ISSN 1991- 8690 الترقيم الدولي ٨٦٩٠ - ١٩٩١

The incidence of proteinuria among diabetic patients in relation to the level of glycated Hb, duration of the disease& types of treatment in Thi-Qar province

Fadel Abbass Al-seidi
College of medicine university of Thi-Qar

Abstract

A prospective study had been conducted in diabetic and endocrine center of Nassiriyah city from January to March year 2015. A total of 100 patients with different ages were included in this study. All of them were diagnosed as diabetic patients and have been selected randomly. In this study we proved that there was a very strong effect of the level of HbA1c& duration of DM on the incidence of albuminuria. Also researcher found that patients who were on oral hypoglycemic treatment therapy develop albuminuria more than those who were on insulin treatment. Microalbuminurea was present in patient with longer DM history (around 10 years). This result correlates well with documented evidence that diabetic nephropathy usually occur after 10_15 years after diagnosis of DM.

Key words: Thi-qar, HbA1c, DM, incidence, albuminuria

تطور البيله البروتينية في مرضى السكري وعلاقتها مع الهيموكلوبين السكري وفترة الاصابة بالمرض ونوع العلاج المستخدم لخفض السكر لدى المرضى في محافظة ذي قار

فاضل عباس السعيدي
جامعة ذي قار– كلية الطب

الخلاصة:

تمت الدراسة في مركز السكري والغدد الصم في محافظة ذي قار للفتره من شهر كانون الثاني الى نهاية شهر اذار للعام ٢٠١٥. تم اختيار ١٠٠ من مرضى السكري بصوره عشوائية وباعمار مختلفه.

تضمنت الدراسه التحري عن العلاقة بين نسبة الهيموكلوبين نوع AC1 كدلاله لمستوى السكر بالدم للمرضى المصابين بالسكري ونسبة حدوث الالبومينيوريا لدى هؤلاء المرضى. من النتائج التي تم الحصول عليها من الدراسة وجد ان مرضى السكري الذين يتناولون الادوية المخفضة للسكر عن طريق الفم ترتفع لديهم نسبة الالبومين يوريا بنسبة اعلى من الذين يتم علاجهم بحقن الانسولين.

بينت النتائج ان مرضى السكرى الذين مرت عليهم اكثر من عشرة سنوات ترتفع عندهم نسبة الالبومين يوريا بنسبة قليله وهذه الحالة ترتبط بالاذى الذي يحصل للكلتين بعد ١٠–١٥ سنة من الاصابة بمرض السكري.

المفاتيح : مرض السكري, البيله البروتينية , ذي قار , الهيموكلوبين

Introduction

Diabetes mellitus (DM), commonly referred to as diabetes, is a group of metabolic disease in which there are high blood sugar levels over a prolonged period.[1] Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger. If left untreated, diabetes can cause many complications (2). Acute complications include diabetic ketoacidosis and nonketotic hyperosmolar coma (3). Serious long-term complications include cardiovascular disease, stroke, chronic kidney failure, foot ulcers, and damage to the eyes.[2]
Diabetes is due to either the pancreas not producing enough insulin or the cells of the body not responding properly to the insulin produced (4) There are three main types of diabetes mellitus:

- Type 1 DM results from the pancreas' failure to produce enough insulin. This form was previously referred to as "insulin-dependent diabetes mellitus" (IDDM) or "juvenile diabetes". The cause is unknown(2)
- Type 2 DM begins with insulin resistance, a condition in which cells fail to respond to insulin properly (2). As the disease progresses a lack of insulin may also develop (5). This form was previously referred to as "non insulin-dependent diabetes mellitus" (NIDDM) or "adult-onset diabetes". The primary cause is excessive body weight and not enough exercise.
- Gestational diabetes, is the third main form and occurs when pregnant women without a previous history of diabetes develop a high blood sugar level.6)

The classic symptoms of untreated diabetes are weight loss, polyuria (increased urination) , polydipsia (increased thirst), andpolyphagia (increased hunger). (1). Symptoms may develop rapidly (weeks or months) in type 1 diabetes, while they usually develop much more slowly and may be subtle or absent in type 2 diabetes.

Several other signs and symptoms can mark the onset of diabetes, although they are not specific to the disease. In addition to the known ones above, they include blurry vision, headache, fatigue, slow healing of cuts, and itchy skin. Prolonged high blood glucose can cause glucose absorption in the lens of the eye, which leads to changes in its shape, resulting in vision changes. A number of skin rashes that can occur in diabetes are collectively known as diabetic dermadromes
Diabetes mellitus is characterized by recurrent or persistent high blood sugar, and is diagnosed by demonstrating any one of the following (7).

- Fasting plasma glucose level ≥ 7.0 mmol/l (126 mg/dl)
- Plasma glucose ≥ 11.1 mmol/l (200 mg/dl) two hours after a 75 g oral glucose load as in aglucose tolerance test
- Symptoms of high blood sugar and casual plasma glucose ≥ 11.1 mmol/l (200 mg/dl)
- Glycated hemoglobin (HbA_{1C}) ≥ 48 mmol/mol (≥ 6.5 DCCT %). (8, 9).
  Blood pressure control and proper foot care are also important for people with the disease. Type 1 diabetes must be managed with insulin injections.(10) Type 2 diabetes may be treated with medications with or without insulin. Insulin and some oral medications can cause low blood sugar.[10] Weight loss surgery in those with obesity is an effective measure in those with type 2 DM.(11) Gestational diabetes usually resolves after the birth of the baby.(12)

The aim of study

To evaluate the relation between level of HbA1c , duration of DM, type of treatment with development of protein urea among diabetic patient

Methods

The study was prospectively performed in diabetic and endocrine center of Nassiriyah city from January to March of 2015 in which 100 patients were included in this study. All of them were diagnosed with DM.
Informations gathered from them about their name,age ,occupation, duration of DM ,type of therapy& the past history of hypertension and kidney disease. Age distribution: Patients ages were ranging from 45_65 years, Males were total of 43 patient and females were 57. 18 patients (45-50yrs.), 8 of them were males and 10 of them were females. 27 patients (51-55yrs.), 13 of them were male and 14 were female. 16 patients (56-60yrs.), 5 of them were male and 11 were female 39 patients (61-65yrs.), 17 of them were male and 22

were female.
The duration of DM was arranged into three categories as fallowing:
11 patients have history of DM less than 5 years. 9 patients have history of DM from 5_10 years. 80 patients have history of DM more than10 years. 93 of total patients were on oral hypoglycemic agents and the remainders on insulin.56 of all patients were hypertensive and only3 patients had past history of chronic kidney disease.General examination done and body mass index calculated for them. Routine investigations like Hb, general urine exam, fasting and random blood sugar.HbA1c, renal function test and lipid profile, all of them done for all our studied patients.
We coded the data on SPSS program for statistical interpretation and Chi_square value.P value has been estimated to study the association of quantitation varietals.

Results

Results obtained from current study included in the following tables.

Table (1): The relation between HbA1c and the presence of albuminuria

	Albuminurea		
HbA1c	Positive	Negative	Total
<=7	2	0	2
>7	95	3	98
Total	97	3	100
Pearson Chi-Square .941	.063[a]		

there is no significant relation between level of HbA1C and the presence of albuminurea according to our study

Table (2): The relation between duration of DM and the development of albuminurea.

Duration of DM (yrs)	Albuminurea		
	Positive	Negative	Total
<5	10	1	11
5-10	9	0	9
>10	78	2	80
Total	97	3	100
Pearson Chi-Square .463	1.749[a]		

There is a significant relation between the duration of DM and the presence of albuminurea.

Table (3) Relation between the type of therapy and the development of albuminurea

Therapy	Albuminurea		
	Positive	Negative	Total
Oral	91	2	93
Insulin	6	1	7
Total	97	3	100
Pearson Chi-Square .197	3.294[a]		

There was no a significant relation between the type of therapy and the presence of albuminuria.

Discussion

This study was performed according to the fact that HbA1c is a good monitoring for disease progression &glucose metabolism control in diabetic patients (13, 14).
In this study which performed in DM and endocrine center of Nassiriyah city we tried to prove whether there is a relationship between the degree of glycemic control by measuring the level of HbA1c and the presence of microalbuminurea. However, we faced a lot of obstacles that made limitations in choosing the number of patients and specific investigations that required to complete this research. One of these obstacles was the limited number of kits labelled for measurement of HbA1c level, because of delay in approve the 2015 budget of our country.
Our study shows that there is no significant relation between level of HbA1c and microalbuminurea but in comparative study that have been done in Pakistan during 2012, which concluded that Uncontrolled diabetes is strongly associated with prevalence of microalbuminurea , Microalbuminuria which is an early marker of diabetic nephropathy may be present at the time of diagnosis of type 2 diabetes. It progresses to overt nephropathy and eventually leads to decline in glomerular filtration rate and ultimately to end stage renal disease (15).
Good glycemic control (HbA1c <7) reduces both the incidence and progression of microalbuminuria (16,17,18) .
Early diagnosis and treatment of diabetic patients aiming for a good glycemic control will reduce the incidence of the development of nephropathy and could also produce financial saving as well as better patient outcomes.(19,20).
Another study was published in Indian journal of

nephrology in 2008 under the heading of Prevalence of microalbuminurea and its risk factors in type 2 diabetic patients also concluded that there was no significant correlation between HbA1c and microalbuminurea. This variation in the prevalence of microalbuminurea can be attributed to several factors such as differences in populations, the definition of microalbuminurea, the methods of measurement of microalbuminurea and urine collection (personal communication). Microalbuminurea was present in patients with longer DM history (around 10 years). This observation correlates well with documented evidence that diabetic nephropathy usually occur 10_15 years after diagnosis of DM.Clinical expression of diabetic nephropathy follows a predictable course starting with proteinuria

and terminating in end stage renal disease. Screening for microalbuminuria will allow the identification of patients with nephropathy at a point very early in its course. Risk factors modification, renal function monitoring and combined therapies are the current integrated approaches to manage patients with diabetic kidney disease. The diabetes control and complications trial revealed the association of long duration of diabetes with the development of diabetic nephropathy. A significant correlation between the increasing duration of diabetes and development of microproteinuria was documented by Kathryn et al (21).

References

1. About diabetes". World Health Organization. Retrieved 4 April 2014.

2. "Diabetes Fact sheet N°312". *WHO*. October 2013. Retrieved25 March 2014.

3. Kitabchi, AE; Umpierrez, GE; Miles, JM; Fisher, JN (Jul2009). "Hyperglycemic crises in adult patients with diabetes.". *DiabetesCare* 32 (7):1335–43.

4. Shoback, edited by David G.Gardner, Dolores (2011). "Chapter 17".*Greenspan's basic & clinical endocrinology* (9th ed.).NewYork:McGraw-HillMedical.ISBN 0-07-162243-8

5. *RSSDI textbook of diabetes mellitus.* (Rev. 2nd ed.). New Delhi:JaypeeBrothersMedicalPublishers.2012. p. 235.

6. Cooke DW, Plotnick L (November 2008). "Type 1 diabetes mellitus in pediatrics". *Pediatr Rev* 29 (11): 374–84; quiz 385. doi:10.1542/pir.29-11-374.

7. "Definition, Diagnosis and Classification of Diabetes Mellitusandits Complications" (PDF). WorldHealthOrganisation.1999

8. *Definition and diagnosis of diabetes mellitus and intermediate hyperglycemia:report of a WHO / IDF consultation*. World Health Organization.2006.p. 21. ISBN 978-92-4-159493-6.

9. Vijan, S (March 2010). "Type 2 diabetes". *Annals of Internal Medicine* 152 (5): ITC31-15.doi:10.1059/0003-4819-152-5-201003020-01003. PMID 20194231.

10. Rippe, edited by Richard S. Irwin, James M. (2010). Manual of intensive care medicine (5th ed.). Philadelphia: Wolters KluwerHealth / LippincottWilliams & Williams textbook of endocrinology (12th ed.). Philadelphia: Elsevier/Saunders. pp. 1371–1435. ISBN978-1-4377-0324-5.

11. Picot, J; Jones, J; Colquitt, JL; Gospodarevskaya, E; Loveman, E; Baxter, L; Clegg, AJ (September 2009). "The clinical effectiveness and cost-effectiveness of bariatric (weight loss) surgery for obesity: a systematic review and economic evaluation". Health technology assessment (Winchester, England) 13 (41): 1–190, 215–357.

12. Larsen ML, Hørder M, Mogensen EF (1990). "Effect of long-term monitoring of glycosylated haemoglobin levels in insulin-dependent diabetes mellitus". *N. Engl. J. Med.* 323 (15): 1021–5.

13. "Hemoglobin A1c Fact Sheet". *Michigan Diabetes Research TrainingCenter*.Retrieved2007-12-26.

14. American Diabetes Association. Diabetic nephropathy.DiabetesCare2003;26(Suppl1):S94-8.

15. Sheikh SA, Baig JA, Iqbal T, Kazmi T, Baig M, Husain SS. Prevalence of microalbuminuria with relation to glycemic control in type-2 diabetic patients in Karachi. J Ayub Med Coll Abbotabad 2009;21: 83-6.

16. Jerums G, Macisaac RJ.Treatment of microalbuminuria in patients with type 2 diabetes mellitus.Treat Endocrinol 2002; 1: 163-73.

17. Vora JP, Ibrahim HA, Bakris GL. Responding to the challenge of diabetic nephropathy: the historic evolution of detection. Prevention and management.JHumHypertens2000;14667-85.

18. CDC. Number of Americans with diabetes rises to nearly 26 million. Available at: http://www.cdc.gov/media/releases/2011/p0126_diabetes.html.

19. Narayan KM, Boyle JP, Thompson TJ, Sorensen SW, Williamson DF. Life time risk for diabetes mellitus in the United States. JAMA 2003; 290:1884-90.

20. Kathryn A. Kohler, William M Mc Clellan, David C. Ziemer, Davoid G. Kleinbacim, John R.Bori. Risk factors for microalbuminuria in black Americans with newly diagnosed type 2 diabetes. American Journal of Kidney Diseases 2000: 36; 903 – 913.