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International Journal of Clinical Biochemistry and Research

Journal homepage: https://www.ijcbr.in/

Original Research Article

Study of HbA1c & microalbumin in urine in patients of metabolic syndrome

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ARTICLE INFO

Article history:
Received 27-10-2021
Accepted 27-11-2021
Available online 05-01-2022

Keywords:
Microalbuminuria
Diabetes

ABSTRACT

Objective: We aimed to provide correlation of HbA1c & Microalbumin in urine in patients of metabolic syndrome.
Materials and Methods: 100 patients coming to OPD of Medicine department in Shri Mahant Indresh Hospital. Plasma samples taken for Hba1c and urine for microalbumin and run on VITROS 5600/7600 and reported for Hba1c & microalbumin.
Results: 51 were males and 49 were females out of 100 total patients. For males age mean & SD was 55.84±13.52 & for females was 57.56±10.08.
For raised and unraised HbA1c 10.42±+9.628 & 5.066±.0.216 for raised and unraised microalbumin 412.±1133 & 11.97±7.129.
When we compared both HbA1c and microalbumin in both males and females then mean and SD came out to for HbA1C for males 8.56±2.663 and females were 11.62±12.86 with t value 2.327 and p value 0.021 that states it was significant. And for micralbumin for male 391.5±1184 & for females 60.37±116.6 t value was 2.7832 and p value was 0.0059 it also states it was significant.
Therefore both the parameters were significant in patients of metabolic syndrome.

1. Introduction

The term metabolic Syndrome refers to: abdominal obesity, insulin resistance, hypertension & dyslipidemia (elevated triglyceride and decreased HDL Cholesterol level).[1]

Microalbuminuria, defined as a urine albumin- creatinine ratio (UACR) of > 2 g/mmol, originally has been used as an early warning sign of chronic kidney disease and diabetic nephropathy by H.C. Gerstein & J.F. Mann.[2] Additionally, it has been known as a useful predictor of cardiovascular events in adults.[3–5] Microalbuminuria is considered as an early indicator of chronic renal disorder, vascular dysfunction and cardiovascular mortality.[6–8] Microalbuminuria is more frequent in subjects with type 2 Diabetes[8] and has been included in the unifying definition of Metabolic Syndrome (MetS) suggested by WHO.[9] In previous studies, microalbuminuria was associated with hypertension and abdominal obesity.[10,11]

MetS is a group of metabolic abnormalities characterized by elevated blood pressure, hyperglycemia, abdominal obesity, high triglycerides and reduced high-density lipoprotein cholesterol that collectively increases the risk of diabetes, cardiovascular diseases, and overall mortality.[12–14] The American Heart Association criteria[15] did not include microalbuminuria as part of MetS. Several studies have shown association of microalbuminuria with MetS and its components in adults.[16–18]

HbA1c refers to glycated haemoglobin. It develops when haemoglobin, a protein within red blood cells that carries oxygen throughout your body, joins with glucose

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https://doi.org/10.18231/j.ijcbr.2021.066

Table 1:

	Male	Female			
Parameter	Mean±SD	Mean±SD	T Value	P Value	Significant
Age	55.84±13.52	57.56±10.08	0.7212	0.4725	NS(P≥0.05)
HBA1C	8.564±2.663	11.62±12.86	2.327	0.021	S(P≤0.05)

Table 2:

	Male	Female			
Parameter	**Mean±SD**	**Mean±SD**	**T Value**	**P Value**	**Significant**
Age	55.84±13.52	57.56±10.08	0.7212	0.4725	NS(P≥0.05)
Microalbumin	371.5±1184	60.37±116.6	2.7832	0.0059	S(P≤0.05)

Table 3:

	Raised	Unraised			
Parameter	**Mean±SD**	**Mean±SD**	**T Value**	**P Value**	**Significant**
HBA1C	10.42±9.628	5.066±0.216	5.5595	0.0001	S(P≤0.05)
Microalbumin	412.1±1133	11.97±7.129	3.5315	0.0005	S(P≤0.05)

Table 4:

	Male	Female			
Parameter	**Mean±SD**	**Mean±SD**	**T Value**	**P Value**	**Significant**
HBA1C	8.564±2.663	11.62±12.86	2.327	0.021	S(P≤0.05)
Microalbumin	391.5±1184	60.37±116.6	2.7832	0.0059	S(P≤0.05)

Table 5:

	HBA1C	Microalbumin			
Parameter	**Mean±SD**	**Mean±SD**	**T Value**	**P Value**	**Significant**
Age	56.7±11.89	56.7±11.89	0	1	NS(P≥0.05)
observed value	12.24±12.88	280.5±1043	2.5718	0.0108	S(P≤0.05)

in the blood becoming glycated. By measuring glycated haemoglobin clinicians are able to get an overall picture of what our average blood sugar levels have been over period of weeks/months. When the body processes sugar, glucose in the blood stream naturally attaches to haemoglobin. The amount of glucose that combines with this protein is directly proportional to the total amount of sugar that is in our system at that time. Because red blood cells in human body is for 8-12 weeks before renewal measuring glycated haemoglobin can reflect average blood glucose levels over that duration providing a useful longer term blood glucose control.

2. Results

According to this study there is significant correlation of HbA1c and Microalbumin in patients of Metabolic syndrome. When we compared both HbA1c and microalbumin in both males and females then mean and SD came out for HbA1C for males 8.56±2.663 and females were 11.62±12.86 with t value 2.327 and p value 0.021 that states it was significant. And for micoralbumin for male 391.5±1184 & for females 60.37±116.6 t value was 2.7832 and p value was 0.0059 it also states it was significant.

Therefore both the parameters were significant in patients of metabolic syndrome.

3. Discussion

In this study we found strong positive associations between microalbuminuria and metabolic syndrome in both males and females. These results indicate microalbuminuria may be a component of metabolic syndrome supporting results from other epidemiological studies.[19–22] Hypertension has long been associated with microalbuminuria.[19,20,23,24] Increased intraglomerular capillary pressure is thought to cause leakage of albumim.[25] Clinically microalbuminuria may be an indicator of early vascular complications of hypertension. Yudkin[26] proposed in 1996 that the clustering of risk factors attributed to insulin resistance and microalbuminuria may all be features of damage to different aspects of endothelial functions. Signs of early endothelial dysfunction as manifested by microalbuminuria may herald impending renal impairment and may offer another focus for treatment of metabolic syndrome.

Studies suggest that prevalence of microalbuminuria is greatest in populations with both hypertension and diabetes.[27–29] Microalbuminuria may reflect chronicity of even mild BP and glucose elevations.

Further research in this area could investigate the longitudinal relationship and explre pathways between metabolic syndrome and microalbuminuria.

4. Source of Funding

None.

5. Conflict of Interest

The authors declare no conflict of interest.

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Cite this article: Ahsan F, Qureshi N, Samreen S, Kukreti S. Study of HbA1c & microalbumin in urine in patients of metabolic syndrome. *Int J Clin Biochem Res* 2021;8(4):308-311.