PREVALENCE OF DIABETIC COMPLICATIONS IN RELATION TO THE DURATION AND CONTROL OF DIABETES MELLITUS

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ABSTRACT

Background: long term complications of DM including atherosclerosis, neuropathy, nephropathy and diabetic foot are the major causes of morbidity and mortality in diabetic patients.

Objective: To study the effects of the control and duration of diabetes on the development of long term complications in diabetic patients.

Method: The long term diabetic complications (neuropathy, IHD, CVA, PVD and diabetic foot) were assessed in 80 diabetic patients of type 1 and type 2 who attended the diabetic clinic in AL-Sader teaching hospital over 10 months period.

Results: There was significant relationship between the prevalence of long term complications and degree of diabetic control and duration of diabetes mellitus

Conclusion: The control and duration of diabetes mellitus are the major predictors of long term diabetic complications.

Key words: diabetes mellitus, long term complications, control of diabetes.

INTRODUCTION

Diabetes mellitus is a chronic and complex disease, requiring continued lifelong management aimed at reducing the high morbidity and premature mortality caused by chronic complications associated with long standing hyperglycemia. (1) Type 2 diabetes mellitus is estimated to affect 14 million individuals in the United States, approximately one third of them are undiagnosed. The duration of DM type 2 before diagnosis has been estimated to be 7 to 10 years, and the presence of microvascular complications at the time of diagnosis is common, the burden of microvascular complications from DM type 2 is high. Diabetes is the leading cause of end stage renal disease, polyneuropathy and non-traumatic amputation and it is the most common cause of new blindness in adults aged 20-74 years. Results of observational and experimental studies suggest that intensive glycemic control in type 2 DM, once diagnosed, reduces the risk of microvascular complications. However, these trials leave open the question of whether early detection of DM, before symptoms appear, is of net benefit. (2) (3) (4) The pathogenesis of microvascular and neuropathic complications of diabetes is complex and poorly understood. Two well researched mechanism proposed for glucose induced cell injury are advanced glycosylation end products (AGES) and an accelerated polyol pathway with consequent protein kinase c activation. (5) Long term complications are commonly divided into microvascular and macrovascular effects, microvascular complications involve damage to small arterioles and capillaries due to glycosylation and oxidation of cell wall proteins. These changes cause the nephropathy, retinopathy and autonomic and peripheral neuropathy commonly seen in diabetic patients. Macrovascular diseases include coronary artery, cerebrovascular and peripheral vascular disease (6).

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PATIENTS & METHODS

The prevalence of diabetic complications in relation to diabetic control have been evaluated retrospectively by direct questionnaire and examinations of 80 diabetic patients (40 Female and 40 male), (Type 1 29 patient, Type 2 51 patient), age of patients range between 16-80 year.

All patients attend the diabetic clinic in AL-Sadder teaching hospital during the period from January to October 2006. Because of unavailability of HbA_{1c} assessment, the evaluation of control of DM based on the mean of fasting blood glucose for the previous three months in at least three separate readings and classify the control of blood sugar as good when FBG 80-150 mg/dl and poor when FBG more than 150mg/dl. All patients were screened for presence of neurological, cardiovascular, cerebrovascular and peripheral vascular complications and for signs of diabetic Foot.

Detection of neurological complications depends on examinations for signs of peripheral neuropathy and mononeuropathy and symptoms of autonomic neuropathy. Diagnosis of cardiovascular complications based on history of angina or rnyocardial infarction or presence of ECG changes. While diagnosis of cerebrovascular accident depend on history of transient ischemic attack or presence of stroke.

Detection of peripheral vascular disease depends on clinical examination of peripheral pulses. Definition of diabetic foot based on presence of ulcer, cellulites, gangrene or amputation. In this paper we study the effect of degree control of DM and duration of DM on the prevalence of these complications; also we did study the relationship between the degree of control of DM and age, sex. residence and mode of treatment.

RESULTS

The control of diabetes was significantly better in patients on oral hypoglycemic than in those on insulin therapy and significantly better in patients from urban than in those from rural areas but there is no significant effect of age and sex on degree of control. (Table 1). The prevalence of diabetic complications including neuropathy, macrovascular complications and diabetic foot, stepwise significantly with the magnitude of hyperglycemia and with duration of diabetes both in type 1 and type 2 DM. (Table 2 and table 3).

DISCUSSION

Few comparative studies of the epidemiology of diabetes mellitus in terms of glycemic control and chronic complications have been performed and reported in Asian countries (7). The Diabcare - Asia study was carried out to ascertain the status of diabetes control and diabetes complication in Asian patients with type 2 diabetes, In the first phase of this study, patients managed by specialists (secondary / territiary care), in 230 referral centers out of 12 Asian regions were studied, more then 50% even treated by specialist, were not well-controlled and this study confirmed that diabetic complications were more prevalent in patients with poorer glycemic control (higher HbA_{1C} values) this led to the need of second phase study in 2001 address the question of diabetes control and diabetic complications in patients managed by general practitioners, who take care of most patients with diabetes in this part of the world (7). In this study we found better control of diabetic patients from urban areas compared with rural areas and this is probably related to degree of education, availability of the treatment and easy access to the hospital and laboratory. Also the magnitude of control was better with oral hypoglycemic agents than with insulin due to more compliance of patients in case of oral hypoglycemic.

The data from this limited study reveal linear relationship between chronic diabetic complications and duration of diabetes mellitus. Duration of diabetes is universal risk to all kinds of chronic diabetic complications (8) (9).

It has been well established the relation between diabetic control as reflected by

HbA1c and development of micro- vascular and macrovascular complications (10) (11).
In our study we did not have HbA_{1C} so we depend on the average readings of fasting blood sugar at different time to assess the control and we found significant relation ship between the control and development of chronic complications especially neuropathy.

CONCLUSION

There is significant linear relation ship between the duration and poor control of diabetes mellitus and appearance of chronic complications of diabetes mellitus.

TABLES

Table 1. The relationship between control of diabetes mellitus and age, sex, residence and mode of treatment.

Variant		Fasting blood sugar		Total	p-value
		Poor control FBG > 150mg/dl	Good control FBG 80-150mg/dI		
Age	<4oy	20 (80%)	5 (20%)	25	> 0.05
	>4oy	46 (84 %)	9(17%)	.55	
sex	Male	33 (83%)	7(18%)	40	> 0.05
	Female	34 (85%)	6(15%)	40	
Residence	Rural	8 (89%)	1 (11%)	9	< 0.05
	Urban	55 (77%)	16(23%)	71	
Mode of treatment	OHA	29 (80%)	7 (20%)	36	< 0.05
	Insulin	42 (95%)	2 (4%)	44	

T able 2. The effect of control of diabetes mellitus on prevalence of diabetic complications.

Complication	Fasting blood sugar	
	Poor control > 150mg/dl	Good control 80-l50mg/di
Neuropathy	36 (53%)	6 (40%)
IHD*	8(11%)	2(13%)
CVA**	3 (4%)	1 (7%)
PVD***	.10(15%)	3 (20%)
Diabetic Foot	11 (16%)	3 (20%)

P<0.05

* Ischemic heart disease. **cerebrovascular accident. ***peripheral vascular disease.

Table 3. The effect of duration of diabetes mellitus on prevalence of complications.

Complication	Duration of diabetes mellitus	
	< 5 years	≥ 5 years
Neuropathy	8(61%)	34 (48%)
IHD	1 (7%)	9(13%)
CVA	1 (7%)	3 (4%)
PVD	2(15%)	11(5%)
Diabetic Foot	1(7%)	13(18%)

P < 0.05

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