Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 7, Issue, 02, pp.12507-12509, February, 2015

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

HYPERTENSION IS ONE OF THE PREDISPOSING FACTOR IN DEVELOPMENT OF MICROALBUMINURIA IN DIABETIC NEPHROPATHY

[1,*]Muhammad YousufMemon, [2]Muhammad Azhar Mughal, [3]Hajira Naila Rahu, [4]Ali Akbar Rahu, [5]Khemo Mal A Karira and [1]Ali Raza Memon

[1]Department of Biochemistry, Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro Sindh, Pakistan
[2]Department of Pharmacology,Jinnah Sindh Medical University Karchi Sindh, Pakistan
[3]Department of Physiology, Peoples University of Medical and Health Sciences (For Women) Nawabshah Sindh, Pakistan
[4]Department of Biochemistry, Peoples University of Medical and Health Sciences (For Women) Nawabshah Sindh, Pakistan
[5]Sir Syed Medical Collage Karachi, Sindh, Pakistan

ARTICLE INFO

Article History:
Received 14th December, 2014
Received in revised form
07th January, 2015
Accepted 15th January, 2015
Published online 26th February, 2015

Key words:
Type II Diabetes Mellitus, Hypertension, Albumin in Urine.

ABSTRACT

Non-insulin dependent diabetic subjects have higher morbidity and mortality for various vascular events than does those in general population. Cerebrovascular and renal diseases related to the progression of atherosclerosis are well known to be the frequent cause of death and microalbuminuria has been shown to predict increased morbidity and early mortality in non-insulin dependent diabetes mellitus.

INTRODUCTION

Diabetes mellitus is the most common of endocrine disorders and is worldwide in distribution (**Frier *et al*., 1999**). It is a chronic disorder characterized by impaired metabolism of glucose and other energy yielding fuels (**Sherwin 1996**), and represents a syndrome with disordered metabolism and an inappropriate hyperglycemia due to either absolute deficiency of insulin secretion or a reduction of its biologic effectiveness or both (**Karam 1999**). In diabetic patients mortality rate increases excessively with the onset and progression of diabetic nephropathy (**Sawicki *et al*., 1994**), while renal dialysis and transplantation may delay early mortality and improve the quality of life (**Klein *et al*. 1995**). The majority of diabetic patients entering chronic dialysis have NIDDM (~60%), although there is substantial proportion of end stage renal disease with IDDM (~40%). This is because nephropathy more frequently complicates IDDM than NIDDM, but there are many more NIDDM patients in the general population (**Consensus Statement 1994**).

Corresponding author: Muhammad Yousuf Memon,
Department of Biochemistry Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro Sindh, Pakistan.

Diabetic microalbuminuria is defined as "sub-clinical" albuminuria, that is, excretion rates of albumin, which are abnormally elevated but not detectable by routine laboratory procedures (**Mogensen *et al*., 1986; Nelson *et al*., 1995**). The primary and most important cause of microalbuminuria in diabetes is an early phase of diabetic nephropathy. However, it should be stressed that there are a number of other factors that enhance albumin and protein excretion, in normal persons as well as in diabetics (**Mogensen *et al*., 1986**).

Several modifiable risk factors for the development and progression of microalbuminuria, such as poor glycemic control, slightly increased blood pressure, smoking, hyperlipidemia, and strict metabolic control have been identified (**Park *et al*., 1998**).Both poor control of diabetes and high blood pressure, are associated with a high urinary albumin excretion in diabetes (**Mogensen 1984**). Increased Blood Pressureis a major determinant in the progression towards end-stage renal failure. Numerous cross sectional studies have shown that microalbuminuria is associated with the increased blood pressure (**Poulsen *et al*. 1994**). It affects the progression of microalbuminuria to overt proteinuria in NIDDM (**Tanaka *et al*., 1998**), especially systolic blood

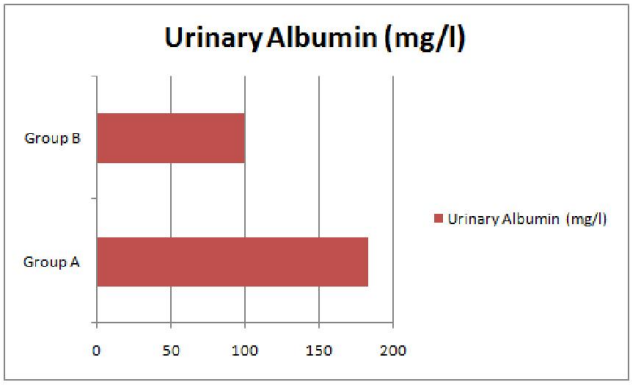
pressure has a positive influence on the progression of microalbuminuria (**John *et al.*, 1994**). It is well established that overt proteinuria in type I diabetes is associated with elevated blood pressure and early mortality. Effective antihypertensive treatment has been shown to slow the progression of diabetic renal disease (**Mogensen, 1984**); especially angiotensin converting enzyme (ACE) inhibitors have been shown to slow the rate of deterioration of albumin excretion rate and creatinine clearance in normotensive microalbuminuric NIDDM, although the superiority of ACE inhibitors over other antihypertensives that has been demonstrated in IDDM has not been confirmed in NIDDM. There is controversy as to whether an increase in blood pressure precedes or is a result of the development of microalbuminuria (**Jones *et al*., 1998**).

MATERIALSAND METHODS

The proposed study was carried out in the Department of Biochemistry, Basic Medical Sciences Institute, Jinnah Postgraduate Medical Center, and Karachi. Total 50 patients selected for this study, and they were divided in two groups. Group A include 25 patients suffered from hypertension & diabetes mellitus type II and group B include 25 patients suffered from type II diabetes but having no hypertension. Bot groups having diabetes from more than 15 years. Twenty-four hour urine samples were collected in the 5 liter plastic containers, which were washed with 15% HCl and rinsed with deionized water.

Table 1.

Variables	Group A	Group B
FBS (mg/dl)	185	165
B.P (mmHg)	155/105	125/80
Urinary Albumin (mg/l)	100	183



Graph 1.

All subjects were provided with a labeled container, containing 5 ml toluene as a preservative and a bag in which to carry the container. The 24-hour urine collection was started in the morning at 8.00 a.m. after discarding the first urine passed, then all urine produced for remainder of the day and overnight was added to the specimen container, till next morning at 8.00 a.m. Immediately after collection, the urine was poured into a measuring cylinder and the volume of each specimen was recorded and processed for determination of microalbuminuria, and creatinine. Three consecutive 24-hour urine samples of each subject were collected, and if in two out of three found positive microalbuminuria, were included in the study.

Blood glucose levels were estimated by the glucose oxidase method. All the result was statistically analyzed by SPSS version 16.

RESULTS

The mean Fasting blood sugar levels of group A was 185 mg/dl, while group B was 165 mg/dl. The mean systolic B.P of group a was 155mmHg while 125 mmHg of group B, and diastolic B.P of group A was 105mmHg while 80 mmHg of group B. The urinary albumin of group A patients 183mg/l while group B levels were 100mg/l.($p< 0.01$). Finally the results show that hypertension is one of the contributing factor of microalbuminuria in the patients of diabetes mellitus type II which move toward complication of diabetic nephropathy.

DISCUSSION

Non-insulin dependent diabetic subjects have higher morbidity and mortality for various vascular events than does those in general population. Cerebrovascular and renal diseases related to the progression of atherosclerosis are well known to be the frequent cause of death (**Nakano *et al*., 1998**), and microalbuminuria has been shown to predict increased morbidity and early mortality in non-insulin dependent diabetes mellitus (**Yudkin *et al*., 1988**).

Nelson *et al*. (1995) have reported in their study, that the incidence of urinary albumin excretion was related to the retinopathy, type of diabetes, longer duration of diabetes, higher values of mean arterial pressure, glycated hemoglobin, and fasting blood glucose concentration at the base line. Many other authors have also reported the association of poor glycemic control with the development of microalbuminuria (**Mathiesen *et al*., 1995; Klein *et al*., 1995; Park *et al*., 1998; Mattock *et al*., 1998), and progression of microalbuminuria to early nephropathy (Jones *et al*., 1998**). **Mogensen, (1984)** have demonstrated the association of glycemic control and blood pressure with high urinary albumin excretion. In his study the increase in albumin excretion due to poor glycemic control is considerably less than the increase associated with diabetic nephropathy, in which hypertension is the prominent finding.The present study shows that hypertension is one of the major factor to develop microalbuminuria in diabetic patients esp: suffering from nephropathy.

REFERNCES

Consensus Statement. Consensus development conference on the diagnosis and management of nephropathy in patients with diabetes mellitus. *Diabetes Care,* 1994; 17(11):1357-61.

Frier, B.M., Truswell, A.S., Shepherd, J., Delogy, A. and Jung, R..1999. Diabetes Mellitus and Nutritional and Metabolic disorders, In: Davidson's Principles and Practice of Medicine, 18th ed. Churchill Livingstone, pp. 471-542.

Jones, C.A., Leese, G.P., Kerr, S., Isherwood, D.I., Vora, J.P., Hughes, D.A. and Smith, C. 1998. Development and progression of microalbuminuria in a clinic sample of patients with insulin dependent diabetes mellitus. *Arch Dis Child.,* 78:518-23.

Karam, J.H.1999. Diabetes mellitus and Hypoglycemia, In: Current Medical Diagnosis and Treatment, 38th ed. Appleton and Lange, pp.1118-60.

Klein, R., Klein, B.E.K., Moss, S.E. and Cruickshanks, K.J. 1995. Ten-year incidence of Gross Proteinuria in people with Diabetes. *Diabetes,* 44:916-923.

Mathiesen, E.R., Ronn, B., Storm, B., Foght, H. and Deckert, T. 1995. The natural course of microalbuminuria in insulin dependent diabetes: A 10 year prospective study. *Diabetic Med.,* 12:882-7.

Mogensen, C.E., Chachati, A., Christensen, C.K., Close, C.F., Deckert, T., Hommel, E., Kastrup, J., Lefebvre, P., Mathiesen, E.R., Feldt-Rasmussen, B., Schmitz, A. and Viberti, G.C. 1986. Microalbuminuria: An early marker of renal involvement in diabetes. Uremia Invest., 9:85-95.

Mogensen, C.E.1984. Microalbuminuria predicts clinical proteinuria and early mortality in maturity onset diabetes. *N. Eng. J. Med.,* 310:356-60.

Nakano, S., Fukuda, M., Ito, I., Ishii, T., Kitazawa, M., Nishizawa, M., Kigoshi, T. and Uchida, K. 1998. Reversed circadian blood pressure rhythm is associated with occurrence of both fatal and non-fatal vascular events in NIDDM subjects. *Diabetes,* 47:1501-06.

Nelson, R.G., Knowler, W.C., Pettitt, D.J., Hanson, R.L. and Bennett, P.H.1995. Incidence and determinants of elevated urinary albumin excretion in Pima Indians with NIDDM. *Diabetes Care,* 18(2):182-187.

Poulsen, P.L., Hansen, K.W. and Mogensen, C.E.1994. Ambulatory blood pressure in the transition from normo- to microalbuminuria. A Longitudinal study in IDDM patients. *Diabetes,* 43:1248-54.

Sawicki, P.T., Didjurgeit, R., Muhlhauser, I., Bender, R., Heinemann, L. and Berger, M. 1994. Smoking is associated with progression of Diabetic nephropathy. *Diabetes Care,* 17:126-31.

Sherwin, R.S.1996. Diabetes mellitus, In: Cecil, Textbook of Medicine, edited by Bennet JC, Plum F., 20th ed., Philadelphia, Saunders Company, pp.1258-67.

Tanaka, Y., Atsumi, Y., Matsuoka, K., Onuma, T., Tohjima, T. and Kawamori, R. 1998. Role of glycemic control and blood pressure in the development and progression of nephropathy in elderly Japanese NIDDM patients. *Diabetes Care,* 21:116-20.

Yudkin, J.S., Forrest, R.D. and Jackson, C.A. 1988. Microalbuminuria as predictor of vascular disease in non-insulin dependent diabetic subjects. Islington diabetes survey. Lancet, 1:530-3.

****