Prevalence of Macrovascular Complications in Diabetics of WAH, District Rawalpindi

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Abstract

Objective: To determine the prevalence of macrovascular complications in diabetic subjects with relation to age duration of diabetes and metabolic control..
Setting: Primary care centres of WAH, District Rawalpindi cross sectional population based study.
Methods: A total of 805 known diabetics (380 males and 425 females) were studied. Relevant history, detailed physican examination and ECG were done to assess the presence of ischaemic heart disease, stroke and diabetic foot complications. Their diabetic control was assessed by estimation of their plasma glucose and glycosylated haemoglobin.
Results: The prevalence of macrovascular complications was as follows: Ischaemic heart disease 19.8% (female 4.7%, males 7.8%), cerebrovascular disease 6.2% (females 4.7%, males 221%) and diabetic foot complications 2.1%. The macrovascular complications increased with age, duration of diabetes and were more prevalent in uncontrolled diabetics having glycosylated haemoglobin >8.6%.
Conclusion: Prevalence of macrovascular complication in our population is higher as compared to the West probably due to better management and diabetic care in those countries (IPMA 49:8, 1999).

Introduction

Diabetes, one of the most common chronic disorders among adults in the Western world is associated with increased prevalence of macrovascular disease[1]. Atherosclerotic heart disease is accelerated in patients with diabetes whose motbidity from ischaemic heart(IHD), cerebrovascular disease (CVD) and peripheral vasculardisease (PVD) greatly exceeds those of the non-diabetic population[2].
Several studies have been carried out in USA, Europe and South Asian countries to determine the prevalence of macrovascular complications in their diabetic patients[3-7]. Diabetics suffer 2 to 4 times the risk of developing cardiovascular disease than non-diabetics in Europe[8] and epidemiological studies demonstrate that diabetes mellitus carries a 2 to 6 fold increased risk of stroke[9]. Diabetic patients have an overwhelming propensity to atheroma and gangrene of the lower extremity and the risk of amputation is six times greater than in non-diabetic subjects[10-11] . The studies carried out to know the prevalence of these complications in Pakistan were clinical based and they did not provide any information regarding the effects of duration and metabolic control upon macrovascular complications of diabete[12,13]. Hence a populationbased study was designed for the purpose inknown diabetics of Wah, District Rawalpindi.

Subjects and Methods

This was across sectional, populationbased study to see the pattern of diabetic complications in known diabetics repoiting to primary care centers in a localized population of Wali. Out of thirteen hundred and thirty-eight known registered diabetics in Wah, a total of 805 (380 males and 425 females) participated aflerfull informed consent. The duration of diabetes was the time between the diagnosis

and the time of examination. A complete history about the macrovascular complications was enquired and a complete general physical and systemic examination perfonned.
Ischaeinic Heart Disease (IHD) was considered to be present if there was a history of inyocardial infarction that was confinned by ECG (i.e., pathological Q waves) at the time of examination/review of previous hospital records when present, or history of angina elicited and confinned by the physician. CVD was recorded if there was documentary evidence of stroke (cerebral infarction, haemorrhage or thrombosis), transient ischaemic attack (TIA), hemiplegia or monoplegia. Diabetic foot disease was considered if there were trophic foot ulcers, gangrene oramputationof any part of the extremities. The peripheral pulses (femoral, popliteal, dorsalis pedis and posterior tibial, were palpated.
To assess the metabolic control, plasma glucose and glycosylated haeinoglobin estimation were carried out. Plasma glucose was estimated by enzymatic method (oxidase/peroxidase) of Sera-pak, Ames, England. Its between bach CV was 3.5%. Plasma glycosylated haemoglobin (GHb) was estimated by using Sigma Diagnostics glycohaemoglobin quantitative column tecimique kit Cat No.440 from whole blood collected in EDTA/Sodiuin Flouride. Its between batch CV was 6.1%.

Statistical Analysis

The data was analyzed by the computer programme Special Package for Social Sciences (SPSS). The mean, median and percentile values of the analytes were calculated. The level of significance was put at $p<0.05$.

Results

Out of 805 diabetics the overall prevalence of IHD was 19.8%. It was slightly more common in males (22.1%) than females (17.5%). The percentage distribution of IHD gradually increased with advancing age. The prevalence of CVD was 6.2%. The males (7.89%) were affected more than the females (4.7%). CVD was more prevalent in diabetics of more than 50years of age. The total prevalence of diabetic foot disease was 2.1%. It was three times more common in males (3.42%) than females (0.94%) (Table 1).

Table I. Age and sex distribution of cerebrovascular disease, ischaemic heart disease and diabetic foot in diabetic patients.

Age	Males							Females							Total						
	Diabe-tics	IHD^	%	CVD*	%	DF~	%	Diabe-tics	IHD^	%	CVD*	%	DF~	%	Diabe-tics	IHD^	%	CVD*	%	DF~	%
0-20	9	-	-	-	-	-	-	4	-	-	-	-	-	-	13	-	-	-	-	-	-
21-30	8	-	-	-	-	-	-	11	-	-	-	-	-	-	19	-	-	-	-	-	-
31-40	40	4	10	1	2.5	1	2.5	73	6	8.2	1	1.3	-	-	113	10	8.8	2	1.7	1	0.88
41-50	85	15	17.6	3	3.5	2	2.3	127	16	12.5	2	1.5	3	2.3	212	31	14.6	5	2.3	5	2.3
51-60	134	35	26.1	12	8.9	6	4.4	130	30	23.0	7	5.3	1	0.76	264	65	24.6	19	7.1	7	2.6
61-70	82	24	29.2	11	13.4	3	3.6	65	20	30.7	8	12.3	-	-	147	44	29.9	19	12.9	3	2.04
>70	22	6	27.2	3	13.6	1	4.5	15	4	26.6	2	13.3	-	-	37	10	27.0	5	13.5	1	2.7
Total	380	84	22.1	30	7.89	13	3.42	425	76	17.8	20	4.7	4	0.94	805	160	19.8	50	6.21	17	2.1

*Cerebrovascular disease, ^ischaemic heart disease, ~Diabetic foot disease

IHD was common in patients who had longer duration of diabetes compared to those having shorter duration of illness. The peak incidence was seen in subjects having a 13-16 years duration. The prevalence of CVD increased with long standing diabetes and was seen in diabetics who had the disease for more than one and a half decade. Diabetic foot disease was also more common in patients having prolonged duration of diabetes (Figure 1).

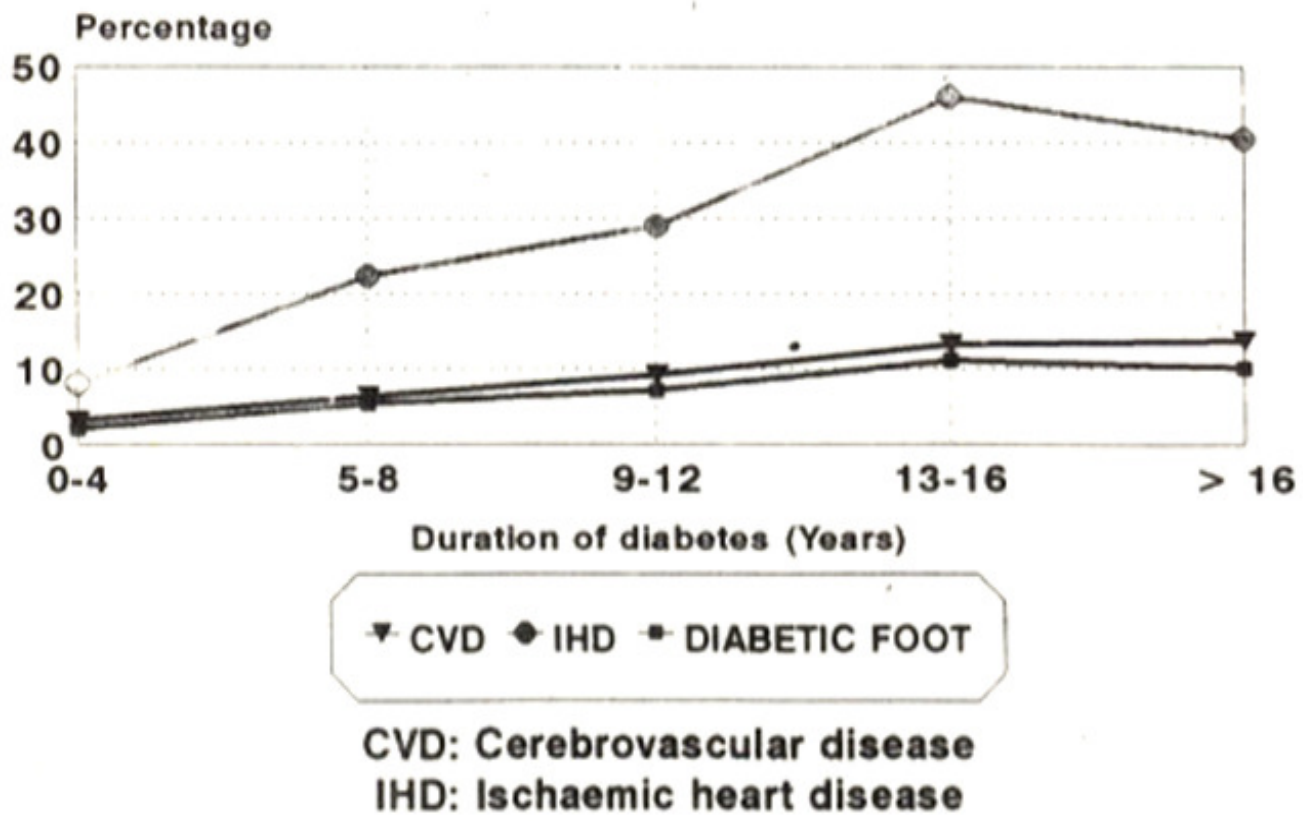

Figure. Prevalence of cerebrovascular disease and ischaemic heart disease in relation to durationof diabetes mellitus (n = 805).

IHD was commonly recorded in uncontrolled diabetics, CVD and diabetic foot disease showed a linear relation with glycosylated haemoglobin (Table II).

Table II. Prevalence of ischaemic heart disease, cerebrovascular disease and diabetic foot disease with relation to glycosylated haemoglobin in diabetic patients (n = 805).

Gly Hb (%)#	Males							Females							Total						
	Diabe-tics	IHD^	%	CVD•	%	DF~	%	Diabe-tics	IHD^	%	CVD•	%	DF~	%	Diabe-tics	IHD^	%	CVD•	%	DF~	%
6-8.5	72	10	13.8	3	4.1	-	-	79	13	16.4	2	2.5	-	-	151	23	15.2	5	3.3	-	-
8.6-11.5	195	42	21.5	13	6.6	6	6.3	195	35	17.9	6	3.1	1	0.5	390	77	19.7	19	4.8	7	1.7
11.6-13.5	44	11	25.0	5	11.1	2	4.5	60	11	18.3	3	5.0	1	1.6	104	22	21.1	8	7.6	3	2.8
13.6-15.5	33	9	27.2	4	12.1	4	12.2	42	9	21.4	4	9.5	2	4.7	75	18	24.0	8	10.6	6	8.0
>15.5	36	12	33.3	5	13.8	1	2.7	49	8	16.3	5	10.2	-	-	85	20	23.5	10	11.7	1	1.1

^ischaemic heart disease, •cerebrovascular disease, ~diabetic foot disease, #glycosylated haemoglobin

Discussion

It is well known that macrovascular disease represents a major threat to the health and life of people with diabetes mellitus[2]. The overall prevalence of IHD in our study was 19.8%(Table I) comparable to the prevalence of 15-27%noted from SouthEast Asiancountries[13,17]. H-ID gradually increased with the age of diabetic patients(Table I). These findings support similar observations noted in European

diabetics. Insulin resistance and obesity am responsible for much of the abnormal lipid metabolism. The plasma lipid abnormalities alongwith glycosylation of vessel lead to increased risk of atherosclerosis and are likely to be an important cause of increased macrovascular disease[18]
CVD occurs 1.5 -2 times more frequently in diabetics than non-diabetics[19,20]. The overall prevalence of CVD in this study was 6.2 1% (Table I) comparable to the prevalence of 4.4-7% noted in European diabetics[21,23]. The prevalence of CVD in these diabetics was lower than that recorded in South East Asian countries (8.2%)[16,17]. The prevalence of CVD increased with age (Table I). Similar findings were noted in diabetics of WHO multinational study[24]. The mechanism that possibly explains the increased stroke damage after hyperglycaemia is cellular acidosis. It is suggested that both pH and lactate levels could independently contribute to cellular damage[25-28].
Diabetic foot disease was common in older diabetics and the total prevalence was 2.1% (Table 1). This was lower than noted in the West (5-7%)[21,29,30], probably due to frequent washing of feet and better hygiene. There are three main factors that lead to tissue necrosis in the diabetic foot disease, namely neumpathy, infection and ischaemia The feet are the target of peripheral neuropathy leading chiefly to sensoly deficit, while ischaemia results from atherosclerosis of the long vessels. The atherosclerosis in diabetics is oftenbilatenil, multisegmental and distal; it usually involvçs vessels below the knee[31].
IHD was more frequent in patients with longerduration of diabetes (Figure 1). Silimar conclusions were recorded in studies conducted in Pakistan and abmad[12,16,32]. CVD was noted to increase withiong standing diabetes (Figure 1). These findings were in agreement with similar observation by other authorss[33,34]. Diabetic foot disease was more prevalent in subjects with prolonged duration of disease (Figure 1). These findings support similar observation in the West[5].
Macrovascular complications were coiiunon in diabetics with poor metabolic control. IHD had a direct correlation with GHb levels (Table II). These findings support the association between DID and elevated GHb recorded in other studies[33,35,36]. CVD and diabetic foot disease were frequent in uncontrolled diabetics (Table II) and these observations were in agreement with the findings in others[33-35]. Similar findings were noted in European diabetics[14].
In this study majority of the patients had poor metabolic control. The reason for poor diabetic care in these centers could be that a doctor examined 50-70 patients daily from the surrounding population. The doctor's time spent with each patient was short and the doctor's advice also appeared relatively ineffective. A high portion of overweight and obese patients were prescribed oral hypoglycaemic agents (7.9%) and these patients could be presumed diet failures, while few were treated with insulin injection(14.5%) and some were managed with diet control and weight reduction (6.6%).
This data provides an important population based information to this poorly studied field and also gives an overview of the magnitude of macrovascular diabetic complications in patients treated primarily by general practitioners and the reasons of poor metabolic control that aggravate the diabetic complications. It is concluded that macrovascular complications due to diabetes are common in our setup. Regular clinical examination, ECG and estimation of plasma glucose, GHb and lipid profile are necessaiy for evaluation of these complications. Establishment of diabetic clinic with facilities of diabetologist, dietician and chirodopodist are essential so as the doctor could spend more time with each patient for detailed examination and imparting health education.

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