
Blood Glucose Control, Ophthalmology Referral & Microalbuminuria In Patients With Insulin Dependent (Type 1) Diabetes Mellitus.

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Abstract:

Objective: To review the blood glucose level, duration of illness, referral for ophthalmologic assessment & microalbuminuria among patients with insulin dependent (type 1) diabetes mellitus.

methods: A retrospective review of randomly chosen medical records for 100 patients with type 1 insulin dependent diabetes mellitus was done in national diabetic center (NDC) of AL-Mustansiriya University from the 1st March 1999 to the 1st March 2004. Review for age, sex, duration of illness FBG, HbA1C, Micral test, blood pressure, and blood urea & creatinine levels, also review of the patient's files for ophthalmologic referral.

Results: Insulin dependent (type 1) diabetes mellitus were more in female with peak incidence between 10-14 yr of age. FBG > 10 mmol/ l in 57%, 38% having the disease ≤ 5 yrs of which 52.6% were referred to ophthalmologist, 10% who had diabetes for 7-17yrs developed cataract & no one had retinopathy. 36% were having HbA1C more than 8%. Micral test were (+ve) in 23.5% of patients, none of them had developed renal failure. 44.5% developed diastolic blood pressure between 90-100 mmHg and the amount of microalbuminuria was directly related to elevation of HbA1C.

Conclusion: Better control of blood glucose and shared care with ophthalmologists are important steps to improve the quality of care provided to diabetic patients. .

Key words: Insulin dependent diabetes mellitus, diabetic nephropathy, diabetic cataract.

Introduction:

Patients with long standing diabetes may develop complication affecting the eyes, kidneys, nerves or major arteries. Approximately 30 – 40% Of people with type 1 diabetes develop renal failure (intracapillary glomerulosclerosis, pylonephritis, renal papillary necrosis, and renal tubular necrosis) or loss of vision (diabetic retinopathy, cataract)^[1,2].

Although the metabolic control has an impact on the development of these complications, genetic factors also have a role, because only 50% of patients develop proliferative retinopathy^[3]. In general good glycemic control, particularly in the early years following the development of diabetes reduces the risk of developing retinopathy^[4]. Risk factors include; early onset, long duration of diabetes, poor glycemic control, racial group (e.g. incidence is higher in Asian races), pre-existing hypertension and family history of diabetic nephropathy^[4].

An increased urinary albumin excretion rate (AER) of 30-300 mg/24 hour, so called microalbuminuria can be detected and constitutes an early stage of nephropathy^[4].

Although values of HbA1C may vary according to the method used for measurement, in non – diabetic individuals, HbA1C fraction is usually less than 6%, in diabetic patients values of 6-9% represent good metabolic control, values of 9-12% fair control and values of 12% or higher represent poor control^[3].

Traditional education for diabetes is to full the patient with knowledge or a pot to be filled with information by doctors, nurses and dieticians^[5].

Patients & Methods:

A retrospective review of medical records of 100 diabetic patients, of both sexes, was carried out in the National Diabetic Center (NDC) of Al-Mustansiriya University, from the 1st of March 1999 to the 1st of March 2004. Review of all 100 patients files for age, sex duration of diabetes, FBG, HbA1C, micral test, blood pressure, blood urea & creatinine levels, also review of the patients' files for ophthalmological referral. According to the duration of illness the patients were classified into two groups (< 5 years of age and ≥ 5 years). Those who are ≥ 5 years duration of diabetes were studied to find the percentage of cataract & retinopathy and their duration, to -find the time of development of microalbuminuria, the relation between HbA1C and the amount of microalbuminuria, the relation between

microalbuminuria and diastolic blood pressure, assessment of renal function (blood urea & creatinine) to detect patient with fully developed nephropathy.

Results:

The result of the current study shows that out of (100) patients studied, 53 (53%) were female and 47

(47%) were male. Table (1) shows that peak incidence of type 1 diabetes in age group 10 – 14 yrs. Duration of diabetes in < 5 yrs in 62% and 38% of

patients' ≥ 5 years. Table 2 shows the Duration of diabetes were < 5 year(62%).

Table (1): Age distribution of 100 diabetic patients.

Age Groups	Frequency	%
< 5 yrs.	7	7 %
5 – 9 yrs	24	24 %
10 – 14 yrs	35	35 %
15 – 19 yrs.	34	34 %

Table (2): Duration of diabetes in 100 diabetic patients.

Duration of Diabetes	Frequency	%
< 5 yrs	52	62 %
5 – 9 yrs.	31	31 %
10 – 14 yrs.	6	6 %
15 – 19 yrs	1	1 %

Table (3) shows that FBG 57% more than 10 mmol /l, while 4% were not recorded. HbA1C > 8% in 36% of patients. Not recorded were in 40% of patients as shown in table (4). We found that HbA1C were available in 60% in medical records while 40% were not. Table (5) shows that 26.3% not referred to

ophthalmologist and 21.1% were not recorded among patients 5yrs and more with diabetes (Total No. 38 out of 100). Cataract developed in 10% of patients between 7 – 17 yrs. Duration of diabetes (total No. 38 out of 100) as shown in table (6).

Table (3): FBS values of 100 diabetic patients.

FBS		Frequency	%
mmol / l	mg / 100 ml		
< 7	< 126	27	27 %
7 – 10	126 – 180	12	12 %
> 10	> 180	57	57 %
Not recorded		4	4 %

Table (4): HbA1C values in 100 diabetic patients.

HbA1C	Frequency	%
< 7 %	15	15 %
7 – 8 %	9	9 %
> 8 %	36	36 %
Not recorded	40	40 %

Table (5): Referral to ophthalmologist among diabetic patients.

Referral to Ophthalmologist	Total	%
Referred	20	52.6 %
Not referred	10	26.3 %
Not recorded	8	21.1 %

Table (6): Percentage of cataract & retinopathy in diabetic patients.

	No. of patients (20)	%	Duration of diabetes
Cataract	4	20%	7 – 17 yrs.
Retinopathy	0	0 %	–

Micral test were (+ve) in 23.5% of patients, (-ve) in 13.2% of patients and 63.3% were not recorded (total No. 38 out of 100) as shown in table (8). In table (7) creatinine level \leq 150 micromol / l in 39.4% of patients while not recorded in 60.6%. Table (9) shows that urea level \leq 7.5 mmol / l in 39.4% while 60.6% were not recorded (total No. 38 out of 100). Table (10) shows that diastolic B.P in patients with

microalbuminuria is between 90 – 100 mmHg in 44.5% of patients and 70 – 80 mmHg 55.5%. (Total No. 38 out of 100). Table (11) shows the appearance of microalbuminuria for patients with 5 – 10 yrs. Duration of diabetes is zero while those with \geq 10 yr were 100%. (Total No. 38 out of 100). In table (12) we can notice that the amount of microalbuminuria is higher in those with HbA1C between 9.4 – 11.9%.

Table (7): Creatinine level (micromole / l) in diabetic patients.

Creatinine level		Frequency	%
micro-mole / l	Mg / 100 ml		
≤ 150	≤ 1.7	15	39.4 %
> 150	>1.7	0	0 %
Not recorded		23	60.6%

Table (8): Micral test in diabetic patients.

Micral test	Frequency	%
(-ve)	5	13.2 %
(+ve)	9	23.5 %
Not recorded	24	63.3%

Table (9): Urea level in diabetic patients.

Urea level		Frequency	%
micro-mole / l	Mg / 100 ml		
≤ 7.4	≤ 45	15	39.4 %
> 7.5	> 45	0	0 %
Not recorded		23	60.6 %

Table (10): Relation between microalbuminuria and diastolic blood pressure.

Test for microalbuminuria	No. of patients	Diastolic B.P. 70-80 mmHg	%	Diastolic B.P. 90-100 mmHg	%
+ve	9	5	55.5%	4	44.5%
-ve	5	4	80%	1	20%
Not recorded	24	-	-	-	-

Table (11): Relation between microalbuminuria and duration of diabetes.

Test for microalbuminuria	No. of patients	5 – 10 yr. duration of diabetes	%	≥ 10 yr. duration of diabetes %	%
+ve	9	0	-	9	100%
-ve	5	5	100%	0	0%
Not recorded	24	-	-	-	-

Table (12): Relation between microalbuminuria and HbA1C.

The amount of microalbuminuria	HbA1C
+	8.4-9%
++	5.4-11.4%
+++	9.4-11.9%

Discussion:

The study shows that, the peak incidence of type 1 diabetes occurred in the age group 10 - 14 yrs. which slightly differs from that obtained by Patarakujavanich. And it's more common in female which is consistent with that obtained by Lee WW *et al*^[6].

Fully developed picture of diabetic nephropathy (elevated blood urea & serum creatinin) was not obtained in the studied patients, which is consistent with Sufliarska A., who reported that nephropathy usually does not occur in children^[7] & it need longer time for there development.

As well, no retinopathy was found among patients with duration of diabetes ≥ 5 yr. but there were 20% having bilateral cataract (only in patients with duration (7 - 17 yr). This is different from that obtained by Vincze, who obtained that the prevalence of cataract was more common between 8 - 17 yr. duration^[8]. This may be duo to we are having 26.3% not referred to ophthalmologist and 21.1% were not recorded whether referred or not. High percentage of cataract among our patients could be due to poor glucose control in those patients.

Regarding microalbuminuria, none of the patients developed it during 1st decade, while 100% had during 2nd decade. This in agreement with that obtained by Campos - Pastor who obtained that the prevalence of microalbuminuria was during the 2nd decade of diabetes & declined thereafter^[9].

It was found that, there was a relation between HbA1C and the amount of microalbuminuria with highest level of HbA1C among patients with (+++) microalbuminuria. This is consistent with the results obtained by Tomeckova., who found that there is significant relation between the level of HbA1C and the amount of urinary excretion of albumin^[7].

A significant correlation was noted in this study between microalbuminuria and diastolic blood pressure (mainly diastolic B.P. between 70-100 mmHg). This is higher than that obtained by Tomeckova, who found that the diastolic B.P. in patients with (+ve) microalbuminuria is between 75 - 85 mmHg^[7].

These data suggest that different types of hypertension (Essential, nephrogenic) may be associated with diabetes mellitus^[10]. Regarding renal function, the rate of decline was not significantly related to blood pressure while closely related to the presence or absence of clinical protienuria^[10]. In our study no decline were detected, may be because we need longer time for its development.

Conclusion:

Improving blood sugar control and shared care with ophthalmologists are important steps to improve the quality of diabetic care in diabetic centers.

References:

- 1-Ronald W, Peter C & Klingensmith G. Endocrine disorder. In Current Pediatric Diagnosis & Treatment, Hathaway WE, William W, Hay J, et al. Eleventh edition, 1993 chapter 27, P: 884.
- 2-Fong DS, Atello L, Gardner TW, et al. Retinopathy in Diabetes. Diabetes care 2004, 27:S84-S87 by the American Diabetes Association, Inc.
- 3-Alemzaeh R & Wyatt D. Diabetes mellitus in children. In Nelson Textbook of Pediatrics, Behrman KJ. Seventeenth edition, 2004 chapter 583, P: 1962-1966.
- 4-Frier BM, Truswell AS, Shepherd J, et al. Diabetes mellitus, nutritional and metabolic disorders. In Davidson Principles & Practice of Medicine, Christopher H, Edwin R, John H.. Eighteenth edition, 1999 chapter 7, P: 498-505.
- 5-Fox C and Anne A. Intensive education for life style change in diabetes. B M J, No. 7424, 15 November 2003, (1120).
- 6-Lee WW, Ooi BC, Thai AC, et al. The Incidence of IDDM in Singapore Children. SMJ (S I N G A P O R E M E D I C A L J O U R N A L). 2003.
- 7-Sufliaraka A, Michalkova D, Tomeckova E, et al. [Microalbuminuria and tubular reabsorption of minerals in children with type 1 diabetes mellitus] [Article in Slovak]. Bratisl Lek Listy. 1998 Jan;99(1):26-32.
- 8-Vincze P; Madacsy L; Petheo I; Brooser; G. Prognostic significance of retinal microaneurysm number and localization in type-1 diabetes mellitus. Orv. Hetil. Vincze, Sept. 2001, 16, 142(37), P: 2015-20.
- 9-Campos-Pastor F, Escobar-Jiménez P, Mezquita JL, et al. Factors associated with microalbuminuria in Type 1 diabetes mellitus: a cross-sectional study. Diabetes Research and Clinical Practice. Volume (issue): 48 (1) 2000. PP 43-49.
- 10-Ittersum V, Frans J, Renate MJ, et al. Determinants of the limits of agreement between the sphygmomanometer and the SpaceLabs 90207 device for blood pressure measurement in healthy volunteers and insulin-dependent diabetic patients. Journal of Hypertension, August 1998, 16(8):1125-1130.

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