminuria has predictive power for early in hospital complications in acute ST segment elevation myocardial infarction patients. (STEMI)

Methods: Study was carried over 64 patients, 40 male and 24 female diagnosed as acute ST elevation myocardial infarction in tertiary care center in Amravati district. Patients were clinically evaluated. ECG, CPK MB, RBS and microalbuminuria were analysed. Association of microalbuminuria and in hospital complications were studied

Result: Out of 64 patients 46 patients were having microalbuminuria. There is significant proportion of patients having early inhospital complications. Early inhospital complications are in the form of Arrhythmias, Conduction defects, Pulmonary edema, Post MI angina, Extension of MI and Death. 71.87 % of patients develop microalbuminuria and out of that 78.26 % of patients developed early in hospital complication as compare to 33.33 % of patient who were not having microalbuminuria.

Conclusion: Microalbuminuria is a significant predictor of in-hospital morbidity and mortality in non-diabetic patients with acute myocardial infarction.

Keywords: Microalbuminuria, inhospital complications, acute ST Segment elevation, nondiabetic patients

Introduction:

Acute myocardial infarction (AMI) is one of the most common diagnoses in hospitalized patients in industrialized countries. In the United States, approximately 525,000 patients experience a new AMI, and 190,000 experience are current AMI each year. Greater than 50% of death due to acute myocardial infarction occurs before patients reached to the hospital. The in-hospital mortality rate

after admission for AMI has declined from 10% to about 6% over the past decade. The 1-year mortality rate after AMI is about 15%. Mortality is approximately fourfold higher in elderly patients (over age 75) as compared with younger patients.¹ It is expected that CHD will become the most common cause of death in human history all over the world by the year 2020.²

Acute myocardial infarction remains a leading cause of morbidity and mortality

worldwide. Myocardial infarction occurs when myocardial ischemia, a diminished blood supply to the myocardium, exceeds a critical threshold and overwhelms myocardial cellular repair mechanisms designed to maintain normal operating function and homeostasis.³ The overall prevalence rate of CAD is 11% (age standardized, 9%).⁴

Many factors like age, diabetes mellitus (DM), prior angina, heart failure, and depressed left ventricular function, can adversely affect prognosis in subjects with acute myocardial infarction. In the healthy kidney over the 90% filtered albumin is reabsorbed by renal tubules. A small increase in glomerular vascular permeability results in an increase filtered albumin presented to the renal tubule. This cannot be reabsorbed and result in large increase in urinary albumin.⁵ Normal albumin excretion detected by radioimmunoassay or enzyme radioimmunoassay is < 30mg/day. Microalbuminuria is defined as urinary albumin concentration of 30 - 200 mg/L. Following the onset of systemic inflammation there is rapid rise in albumin excretion, peak albuminuria is detectable almost 2 days prior to the other markers of the systemic inflammation eg. CRP.⁶ Microalbuminuria is thought to reflect the glomerular component of systemic capillary leak that is fundamental to the pathogenesis of multiorgan failure.⁷ Microalbuminuria is used clinically to monitor incipient diabetic nephropathy, but it is known also to be non specific marker of inflammation both systemic and local, and appears to be useful as a predictor of outcome in several clinical situations like acute pancreatitis bacterial meningitis.⁸

Multiple new biomarkers and inflammatory markers of CHD have been identified such as, increased lipoproteins (a) levels, total plasma homocysteine, elevated plasma fibrinogen levels, plasminogen activating inhibitor (PAI), C reactive protein (CRP), different cytokines and microalbuminuria.

It is also noticed that the patients with MA have more severe angiographic CAD than those without MA.⁹ In normotensive persons with MA there is increased atherogenic risk factor pattern, so it may be taken as a marker for CHD in such patients although it is not certain that the associated metabolic changes of atherosclerosis are due to MA or results from some other metabolic disturbances such as insulin resistance.¹⁰

Microalbuminuria occurs in diabetic patients with acute myocardial infarction but it has been reported that

microalbuminuria occurs in non diabetic patients with acute myocardial infarction also. The aim of this study is to check the association of microalbuminuria in non diabetic STEMI patients with in hospital complications.

Aims and objectives:

To study whether microalbuminuria has predictive power for early in hospital complications in acute ST segment elevation myocardial infarction patients. (STEMI)

Material and methods:

This was a descriptive study performed over a period of 1 year at Dr. P. D. M. M. C. Amravati, a tertiary care hospital in department of medicine. The study protocols are approved by the ethics committee of the hospital and informed written consent was obtained from all patients. Study was conducted over a period of 1 year between August 2015 to August 2016. 64 patients, 46 male and 18 female with acute myocardial infarction fulfilling following inclusion and exclusion criteria were studied.

Inclusion criteria:

- Adult patients presented with acute ST segment elevation myocardial infarction within 6 hrs of onset of chest pain between age group of 18 years to 60 years.

Exclusion criteria:

- Patient presented after 6 hrs.
- Patients with diabetes mellitus.
- Hypertensive patients on ARB's and ACE Inhibitors
- Patients with nephropathy, UTI, Haematuria,
- Patients with CCF.
- Patients with Acute febrile illness.

Patients were admitted in ICU. Diagnosis of STEMI was done from clinical presentation, ECG changes and raised cardiac biomarker in form of CPK MB. Patients ECG, CPK MB and microalbuminuria were analyzed on day one of admission.

26 patients were having anterior wall MI, 19 patients were having inferior wall MI, 10 and 9 patients were having lateral and posterior wall MI respectively.

Urinary albumin was measured in the first 24 hour after onset myocardial infarction. A urine sample was collected from each patient after admission to the ICU and investigated to rule out urinary tract infection and hematuria which may cause false proteinuria. Microalbuminuria was measured by nephelometry. Routine investigations which include complete blood count, Liver function test, Kidney function test, Random blood sugar were also done to exclude any infection and other pathology.

A blood pressure was measured using a standard mercury sphygmomanometer and an appropriately sized cuff. 2D Echocardiography was done in first week of admission for assessment of cardiac function like ejection fraction,

RWMA etc.

Results

Table 1: Territory of myocardial infarct

	MA	NMA	Total
Ant wall MI	18	8	26
Inferior wall MI	13	6	19
Lateral wall MI	8	2	10
Posterior wall MI	7	2	9
Total	46	18	64

MA- Microalbuminuria, NMA- Non microalbuminuria

Out of 64 patients, 46 patients were having micro albuminuria which is 71.87% of total. Sex wise distribution suggests male preponderance with 40 male and 24 female patients. 26 patients belongs to anterior wall MI, followed by 19 patients of inferior wall MI. Lateral and posterior wall MI contribute with 10 and 9 patients respectively.

Table 2: Type of complications

	Ant wall MI		Inferior Wall MI		Lateral wall MI		Posterior wall MI	
	MA	NMA	MA	NMA	MA	NMA	MA	NMA
Pulmonary oedema	2	0	1	0	0	0	1	0
Arrythmia	3	1	3	0	2	1	2	1
Conduction default	4	1	1	0	2	0	1	0
Extention of MI	3	0	3	1	1	0	0	0
Post MI angina	2	1	2	0	1	0	1	0
Death	1	0	0	0	0	0	0	0
Total	15	3	10	1	6	1	5	1

MI- Myocardial Infarction, MA- Microalbuminuria, NMA- Non microalbuminuria

Table 3: Effect of age on the outcome of STEMI

Albuminuria	Age (yrs)		Total	STEMI	
	>40	< 40		Complicated	Uncomplicated
Microalbuminuria	39	7	27	36	10
Normo-albuminuria	9	5	37	5	9
Total	48	12	64	41	19

Table 4: Effect of smoking on the outcome of STEMI

Albuminuria	Smoking		Total	STEMI	
	Yes	No		Complicated	Uncomplicated
Micro-albuminuria	37	9	46	36	10
Normo-albuminuria	10	8	18	6	12
Total	47	17	64	42	22

Discussion:

In present study we take 64 patients diagnosed as acute myocardial infarction. Diagnosis of AMI done from clinical presentation, CPKMB, ECG. We found that out of 64 patients 46 patients had microalbuminuria and there is significant proportion of patients having early inhospital complications. Early inhospital complications are in the form of Arrhythmias, Conduction defects, Pulmonary edema, Post MI angina, Extention of MI and Death. 71.87% of patients develop microalbuminuria and out of that 78.26 % of patients developed early in hospital complication as compare to 33.33 % of patient who were not having microalbuminuria.

Studies which were conducted in past have mixed opinion regarding microalbuminuria and inhospital complications.

Study of Safaa Ali Khudhair et al found that microalbuminuria is significant predictor of in-hospital morbidity and mortality in patients with acute myocardial infarction.¹¹ Study carried by Abdul ghaffar et al found that microalbuminuria may have an association with AMI in absence of traditional risk factor like DM and Hypertension.¹²

Loannis Lekatsas et al found Microalbuminuria as a significant predictor of in-hospital morbidity and mortality in non diabetic patients with acute myocardial infarction.¹³ Lazzeri, Chiara et al studied microalbuminuria in hypertensive nondiabetic patients with ST elevation myocardial infarction and found that it does not yield prognostic information about in-hospital mortality or complications.¹⁴

Conclusion:

Microalbuminuria is significant predictor of in-hospital morbidity and mortality in patients with acute myocardial infarction.

Proforma:

Name:
Age:

Date:
Rg. No.:

Sex:

Date of MI:

Duration of symptoms:

Clinical Diagnosis:

Risk Factors:

ECG Findings:

CPK MB:

RBS:

Microalbuminuria:

Complications:

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