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Original Contribution

THE LEVEL OF MICROALBUMIN EXCRETION AND ITS SHORT TERM PROGNOSIS IN ACUTE MYOCARDIAL INFARCTION

P. Jordanova-Laleva[1], F. Grigorov[2], V. Petkova[1], S. Tisheva[2]

[1]Central Clinical Laboratory, University Hospital 'G. Stranski' Pleven
[2]Cardiology and Rheumatology Clinics, University Hospital 'G. Stranski' Pleven, Bulgaria

ABSTRACT

Microalbuminuria generally occurs in diabetic patients with acute myocardial infarction (AMI), and has been reported also in non-diabetic patients with AMI. Thus microalbuminuria is a significant prognostic factor in hospital mortality. The aim of the present study was to investigate the status of microalbuminuria in short-term prognosis in AMI patients. A prospective 30-day observation of 73 AMI patients, hospitalised in Pleven Cardiologic clinic, was conducted. Correlation dependence between microalbuminuria with major risk and prognostic factors in AMI patients was studied. The diabetic patients manifested microalbuminuria compared to non-diabetic patients. In addition, complications associated with AMI occurred more often in diabetic groups than in the non-diabetic. Significant correlations were found in both patient groups between microalbuminuria with its complications and microalbuminuria with heredity in ischaemic heart disease. Present results demonstrate and confirm a number of unclear problems regarding the role of microalbuminuria in AMI patients. Future surveys on treatment regimens that reduce albumin excretion rate without influencing other prognostic factors would contribute to a clearer answer on the status of microalbuminuria in achieving any medical objective in AMI patients.

Key Words: acute myocardial infarction, microalbuminuria, short-term prognosis

INTRODUCTION

The prognosis associated with myocardial infarction remains unfavourable, despite successes in treatment recorded in the last decade Considering the necessity of the precision of the risk in patients with myocardial infarction, many authors pay a lot of attention on the role and prognostic significance of new, non-traditional factors related to the clinical course and the outcome of myocardial infarction (for shorter or longer periods) such as the level of the natriuretic peptide, C reactive protein, condition of the metabolic control – before and during hospitalisation and microalbuminuria.

The microalbuminuria happens more often in diabetic patients with acute myocardial infarction (AMI) [1] but it has been reported even in non-diabetic patients with AMI. The microalbuminuria is a considerable predictive factor in intra-hospital mortality [2, 3] coronary incidents and the death over longer periods after myocardial infarction [4, 5]. A considerable higher and heavier degree of coronary disease has been registered in patients with AMI and microalbuminuria than in patients with AMI but without microalbuminuria [6].

From clinical practice point of view the investigation of microalbuminuria as a prognostic factor is of considerable importance since a lot of tests show that the microalbuminuria is a factor that could be modified. Some medicines and especially the inhibitors of Angiotensin Converting Enzyme, Angiotensin receptor blockers and statines [7, 8, 9] can decrease its level, which can turn out to be a value in finding therapeutic strategies about diminishing the cardiovascular disease mortality, including patients with myocardial infarction.

Above mentioned studies led us to investigate the relationship between microalbuminuria and the short-term prognosis among patients with AMI.

* **Correspondence to**: *Dr. Pavlina Laleva, Ivan Vazov Str., № 63 ent. Б, apt.10, 5800 Pleven, Bulgaria; E-mail: lalevi@optisprint.net*

MATERIALS AND METHODS

A prospective 30-day observation of 73 AMI patients, hospitalised in Pleven Cardiologic clinic, was conducted between 2004 and 2005. The level of the microalbumin secretion in the urine as well as the serum levels of the blood glucose, HвA1c, cholesterol, triglycerides, total creatinine phosphokinase (CPK), CPK-MB fraction (CK-MB), and creatinine of patients was tested. An echocardiography test was also made and the left ventricle ejection fraction (EF) and dimensions was measured. The biochemical indexes were determined using a biochemical analyser *Cobas Integra 400*. A Roche and a half quantity test Mikral were used to define the microalbuminuria. Patients with proteinuria data were excluded from the survey.

Apart from the already mentioned biochemical parameters, the analysis included also the following: age, gender, arterial hypertension, diabetes mellitus and its duration, heredity at ischaemic heart disease, dislipidaemia, smoking, past myocardial infarctions, heart failure, defined by ACC CLINICAL DATA STANDARDS—REFERENCE GUIDE [10]. Only patients with Type II diabetes were included in the study. The level of the microalbuminuria was tested between the third and the eighth day after hospitalisation in connection with AMI. The microalbuminuria was considered pathological when its value was more than 30 mg/24 h in a 24-hour diuresis. The levels of the blood glucose used in this study were those measured at hospitalisation after the AMI symptoms had increased (but not later than 12 hours after that). The peak of the CK and CK-MB was taken into account in the analysis. The rest of the biochemical tests were made by the third day of the hospitalisation from venous blood after a 12 hours fasting period.

Statistical analyses (including correlation analysis, multiple logistic regression and Cox proportional hazard regression analysis for assessment of factors that influence the survival) were performed using software package. The value of $p<0.05$ was considered as a level of statistical significance.

RESULTS

The main clinical characteristics and biochemical values of the tested AMI patients are shown on **Table 1**.

Table 1. *Clinical characteristics and biochemical indexes of the tested AMI patients.*

Clinical characteristics and values	$\bar{X} \pm SD$	***Relative part (%)***
Age(years)	65.14± 9.96	
Gender (men-women) (%)		men-78.08 women-21.92
Non-smokers(%)		59.8
Arterial hypertension (%)		61.64
Arterial hypertension-duration(years)	9.33± 8.13	
Diabetes mellitus (%)		32.88
First myocardial infarct (%)		73.97
Left ventricle ejection fraction(%)	45.11± 9.98	
Blood glucose at hospitalisation (mmol/l)	9.43± 4.16	
HbA1c (%)	5.31± 1.85	
CK (U/l)	893.03± 506.46	
CK-MB (U/l)	120.25 ± 68.15	
Cholesterol(mmol/l)	5.66± 1.81	
Triglycerides (mmol/l)	1.91± 0.96	
Mycroalbuminuria (%)		32.88

Significant correlations were established between the microalbuminuria and left ventricle hypertrophy (LVH) (r=0.37, p=0.006), microalbuminuria and the blood glucose at hospitalisation (r=0.24, p=0.013), microalbuminuria and the age (r=0.23, p=0.025).

In patients with AMI and microalbuminuria significant correlations were established between albumin excretion rate and 1) the age (r=0.471, p=0.011); 2) the duration of arterial hypertension (r=0.622,

p=0.001); and 3) the smoking (r=0.427, p=0.023. There is no significant relationship between albumin excretion rate and antihypertensive treatment or maintenance of blood pressure in target values of lipid indexes and EF before AMI. Both groups with and without microalbuminuria were not different in respect of age, EF and cholesterol levels, while the values of HbA1c (6.2±1.76% vs. 4.39±1.75%, p<0.001) and the levels of blood glucose at admission (11.64±5.32mmol/l vs. 7.37±1.83mmol/l, p<0.001) were significantly higher among the patients with microalbuminuria compared to those without microalbuminuria. According to our test, the patients with diabetes more often suffer from microalbuminuria in comparison with the patients without diabetes (45.8% and 26.5% respectively). Complications (fatal and nonfatal) related to AMI were also more often in diabetic groups compared to non-diabetic groups (54.2% and 22.5% respectively, p<0.05). There was no difference between both groups in connection with the levels of EF, CK and CK-MB levels. A considerable correlative dependence was observed between the microalbuminuria and complications in both diabetic and non-diabetic patients with AMI (as shown on **Table 2**). Significant correlation was detected between microalbuminuria and heredity for ischaemic heart disease, between microalbuminuria and the level of HвA1c.

Table.2 *Correlations between microalbuminuria in diabetics and non-diabetics*

Group Correlations	***Diabetics***	***Non-diabetics***
HвA1c and microalbuminuria	r=0.411, p=0.046	r=0.459, p=0.001
Heredity for Ischemic Heart Disease and microalbuminuria	r=0.491, p=0.015	r=0.621, p=0.000
Complications of AMI and microalbuminuria	r=0.497, p=0.014	r=0.298, p=0.038

It should be mentioned that among the 73 AMI patients studied only 4 (5.48%) died due to cardiovascular reasons.

DISCUSSION

Relative to other authors [3] we found also a relationship between the presence of microalbuminuria and complications of AMI. At the same time, the results of our survey do not show dependence and significant relationship between the microalbuminuria and the 30 days' mortality. In a seven-year survival period in patients after AMI, Kragelund et al. did not find any considerable relationship between microalbuminuria and mortality [11]. However, the number of patients in our survey was quite smaller compared to the patients in the above study.

Surveys during the recent years [even though it is up for discussion [12, 13] also accept that levels of microalbuminuria under the common ones might play a considerable role as prognostic factor [14]. Such low levels of microalbuminuria excretion are not demonstrated in our study. This fact excludes the possibility that the low levels of microalbimunuria could be related to decreased mortality found in our short –term study. Obviously there is no dependence and significant relationship between the presence of microalbuminuria and mortality among AMI patients studied.

We have established a correlative dependence between the presence of microalbuminuria and heredity for ischaemic heart disease. This could turn out valuable in the search for explanation of the mechanisms of microalbuminuria in prognosis of AMI.

CONCLUSIONS

Matched against the few publications on the topic, we think that our results could be useful in connection the importance of microalbuminuria as a factor for the short term prognosis of AMI.

The presence of a high correlation between microalbuminuria and the complications of AMI in the study groups of patients provide a reason for discussion on the importance of this index in evaluating the course and progress of the disease.

These results confirm the presence of many unclear problems regarding the role of microalbuminuria in AMI patients.

Future surveys with treatment regimens that reduce microalbumin excretion but do not influence the factors with prognostic significance would contribute to a clearer answer in the quest for microalbuminuria in AMI.

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