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Correlation of Microalbuminuria and Multiple Risk Factor in patients with Acute Coronary syndrome

Dr. Abbas F. Hlaihel[1] , Dheyaa Khalf Al-Omer[2] ,Dr. Ehsan Hasan[3] , Dr. Ahmed jabber[4]

[1]Assistant Professor in internal medicine, consultant internal medicine
[2]Assist professor Thi-Qar university collage of medicine
[3]MBChB
[4]M B Ch B

Abstract— Background: Microalbuminuria is associated with an increased risk of cardiovascular events and death and chronic kidney disease in patients with diabetes mellitus and hypertension. epidemiologic studies have found that microalbuminuria is predictive, independently of other risk factors, for all-cause and cardiovascular mortality and CVD events within groups of patients with diabetes or hypertension, and in the general population
Aim of study: This study was designed to determine Correlation of microalbuminuria and Multiple Risk Factors in Acute Coronary Syndrome.
Patients and methods: The present study was carried out during period Oct 2019 to Jan 2020 on patients presenting to AL-Nassiriya Heart center and AL-Hussein Teaching hospital . It was an observational comparison study in which comparison of two groups according to the presence and absence of microalbuminuria in patient diagnosed to have acute coronary syndrome after proper history, thorough clinical examination and investigations and find their correlation with multiple risk factors for acute coronary syndrome
Results and Discussion: Microalbuminuria in cases population was found to be in total 34 patients out of 55(61.81%);whereas in control population, 3 patients comprising of 14.81 On comparison of these two populations, the difference between occurrence of microalbuminuria was found to be stastically significant(x2 =11.7 and p value
1 In MA+ve cases ,there were 4 cases with DM,3 cases of hypertension ,6 smokers and 13 with multiple risk factors. In MA-ve cases there were 2 cases of DM ,1 case with hypertension and 6 smokers and only 2 with multiple risk factors. The difference between occurrence of microalbuminuria was significant in cases with multiple risk factors
). In the present study the difference in occurrence of microalbuminuria were significant ($p < 0.05$)in acute coronary syndrome with multiple risk factors than isolated factor which is similar to DIABHYCAR and HOPE study
Conclusions: This observation implies that microalbuminuria is significantly more commonly seen in patients with acute coronary syndrome as compared to healthy adults of same biological characteristics. The difference between occurrence of microalbuminuria was significant in cases with multiple risk factors than any isolated single risk factor

Key words: Microalbuminuria, syndrome, risk factors, acute coronary.

Introduction:

A lbuminuria is defined an abnormal excretion of albumin in urine while microalbuminuria is term exclusively used when albumin excretion in the urine in the range of 30-299 mg/g creatinine. It is a associated with endothelial dysfunction and increased risk for cardiovascular events and CV mortality especially, but not exclusively, in high-risk populations such as diabetics and hypertensive. [1]

Microalbuminuria is associated with an increased risk of cardiovascular events and death and chronic kidney disease in patients with diabetes mellitus and hypertension.
epidemiologic studies have found that microalbuminuria is predictive, independently of other risk factors, of all-cause and cardiovascular mortality and CVD events within groups of patients with diabetes or hypertension, and or in the general population. The pathophysiologic mechanism behind theses association between albumin excretion and CVD is not clear .first suggestion is that microalbuminuria may be a marker of CVD risk because it reflects subclinical vascular damage in the kidneys and other vascular beds. It may also marker of systemic endothelial dysfunction that predisposes to future cardiovascular events. [2]

The correlation between microalbuminuria and mortality was apparent from studies that involved high-risk patients[3] .
In a Heart Outcomes Prevention Evaluation (HOPE) substudy, Urinary albumin excretion can predicted mortality in patients with high cardiovascular risk (≥55 yr of age with CVD or diabetes plus at least one other cardiovascular risk factor) [4]
.All-cause mortality was 9.4% among patients without microalbuminuria versus 18.2% among those with microalbuminuria [1].

There are echocardiographic abnormalities associated with microalbuminuria including left ventricular (LV) dysfunction and hypertrophy, and also electrocardiographic abnormalities, in addition coronary heart disease (IHD) [5]
recent study that involved diabetic patients with type 1 without symptpms showed a higher incidence of myocardial ischemia, that detected by stress echocardiography and electrocardiography, in the presence of microalbuminuria *versus* absence theses findings in normoalbuminuria [6]

Acute coronary syndrome (ACS) is defined as group of clinical symptoms compatible with acute myocardial ischemia and includes unstable angina (UA), non—ST-segment elevation myocardial infarction (NSTEMI), and ST-segment elevation myocardial infarction (STEMI).[7] the number of vulnerable plaque components increased in ACS and diabetic patients I when there is microalbuminuria . making more intensive medical therapy is needed to stabilize the vulnerable plaque if microalbuminuria is observed in diabetic ACS patients.[8]

High-risk patients with non-ST-segment elevation acute coronary syndromes and albuminuria have poor outcome regarding morbidity and mortality independent of eGFR.[9]

Aim of study
The prognostic significance of microalbuminuria in persons with baseline CHD in the general population is unknown. Therefore, we undertook this study to examine the correlation of microalbuminuria with multiple risk factors in patient with acute coronary syndrome.

Subjects and Methods:
Retrospective study was carried out during the period of October 2019 to January2020 on patients presenting to AL-Nassiriya Heart center and AL-Hussein Teaching hospital . There were 55 cases satisfying the criteria for diagnosis of ACS as mentioned earlier and 27 healthy age and sex matched controls. It was an observational comparison study, in which intra group comparison was the main focus of analysis. This comparison was done between two groups formed in the study cases by dividing them in two groups according to the presence or absence of microalbuminuria.

All the patients who presented with the history, physical examinations and investigations (ECG, cardiac enzymes) satisfying the criteria for diagnosis of Acute coronary syndrom (STMI,NSTMI and Unstable angina (new onset angina, post MI,angina at rest) were included in the study. After proper history and thorough clinical examinations data were recorded and other data regarding history of hypertension, diabetes, tobacco use, smoking, past and family history of CAD were noted.

Every patients first morning urine sample on his or her second post admission day was collected and analysed for microalbuminuria by albumin creatinine ratio test . Microalbuminuria is defined by albumin creatinine ratio is from 30_300. Inclusion Criteria: All the patients with history of chest pain and diagnosis consisting of ACS were included in the study regardless of other parameters

Exclusion Criteria:

1) Those with presence of preexisting renal failure were excluded.
2) Those with stable ischemic heart diseases were not included.
3) Those with suspected ACS but investigations suggesting alternating diagnosis were excluded.
4)patient with albumin creatinine ratio more than 300.

Results
In this study there is 55 patients satisfying the criteria for diagnosis of ACS as mentioned earlier and 27 healthy age and sex matched controls.
The age group of patients with ACS was from 23-90yrs and that of controls was 28- 84yrs
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Table1:show characteristics of cases and control in study

	Cases	Control	Comment
Total Number	55	27	
Male	47(85.47%)	23(85.18%)	P>0.05
Female	8(14.54%)	4(14.81%)	P>0.05
Sex retio	5.875	5.75	P>0.05
Mean Age	52.78+12.96yrs	53+10.61yrs	P<0.05
Total MA+ve(patient)	34(61.81%)	4(14.81%)	P<0.05
Total MA+ve(Males)	28(59.57%)	4(100%)	
Total MA-ve(Females)	6((75%)	0	

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In this study which include 55 patients with ACS and 27 healthy control group there is 47 male [85.47%] versus 8 female [14.54%] in ACS group and 23 male [85.18%] versus 4 female [14.18%] in control group with non significant P value

The mean age for ACS group is 52.78 plus 12.96 years where for control group is 53 plus 19.61 years for control group with no significant p value

Microalbuminuria was found to be in 34 patients [61.81%] out of 55patients with ACS ;whereas in control population, 4 only comprising of[14.81%] with highly significant P value as seen in table 1

Table2:show variable in male and female in the prsent study .

	Males	Female	Comment
Total Cases	47	8	
MA+ve cases	28	6	P>0.05
MA-ve cases	19	2	P>0.05
MeanAge	50.55+11.6yrs	65+13.88yrs	P>0.05 But<0.1
Risk Factors	33(70.21%)	4(50)	P>0.05

In patients with ACS and positive microalbuminuria , there were 28(82.35%) males and 6(17.64%) females and the sex ratio was 4.66:1
.while in those with negative test ,there were 19(90.47%)males and 2(9.52%) females with the sex ratio of 9.5:1.There were 23(85.18%) males and 4(14.81%) females in the control group and the sex ratio was 5.75:1.

Mean age in male patients with ACS is 50.55 plus 11.6 years while in female in the same group is 65 plus 13.88 years. This observation suggests that females with ACS were older than males. Risk factors other than microalbuminuria are present in 33 male patient with ACS and 4 female patient only with p value more than 0.05 as seen in table 2

Table 3:age distribution of microalbuminuria in patients with acute coronary syndrome

Age group	Total cases [55]	microalbuminuria [34]	Normoalbuminuria [21]
Less than 50	24 [43.63%]	16[47.05%]	8[38.09%]
≥ 50	31[56.36%]	18[52.92%]	13[61.90%]

Table 4 :distribution of risk factors in patient with acute coronary syndrome

Risk factor	MA+ve(n=34)	MA-ve(n=21)	Total cases	P Value	Significance
Diabetes Mellitus	4(11.76%)	2(9.52%)	6(10.96%)	P>0.05	Not significant
Hypertension	3(8.82%)	1(4.76%)	4(7.27%)	P>0.05	Not significant
Smoking	6(17.46%)	6(28.57%)	12(21.81%)	P>0.05	Not significant
Multiple risk factor	13(38.23%) HTN+smoking G=5 DM+Smok ING=3 HTN+DM=3 HTN+DM+ Smoking =1	2(9.52%)	15(27.27%)	P<0.05	Significant
No risk factor	8(23.52%)	10(47.61%)	18(32.72%)	P>0.05	Not significant

In patients with ACS and positive test for microalbuminuria ,there were 4 cases with DM,3 cases of hypertension ,6 smokers and 13 with multiple risk factors. While in those with ACS and negative test there were 2 cases of DM ,1 case with hypertension and 6 smokers and only 2 with multiple risk factors. The difference between occurrence of microalbuminuria was significant in cases with multiple risk factors than any isolated risk factors. P value less than 0.05 as seen in table factors. P value less than 0.05 as seen in table 4

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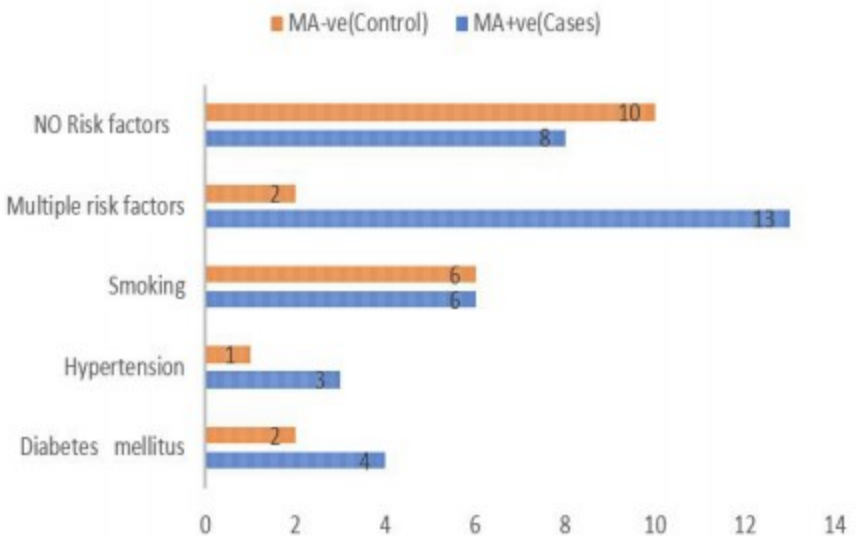

Fig.1:show the distribution of risk factor in cases in the presnt study

Discussion

In this study Microalbuminuria was found to be in 34 patients [61.81%] out of 55patients with ACS ;whereas in control population, 4 only comprising of[14.81%] with highly significant P value

Hilal etal study showed patients with UA/NSTEMI we found a strong correlation of microalbuminuria with echocardiographic changes and findings in coronary angiography.[10]

In this study Mean age in male patients with ACS is 50.55 plus 11.6 years while in female in the same group is 65 plus 13.88 years. This observation suggests that females with ACS were older than males.similar to the INTERHEART study [11] where age distribution was mean age of 59+12 for males and women were older than males by 5.4yrs . Various studies from all over world ,including Asia and India, suggest the maximum no of patients with MI or CAD are from the age group of 50-60yrs

.Case series study from Iran in 2001,average age of patients was 59.1+12.2yrs [12] In our study females with acute coronary syndrome were older than males similar to INTERHEART study. Microalbuminuria in females(75%) was more in our study than males(59.57%) but this difference was not statiscally significant ($p>0.05$) .This difference may be present due to the fact that females were overall older as compared to males and hence prone to endothelial dysfunction. In our study prevalence of microalbuminuria was higher in younger males as compared to older males(66.66% in males 50yrs of age)

. In the present study the difference in occurrence of microalbuminuria were significant ($p < 0.05$)in acute coronary syndrome with multiple risk factors than isolated factor which is similar to DIABHYCAR[13] and HOPE study.[14] Smoking is a recognized cardiovascular risk factor, and it may be also related to MAU

Smoking and microalbuminuria relation is well known for along time . We found a 50% microabumiuria ar present in smokers regardless of the duration and amount . In other studies , showed Microalbuminuria was more common in smokers than in non-smokers [15]

Conclusion

The present study concluded the occurrence of microalbuminuria is significantly more in patients with ACS as compared to the general population. Patients with multiple cardiovascular risk factors are more likely to have microalbuminuria rather than patients with isolated risk factors like diabetes, hypertension and smoking.

Recommendation:

A positive test for urinary albumin excretion could signify the need for an intensive multifactorial intervention strategy, including behavior modification and targeted pharmacotherapy, aimed at preventing further renal deterioration and improving the overall CVD risk factor profile. Data from intervention studies suggest that treatment with angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers, statins, and/or strict glycemic control (in diabetics) offer significant reductions in cardiovascular and/or renal morbidity in patients with microalbuminuria than any isolated risk factor

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