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Original Research Article

Association between Diet and Kidney Function Indicators in Type 2 Diabetes mellitus

Pankaj Bhushan[1], Shahnawaz Hasan[2]

[1]Tutor, Department of Biochemistry, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar
[2]Assistant Professor, Department of Biochemistry, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar

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Corresponding Author: Dr. Shahnawaz Hasan
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Abstract:

Background & Aims: Diet directly link to risks chronic diseases. Few studies explore relationships between dietary pattern & kidney function in adult type 2 diabetic in Bhagalpur.

Method: Diabetic patients (n=50) were selected from JLNMC, Bhagalpur, Bihar. Participated in diabetic cannot study in Bhagalpur. Two dietary pattern Vegetarian & non-Vegetarian were generated as factor analysis. Urinary albumin to creatinine ratio (ACR) and creatinine served as clinical indicator of kidney function.

Result: After adjusting for confounder t-scores of vegetarians and correlated significantly p trend=0.95 that means of decreased creatinine &ACR marginally non-vegetarian a correlated significantly p trend =0.95 that means of increased creatinine & ACR marginally. That is Non vegetarians was marginally associated with creation (p trend=0.95) and ACR

Conclusion: Healthy diet such as vegetarian may be related to indicate better kidney function in type 2 diabetes, further prospective studies with large sample sizes and use of sensitive indicated for studying early renal function decline are needed to confirm this association.

Keywords: DM, Diet, ACR, Urinary albumin, creatinine ratio.

Introduction

Diabetes Mellitus is a group of disease-causing metabolic hyperglycemia leads to macrovascular and microvascular complications causing significant morbidity and mortality among diabetic people. Etiologically, Type 1 Diabetes Mellitus is characterized by P-cell destruction caused by an autoimmune process, usually leads to absolute insulin deficiency whereas Type-2 Diabetes Mellitus is characterized by insulin resistance in peripheral tissues and an insulin secretory defect of the B-cell. According to WHO-globally, the number of people with diabetes is expected to rise up to 300 million (prevalence rate 5.4%) by the year 2025. According to Joshi. SR (Diabetes care in India) diabetes mellitus has emerged as a major health problem in India. There are 66.8 million people with diabetes in India in 2015 and this number is predicted to rise up to 70 million by 2025. By that time every fifth diabetic person will be an Indian. Therefore, Joshi SR et al (2007) stated India – "Diabetic Capital of the world." Diabetic Nephropathy, retinopathy and neuropathy are most common complications of uncontrolled diabetes mellitus. The risk of chronic complication in diabetic patients depend on duration of hyperglycemia and usually manifested after 10 years. Diabetic Nephropathy is one of the common causes of morbidity and mortality in diabetic patients. Pathogenesis of Diabetic glomerulopathy is due to (a)formation of advanced glycation end products (b) Activation of protein kinase-c and (c) Intra cellular hyperglycemia with disturbance in polyol pathway. Advanced glycation end products (AGEs) are formed as a result of non-enzymatic reactions between intracellular glucose derived dicarbonyl precursors with amino group of both intracellular and extracellular protein and promote glomerular dysfunctions. In the capillaries of renal glomeruli albumin binds to the glycated basement membrane causing increased basement membrane thickening which is characteristic of diabetic microangiopathy. The capillaries of glomeruli with the thickened basement membrane are more leaking than normal capillaries to the plasma proteins. The microangiopathy is the basic pathogenesis for development of diabetic nephropathy. "Proteinuria" refers to increase in urinary excretion of albumin and other specific protein or total protein where as "Albuminuria" refers to increase in urinary excre-

tion of albumin specifically. "Microalbuminuria" refers to albumin excretion above the normal range 30 to 300 mg/d but below the level of detection by test for total protein. It is a known fact that the smoking increases the risk of diabetic nephropathy and causes microalbumineria. Albumen creatinine ratio increases in Type 1 Diabetes mellitus and Type 2 Diabetes both. However, Koya D et al (2009 oct.) studied 112 type 2 diabetes patients in Japan of which all 112 diabetic patients progress to overt nephropathy. They concluded that in low protein group overall protein intake was slightly but not significantly lower, it did confer association with diet.

Choi YE et al (2008mar.) observed that soya beans have been shown to be reduce urinary albumin excretion and total cholesterol in non-diabetic patients with nephritic syndrome and concluded that soya beans may prevent the weight loss and morphological disruption of the kidney associated with diabetes mellitus. Soyabeans also may improve glycaemic control and could prevent progression of diabetes mellitus and therefore, nephtopathy could be prevented. Koya D et al (2009 oct) studied 112 type 2 diabetes patients in japan of which all 112 diabetic patients progress to overt nephropathy. They concluded that in low protein group overall protein intake was slightly but not significantly lower, it did confer association with diet.

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Viswanathan V et al (2002) studied 405 type 2 diabetic patients, of which 155 patients were vegetarians and 250 patients were non-vegetarians. They found that mean Albuminuria (mg albumin/mg creatinine) was 67.5±38.6 in vegetarian patients and 72,5±45.9 in non-vegetarian patients. They concluded that the prevalence of mocroalbuminuria was not significantly different between the two groups. But show the association between non-vegetarian & type 2 DM.

Aims and Objectives

Diabetes mellitus is the major health problem in India. It is established fact that dietary protein restriction has a beneficial effect in slowing the progression of diabetic renal disease in man.

In this study we observed that the risk of developing DM is slightly increased in case of Non vegetarian.

In our view it is essential to present the progression of renal damages and other conglications pf tupe 3 diabetic patient by decreasing protein diet and to control their blood sugar within normal limit.

Materials and Methods

The present study has been conducted with the main objective of estimating albumin creatinine ratio (urinary albumin: urinary creatinine) in patients of diabetes mellitus of type-2 in vegetarian and non- vegetariansbgroups. The place of the study was Department of Biochemistry, J. L. N Medical College, Bhagalpur, Bihar, India.

Material: Total 50cases having diabetes mellitus were suffering from the disease for 10 years or more and 50 cases of normal healthy individuals were selected from medical outdoor and indoor Department of Medicine JLNMC Bhagalpur. Bihar.

Inclusion criteria

50 cases of known type 2 diabetes mellitus selected and divided into two category –vegeterain numbered 25 cases and nonvegeterian numbered 25 cases

These cases were compaired with the normal person having nondiabetes and non-smokers. There were 50 normal healty individuals of both sexes range of age group from 20-50 years were selected for control.

Exclusion criteria

1. Cases having Proteinuria detectable by dipsticktests.
2. Cases having any evidence of infection established by of estimation:
3. Spoturinary albumin
4. Spoturinary creatinine
5. Fasting plasma glucose
6. R/E of urine
7. Urine C/S test etc.

Methodology

Collection of urine sample

Urine samples were collected in clean, sterile plastic container. Collected urine sample were tested by dipsticks for the presence of frank Proteinuria

Dipstick negative urine sample were used for quantization of albumin and creatinine within 4 hours of voiding.

Collection of Blood sample:

Blood samples were collected after 12 hours of fasting. Approximately 1 ml of venous blood drawn. It was transferred to sodium fluoride vial and then mixed gently then it was centrifuged at 3000 rpm for 5 minutes. Plasma was pipetted out and kept in a clean steriale vial.

Method of urinary Albumin Estimation

Urinary albumin was estimated by immuno – turbi-dimetric method (Bio Systems' Costa Brava, 30 Bance- kiba (Spain)

Method of urinary creatinine Estimation

Urinary creatinine is estimated by Modified Jaffe Method.

Fasting Plasma Glucose were estimated by GOD-POD Method.

Observation

Table1: Showing the distribution of cases

Group	Type of cases	No. of cases
I	Control	50
II	Type 2 diabetes mellitus	50
Total:		100

Table 2: Showing the number of cases, means, standard deviation and standard error of mean value, t-value and p-values of Albumin creatinine ratio with cases of vegetarian and non-vegetarian diabetics.

No. of cases	Habit	No. of cases	Mean of ACR	SD	SEM	't'	'p'	Remarks
Type 2 diabetes mellitus	Vegetarians	25	48.11	32.69	6.18	0.06	0.95	S
	Non-vegetarians	25	50.93	31.40	-6.04			

Table- 2 shows mean albumin- creatinine ratio values in non-vegetarian increases than vegetarian group and t-score of vegetarians to non-vegetarian and correlated significant p-trend is 0.95. That means ACR is increases.

Table 3: Showing the number of cases, means, standard deviation and standard error of mean value, t-value and p-values of Albumin creatinine ratio with cases of vegetarian and non-vegetarian diabetics

Group	Habit of Diet	No. of cases	Mean of Urinary creatinine	SD	SEM	't' Value	'p' Value	r^2	Remark
Type-2 diabetes mellitus	Vegetarians	25	49.41	7.94	1.58	-1.67	0.01	0.01	Significant
	Non-Vegetarians	25	53.20	8.14	1.62				

Table- 3 shows mean albumin- creatinine ratio values in non-vegetarian increases than vegetarian group and t-score of vegetarian to non-vegetarian and correlated significant p-trend is 0.101. That mean urinary creatinine is increases.

Result and Discussion

In 50 cases of type 2 diabetes mellitus who were vegetarians, the mean albumin creatinine ratio was found to be 48.11 while in 25 cases of type 2 diabetes mellitus who were non-vegetarians, the mean albumin creatinine ratio was found to be 50.93.
When the difference of mean albumin creatinine ratio was compared between vegetarians and non-vegetarians type- II diabetic patients, it was found to be statistically insignificant ($p > 0.05$).

When the difference of mean albumin creatinine ratio was compared between vegetarians and non vegetarians patients of type 2 diabetes mellitus was found to be insignificant but associated. Koya D et al (2009 oct) studied 112 type 2 diabetes patient in japan of which all 112 diabetic patients progress to overt nephropathy. They concluded that in low protein group overall protein intake was slightly but no significantly lower, it did confer association with diet.

Choi YE et al (2008mar.) observed that soyabeans have been shown to be reduce urinary albumin excretion and total cholesterol in non-diabetic patients with nephritic syndrome and concluded that soyabeans may prevent the weight loss and morphological disruption of the kidney associated with diabetes mellitus. Soyabeans also may improve glycaemic control and could prevent progression of diabetes mellitus and therefore, nephtopathy could be prevented.

Viswanathan V et al (2002) studied the prevalaence of mocroalbuminuria in vegetarian and non-vegetarian of type 2 diabetes mellitus and found that the prevalence of Microalbuminuria was not significant between the two groups. But show the association between non-vegetarian &type2 DM.

Nath Ka et al.,(1986), Maschio G et al.,(1982) ,Ihle BU et al.,(1989), Rosman JB et al.,(1984), and El Nahas AM et al.,(1984) have suggested that dietery protein restriction has a beneficial effect in show-

ing the progression of diabetic renal disease in human being..

Conclusion

We concluded that the person who is take Healthy diet such as vegetarian may be related to indicate better kidney function in type 2 diabetes. Further prospective studies with large sample sizes and use of sensitive indicated for studying early renal function decline are needed to confirm this association.

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