Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublisher.com/sjams/

OPEN ACCESS

General Medicine

Correlation between IGT and Microalbuminuria in Type-2 Diabetes Mellitus Patients

S. Muthuchellakumar[1], S. Jaya Kumar[2*], G. Bupesh[3]

[1]Professor, Department of General Medicine, Bharath Medical College, Biher University, India
[2]Assistant Professor, Department of General Medicine, Bharath Medical College, Biher University, India
[3]Associate Director, R& D Wing, Sree Balaji Medical College and Hospital, Biher, Chromepet, India

DOI: 10.36347/sjams.2020.v08i01.42 | **Received:** 04.01.2020 | **Accepted:** 19.01.2020 | **Published:** 26.01.2020

***Corresponding author:** S. Jaya Kumar

Abstract **Original Research Article**

Impaired glucose tolerance (IGT) is one of the metabolic diseases caused by uncontrolled carbohydrate metabolisms in type-2 diabetes mellitus. The study population was selected based on the results of glucose tolerance test (GTT, 75G), IGT was defined between 140-199mg/dl of serum glucose after two hour Oral 75g glucose consumption. The results inferred that the urinary albumin secretion in both samples was significantly found in twenty subjects (20) with IGT with microalbuminuria and 18 patients from this group developed diabetes mellitus within a year follow up period. Moreover, 4 patients with IGT without microalbuminuria also developed diabetes mellitus during the one year study period. According to ADA, IGT patients with albuminuria were at risk of progression to diabetes mellitus than subjects without albuminuria.

Keywords: Impaired Glucose Tolerance, Type-2 Diabetes mellitus, Microalbuminuria.

Copyright @ 2020: This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited.

INTRODUCTION

Impaired glucose tolerance (IGT) is the abnormal glucose metabolisms which are located between the normal glucose tolerance (NGT), and type 2diabetes. This disorder has significant pathophysiological effects on insulin sensitivity, and secretion as well as cardiovascular diseases [1]. Epidemiological studies have considered microalbuminuria (MAU) as a risk factor for atherosclerosis, coronary artery disease, and other vascular disorders in patients with type 2 diabetes, and IGT [2].

Microalbuminuria refers to a slight increase in secretion of albumin in urine, and is a sign of progression towards nephropathy in patients with diabetes. It is a clue which helps us predict the occurrence of cardiovascular disorders in both patients with or without diabetes. The risk of microalbuminuria is correlated with plasma glucose level, and the duration of hyperglycemia in patients with diabetes [3,4]. Glycemic control in these patients can prevent the development, and progression of microalbuminuria, but this issue has not been well-documented about IGT and disorder yet. Some studies conducted in this regard have shown that IGT is a more important risk factor developing microalbuminuria [5, 6]. At present, no special treatment and diagnostic measures is advised in patients with IGT. Considering that early diagnosis and control of microalbuminuria can Slow its progression towards microalbuminuria and renal failure, and also prevent cardiovascular complications, the present study was and IGT [7].

METHODS

This study was performed from 2018 to 2019 in Venkataeswara hospital, Chennai. Exclusion criteria were as follows: Over diabetes mellitus, hypertension, urinary tract infection (UTI) and treatment with corticosteroids or spironolactone, ARBs, (Angiotensin Receptor Blockers) and ACEIs (Angiotensin Converting Inhibitors). The study population was sequentially selected based on the results of glucose tolerance test (GTT, 75G), IGT was defined between 140-199mg/dl of serum glucose after two hour Oral 75g glucose consumption. The study was approved by the local ethics Committee, and informed consent was obtained from all participants. The quantitative urine albumin-creatinine (Cr) ratio in morning spot urine samples were used for standard microalbuminuria determination. For these Measurements, the automated clinical chemistry analyzers by immunotorbidometry

assay were used. Microalbuminuria was defined as 30-300mg/g Cr in two random measurements with a month interval. The subjects with different results in these two random tests (one positive and one negative) were asked for testing the third sample. All of our cases were Followed up for one year, we did not have any drop out in our patients follow, and their blood sugar and urine albumin levels were measured every 2 months. For each participant, HbA1c was requested at least four times in a One year follow up. We used chromatography method with bio-system kit for this test. The obtained data was analyzed by SPSS software. Correlation between Blood glucose and urine albumin was evaluated.

RESULTS

The mean (SD) age of the subjects was 45.2(+_10) years in the IGT and control groups. Fifty subjects with normal glucose tolerance, 20 were female (40%) and 30 were male patients (60%). Fifty subjects with IGT, 25 were female (50%) and 25 were male patients (Figure 1). Basic blood glucose 2 hrs after 75gr oral glucose in the two groups (IGT and control groups) was taken (Figure 2). Microalbuminuria was not seen in the control group. Urine albumin secretion in both samples measurement was significantly twenty subjects (20) with IGT group had microalbuminuria and 18 patients from this group developed diabetes mellitus within a year follow up period. Moreover, 4 patients with IGT without microalbuminuria also developed diabetes mellitus during the one year study period. According to ADA, IGT patients with albuminuria were at risk of progression to diabetes mellitus than subjects without albuminuria.

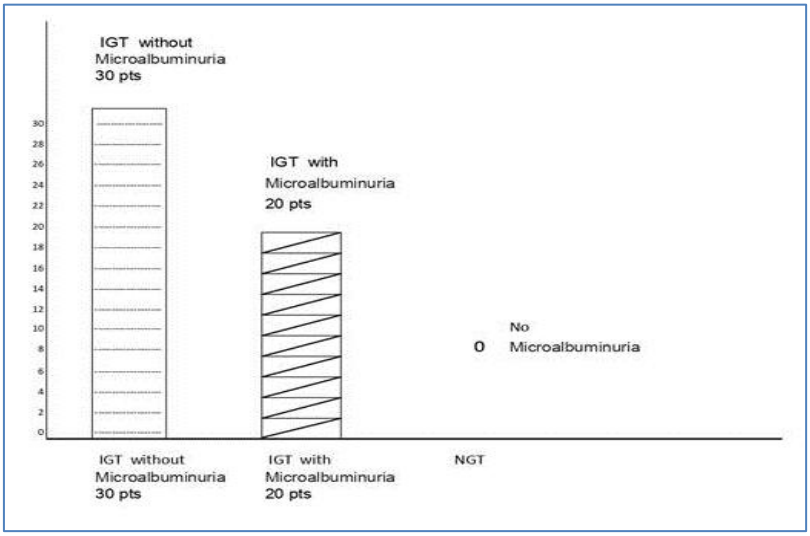

Fig-1: Microalbuminuria Prevelance in IGT and Normal Population

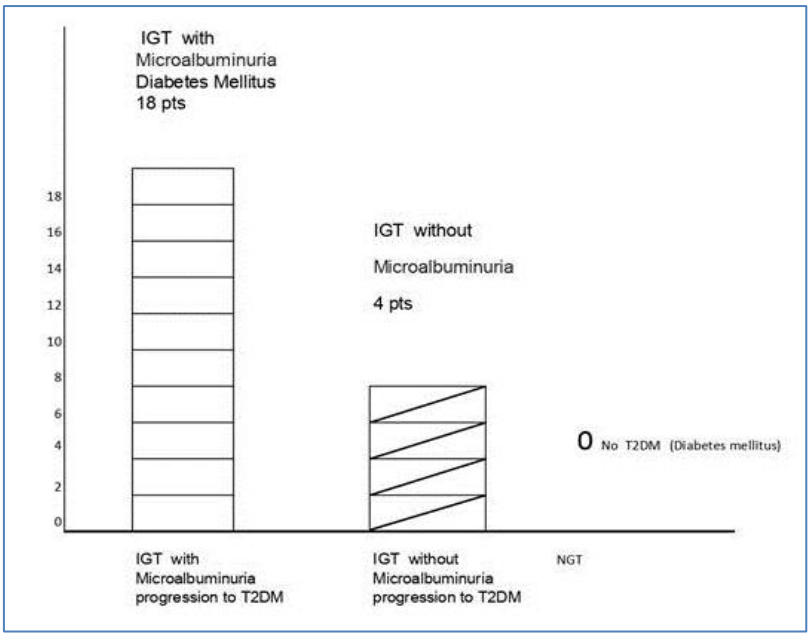

Fig-2: Progression towards Diabetes Mellitus in Subject with IGT

DISCUSSION

The current study revealed that the urinary albumin secretion is significantly higher in IGT groups than in the NGT group. IGT patients with Microalbuminuria were at risk of progression to diabetes mellitus than subjects (IGT) without Microalbuminuria [8]. Normal glucose tolerance (NGT) patients are less likely to have Microalbuminuria, and are less likely to develop diabetes mellitus. Only one trial to date, the Diabetes Prevention Program, has directly compared lifestyle intervention with pharmacotherapeutic intervention for the prevention of diabetes in people with IGT [9, 10]. It found a significantly lower risk for progressing to DM with aggressive lifestyle intervention compared with taking metformin (4.8 percent versus 7.8 percent per year; especially in individuals 60 years of age or older.

Lifestyle modifications may be difficult to maintain, in people with IGT the following strategies have been shown to increase the likelihood of patient success:

1. Patient self-monitoring
2. Realistic and stepwise goal setting
3. Stimulus control
4. Cognitive strategies
5. Social support
6. Appropriate reinforcement

The structured lifestyle interventions included training people with IGT to achieve modest weight loss through diet and physical activity. Important aspect of therapeutic lifestyle management that should be discussed with every patient with IGT.

CONCLUSION

The Present study suggests and recommends the following to the management of IGT.

1. Consistency in day-to-day carbohydrate intake
2. Limitation of sucrose-containing or high-glycemic index foods
3. Adequate protein intake
4. Weight management

REFERENCES

1. Weyer C, Tataranni PA, Bogardus C, Pratley RE. Insulin resistance and insulin secretory dysfunction are independent predictors of worsening of glucose tolerance during each stage of type 2 diabetes development. *Diabetes Care. 2001:* 24(1): 89–94.
2. Dell'Omo G, Penno G, Giorgi D, Di Bello V, Mariani M, Pedrinelli R. Association between high-normal albuminuria and risk factors for cardiovascular and renal disease in essential hypertensive men. *Am J Kidney Dis. 2002:* 40(1): 1–8.
3. Garg JP, Bakris GL. Microalbuminuria: marker of vascular dysfunction, risk factor for cardiovascular disease. *Vasc Med. 2002:* 7(1): 35–43.
4. Wang XL, Lu JM, Pan CY, Tian H, Li CL. A comparison of urinary albumin excretion rate and microalbuminuria in various glucose tolerance subjects. *Diabetes Med. 2005:* 22(3): 332–5.
5. Fioretto P, Caramori ML, Mauer M. The kidney in diabetes: dynamic pathways of injury and repair. The Camillo Golgi Lecture 2007. *Diabetolo gia. 2008:* 51(8): 1347–55.
6. Mogensen CE. Microalbuminuria predicts clinical proteinuria and early mortality in maturity-onset diabetes. *N Engl J Med. 1984:* 310(6): 356–60.
7. Yudkin JS, Forrest RD, Jackson CA. Microalbuminuria as predictor of vascular disease in non-diabetic subjects. Islington Diabetes Survey. *Lancet. 1988:* 2(8610): 530–3.
8. Nelson RG, Kunzelman CL, Pettitt DJ, Saad MF, Bennett PH, Knowler WC. Albuminuria in type 2 (non-insulin-dependent) diabetes mellitus and impaired glucose tolerance in Pima Indians. *Diabetologia. 1989:* 32(12): 870–6.
9. Meigs JB, D'Agostino RB, Sr, Nathan DM, Rifai N, Wilson PW. Longitudinal association of glycemia and microalbuminuria: the Framingham Offspring Study. *Diabetes Care. 2002:* 25(6):977–83.
10. Franciosi M, Pellegrini F, Sacco M, De Berardis G, Rossi MC, Strippoli GF, Belfiglio M, Tognoni G, Valentini M, Nicolucci A. Identifying patients at risk for microalbuminuria via interaction of the components of the metabolic syndrome: a cross-sectional analytic study. Clinical Journal of the American Society of Nephrology. 2007 Sep 1;2(5):984-91.