General Medicine

STUDY OF RELATIONSHIP BETWWEEN MICROALBUMINURIA & CRP IN UNCONTROLLED DIABETES

KEY WORDS: type 2 diabetes mellitus , CRP ,Microalbuminuria , Glycemic control , HbA1c

Dr.ANAND KUMAR
Department of General Medicine, senior resident of General Medicine, patna medical college and hospital,Bihar

Dr.PANKAJ HANS
Department of General Medicine,Associate professor,patna medical college and hospital

ABSTRACT

BACKGROUND: HbA1c is most commonly used parameter for glycemic control in type 2 diabetes mellitus patient.
AIM
- The aim of the study was to evaluate whether any association exists between C-reactive protein and microalbuminuria in well controlled and poorly controlled Type 2 DM patients. **METHOD** :
- In this study, we included total 90 patients of type 2 Diabetes Mellitus admitted in PMCH , Bhuj during the period from Aug. 2018 to June 2020.
- The subjects were divided into two groups according to glycemic control as Group 1(Poorly controlled Diabetics) and Group 2(Well controlled Diabetics)
- The groups 1 and 2 (based on Glycemic control) were further divided into 3 subgroups A, B and C (based on CRP level) with 15 subjects in each of these six subgroups.

RESULT: Subjects with poor glycemic control had elevated values of MAU at all comparative levels of CRP. Further, it was shown that the level of MAU increased considerably with increasing level of CRP.
CONCLUSION : There is a significant positive correlation between the level of MAU and CRP status in poorly controlled Type 2 diabetics.

INTRODUCTION:

- Microalbuminuria (MAU) is an established marker of diabetic nephropathy.[1,2]
- MAU refers to the excretion of albumin in urine at a rate that exceeds normal limits but is less than the detection level of traditional dipstick methods.[3]
- In addition to its established role as an early indicator of diabetic nephropathy, recent findings suggest that it may be an independent marker of cardiovascular risk.
- C-reactive protein (CRP) is one of the most sensitive markers of sub-clinical inflammation and is thought to represent a state of chronic low-grade inflammation of the arterial wall.[4]
- Because CRP and MAU reflect closely related components of the same disease process, a strong relationship between these two variables may be anticipated.

AIMS AND OBJECTIVES:

- To evaluate whether any association exists between C-reactive protein and microalbuminuria in well controlled and poorly controlled Type 2 DM patients.
- To evaluate the role of glycemic control in modifying the association between CRP and MAU.

MATERIALS AND METHODS:

- In this study, we included total 90 patients of type 2 Diabetes Mellitus admitted in PMCH, during the period from Aug. 2018 to June 2020.

INCLUSION CRITERIA:-

- Age of onset > 40 years of age
- serum creatinine < 1.5 mg/dl
- serum TG < 400 mg/dl
- absence of proteinuria with the dipstick test
- negative urine culture
- no significant past history other than diabetes

EXCLUSION CRITERIA:-

- Patient's Refusal.
- Patients with known major other systemic disorders

METHODOLOGY

- The subjects were divided into two groups according to glycemic control as Group 1(Poorly controlled Diabetics) and Group 2(Well controlled Diabetics)
- The groups 1 and 2 (based on Glycemic control) were further divided into 3 subgroups A, B and C (based on CRP level) with 15 subjects in each of these six subgroups.
- MAU was defined as an excretion rate of albumin between 30-300 mg/24 hours which is above normal values but till below values seen in conventional proteinuria.

Group 1: Poorly controlled Diabetics (FBS > 126 mg/dl, PPBS > 200 mg/dl, HbA1c > 10%)	
1A	CRP level between 0 – 3 mg/L
1B	CRP level between 3 – 6 mg/L
1C	CRP level between 6 – 9 mg/L
Group 2 : Well-controlled Diabetics (FBS < 110mg/dl, PPBS < 140 mg/dl, HbA1c < 8 %)	
2A	CRP level between 0 – 3 mg/L
2B	CRP level between 3 – 6 mg/L
2C	CRP level between 6 – 9 mg/L

RESULTS

Table 1: Poorly controlled Diabetics

Group 1: Poorly controlled Diabetics						
Sub Group	**CRP (mg /L)**	**MAU (mg/24hours)**			**Pearson's Correlation**	**Significance**
		Mean ± SD	**Range**	**% positives**		
1A	**0-3**	**78.30 ± 45.72**	**12 – 172**	**50**	**0.667**	**P < 0.01***
1B	**>3-6**	**150.0 ± 59.30**	**63 – 220**	**100**		
1C	**>6-9**	**208.9 ± 62.94**	**88 – 291**	**100**		

- As shown in this table, subjects with poor glycemic control had elevated values of MAU at all comparative levels of CRP. Further, it was shown that the level of MAU increased considerably with increasing level of CRP.

In diabetics with poor glycemic control (Group 1) shows a significant positive correlation (pearson's correlation coefficient 0.667, $p < 0.01$) between MAU and CRP level.

TABLE – 2 -Well-controlled Diabetics

Group 2: **Well-controlled Diabetics**				
Sub	CRP	MAU (mg/24hours)	Pearson's	Significan

	L)	± SD	positives	
				1

2B	>3-6	28.30 ± 13.89	8-56	50		
2C	>6-9	39.90 ± 17.41	13-73	50		

- In diabetics with adequate glycemic control (Group 2) MAU increased considerably with increasing level of CRP.
- But these variables failed to show any significant correlation (pearson's correlation coefficient 0.342, $p > 0.05$).

DISCUSSION

- The present study was conducted to evaluate whether any association exists between CRP and MAU status in type 2 DM patients and if such association is modified significantly by glycemic control.
- The results of the present study showed a significant increase in MAU of patients with poor glycemic control when compared with well-controlled diabetics at comparative status of CRP.
- Also, it was found that mean levels of CRP was significantly more in microalbuminuric subjects than normoalbuminurics
- Because MAU and CRP are shown to be closely associated in poorly controlled DM, the cause of this relationship has been hypothesized.
- These findings suggest that chronic inflammation could emerge as a potential mediator between MAU and macrovascular disease.
- It may be summarized that poor glycemic control increases the risk of complications of DM 2 in part through causing endothelial dysfunction, increased inflammatory activity and MAU.
- As well as underscores the importance of proper glycemic control in arresting the progression of inflammation.

CONCLUSION:

It may be concluded from the results of this study that:

- MAU is significantly more in patients with poor glycemic control than in well-controlled diabetics at similar levels of CRP.
- There is a significant positive correlation between the level of MAU and CRP status in poorly controlled Type 2 diabetics.
- This correlation is absent in diabetics with adequate glycemic control.

REFERENCES

1. Caramori M, Fioretto P, Mauer M. The need for early predictors of diabetic nephropathy risk: is albumin excretion rate sufficient? Diabetes 2000; 49:1399- 1408.
2. Mogensen C.Microalbuminuria predicts clinical proteinuria and early mortality in maturity-onset diabetes. N Engl J Med 1984; 310: 356-60.
3. American Diabetes Association.Diabetic nephropathy. Diabetes Care 2003; 26 (Suppl 1)S94- S98.
4. Ross R. Atherosclerosis– an inflammatory disease. N Engl J Med 1999; 340: 115-26.