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THE PREVALENCE OF DIABETIC COMPLICATION OF ELDERLY DIABETICS IN HIMEJI

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INDEXING WORDS

diabetic microangiopathy ; diabetic macroangiopathy ; diabetic duration ; elderly diabetics

SYNOPSIS

Diabetes mellitus has recently markedly increased among elderly patient's diseases. There are no recent epidemiological reports on the relative number of male and female diabetic patients. So, an epidemiological study was performed on 746 Non-Insulin-Dependent Diabetes Mellitus patients, whose data were obtained from members of the Himeji Internal Medicine Association, divided into six groups according to sex and duration of illness. The following results were obtained. 1) The number of male patients was greater by about 20% than that of female patients, while elderly patients accounted for a larger proportion, nd age at onset of disease was about ten years higher in female than in male patients. 2) All indicators of diabetes mellitus became worse with longer duration of illness. 3) There was a corelation between the prevalence of complications and the duration of illness: The prevalence of complications in creased in parallel with increasing duration of illness, and this tendency was more marked in female than in male patients. 4) Female patients had a more marked

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tendency to develop hypertension, hyperlipidemia and obesity than male patients. 5) Microangiopathy generally manifested itself earlier than macroangiopathy, and the increase in the prevalence of angiopathy in accordance with prolonged duration of illness was more marked for microangiopathy than for macroangiopathy. Clinical features of Japanese diabetics are found to be similar to those of Europeans, especially dominant in females. This might be due to the changing life style in japan.

INTRODUCTION

Complications of diabetes mellitus have given rise to social issues along with the increase in the incidence of diabetes mellitus in recent years. We investigated the nature of diabetes mellitus in Himeji, and determined the patterns by which each complication was changing with the duration of illness. Risk factors of complications were also epidemiologically investigated for comparison between males and females.

METHODS

Questionnaires were sent to 150 medical organizatios belonging to the Himeji Medical Association, and responses and clinical data on 746 patients with non-insulin-dependent diabetes mellitus (NIDDM), who were examined in November 1993, were received from 47 organizations. The patients were divided into six groups, and each group was subdivided according to sex. . Significant differences were determined by the χ^2 test of the number of patients, and differences at $p<0.05$ were considered to be significant.

RESULTS

The number of male patients was significantly greater, 417 (55.8%), than femalepatients, 329 (44.1%) among the 746 patients with NIDDM. The largest number of male patients were within the 50-59(59.48 + 11.36,M + SD) year age group, while the largest number of female patients were within the 60-69(64.73 + 11.51,M + SD) year age group. The age distribution showed a peak in the female patients about 10 years later than in the male patients. The age at occurrence was 40-49(48.89 + 12.85,M + SD) year in the largest number of male patients, while it was 50-69(56.28 + 12.16,M + SD) year in the largest number of female patients. From these findings, it is concluded that diabetes mellitus occurs in women later than in men and that many female patients of diabetes mellitus are elderly.(Fig.1 Table I)

Age at Distribution of NIDDM Patients
Current and at the Time of Clinical Onset

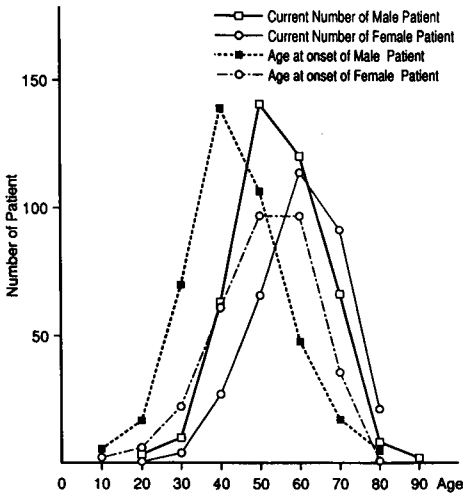

Fig.1.

Illustrate age at diagnosis and current for male and female diabetics. Total numbers of male patients is greater than female patients. The ages at diagnosis are ten ten years earlier in male than in female patients.

Table I.

The Age Distribution of NIDDM Patients Current and at the Time of Clinical Onset

Age			0~9	10~19	20~29	30~39	40~49	50~59	60~69	70~79	80~89	90~	Total
Age	Male	No	0	0	4	10	64	143	120	66	9	1	417
		%	0	0	1.0	2.4	15.4	34.4	28.8	15.9	2.0	0.2	100.0%
	Female	No	0	0	2	5	28	66	114	92	22	0	329
		%	0	0	0.6	1.5	8.5	20.0	34.7	28.0	6.7	0	100.0%
Age at onset	Male	No	0	6	17	70	141	109	49	19	5	0	416
		%	0	1.4	4.1	16.8	33.9	26.2	11.8	4.6	1.2	0	100.0%
	Female	No	0	1	6	24	64	98	98	36	2	0	322
		%	0	0.3	1.9	7.5	19.9	30.4	30.4	11.2	0.6	0	100.0%

Fasting blood glucose (FBG) and hemoglobin A1c(HbA1c) levels were compared according to the duration of diabetes. As indicators of diabetes mellitus increased, FBS and HbA1c levels increased.(Fig.2)

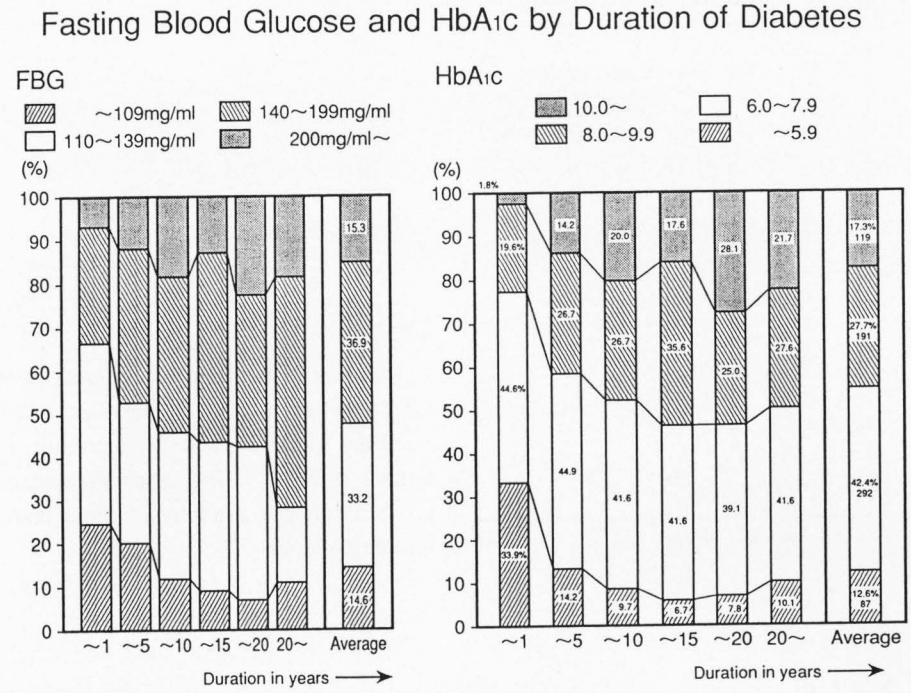

Fig.2.

Distribution of fasting blood glucose by duration of diabetes. As duration of diabetes is longer, FBS is higher. Distribution of HbA1c by duration of diabetes. As duration of diabetes is longer, HbA1c is higher.

Blood pressure, total cholesterol, and the body mass index, which are factors affecting complications, were compared for the male and female patients. As shown in Figure 3 and Table II, the level of each factor was significantly higher in the female than in the male patients.(Fig.3 Table II)

Figure 4 and Table III show the incidence of complications according to the duration of diabetes by sex. As the duration of diabetes increased, the complications rose in both male and female patients. There was a constant correlation between duration of illness and the incidence of complications. There was no difference in the frequency of complications between the male and female patients when the duration of diabetes was short, but the incidence of complications rose as the duration of diabetes increased in the female patients, and the prevalence was very significant in the female patients.(Fig.4 Table III)

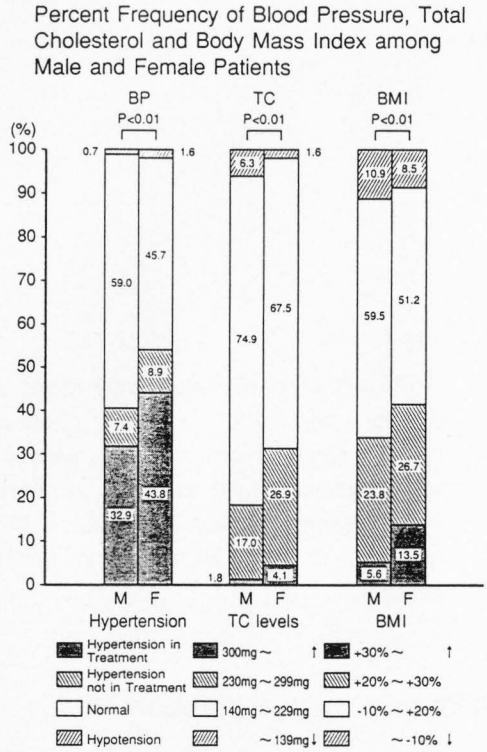

Fig.3.

Percent distribution of blood pressure, total cholesterol and obesity index by sex. Numbers of patients who have high blood pressure, hypercholesterolemia and obesity are greater in female than in male.

Table Ⅱ.

Percent Frequency of Blood Pressure, Total Cholesterol and Body Mass Index among Male and Female Patients

		Hypertension in Treatment	Hypertention not in Treatment	Normal	Hypotension	χ^2
Hypertension	Male	134 (32.9%)	30 (7.4%)	240 (59.0%)	3 (0.7%)	P < 0.01
	Female	138 (43.8%)	28 (8.9%)	144 (45.7%)	5 (1.6%)	

		300mg～	230～299mg	140～229mg	～139mg	χ^2
TC levels	Male	7 (1.8%)	68 (17.0%)	299 (74.9%)	25 (6.3%)	P < 0.01
	Female	13 (4.1%)	86 (26.9%)	216 (67.5%)	5 (1.6%)	

		+30%～	+20～+30%	−10～+20%	−10%～	χ^2
BMI	Male	23 (5.6%)	98 (23.8%)	245 (59.6%)	45 (10.9%)	P < 0.01
	Female	44 (13.5%)	87 (26.7%)	167 (51.2%)	28 (8.5%)	

Prevalence of Diabetic Complications
by Duration of Diabetes (Male and Female)

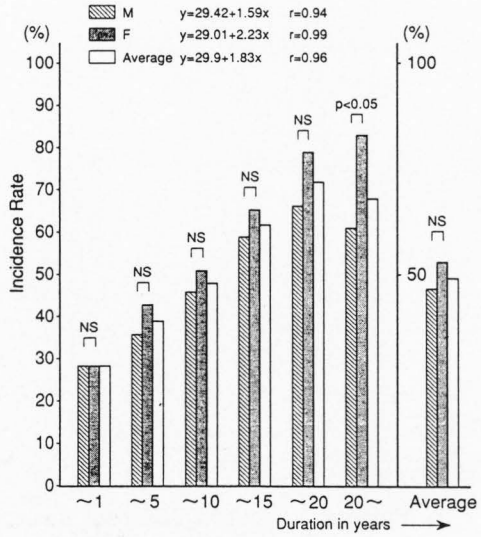

Fig.4.

Prevalence of diabetic complications by duration and sex. Frequency of all diabetic complications such as macro- , microangiopathy and cataract increased with increasing duration of diabetes. This tendency is more prominent in female patients.

Table Ⅲ.

Incidence of Complications According to the duration of Diabetes by Sex.

Duration in years			~1	~5	~10	~15	~20	20~	Total
Complications	Male	+ (%)	10 (28.6)	42 (35.3)	54 (46.2)	32 (59.3)	24 (66.7)	32 (61.5)	194 (47.0)
		− (%)	25 (71.4)	77 (64.7)	63 (53.8)	22 (40.7)	12 (33.3)	20 (38.5)	219 (53.0)
		Total	35	119	117	54	36	52	413
	Female	+ (%)	8 (28.6)	46 (43.0)	46 (51.1)	25 (65.8)	23 (79.3)	20 (83.3)	168 (53.2)
		− (%)	20 (71.4)	61 (57.0)	44 (48.9)	13 (34.2)	6 (20.7)	4 (16.7)	148 (46.8)
		Total	28	107	90	38	29	24	316
	Total	+ (%)	18 (28.6)	88 (39.0)	100 (48.3)	57 (62.0)	47 (72.3)	52 (68.4)	362 (49.7)
		− (%)	45 (71.4)	138 (61.0)	107 (51.7)	35 (38.0)	18 (27.7)	24 (31.6)	367 (50.3)
		Total	63	226	207	92	65	76	729

All the patients were investigated in regard to estimated onset of disease, and in what pattern its frequency was observed to have increased.(Fig.5)

Diabetic dermopathy, nephropathy, neuropathy and retinopathy were revealed to have appeared relatively early. The increase in frequency of coronary heart disease, cerebrovascular disease, leg ulcer and so on, which are called macroangiopathies,

tended to be late.(Fig.5) The incidence of microangiopathies, which include retinopathy, nephropathy and neuropathy, and of macroangiopathies was compared according to the duration of diabetes. The rate of increase of microangiopathies was more marked than that of macroangiopathies.(Fig.6)

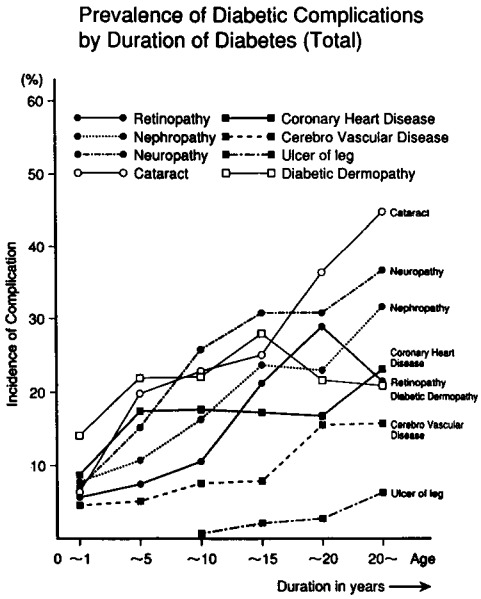

Fig.5.

Prevalence of diabetic complications by duration and sex. Frequency of diabeticcomplications increased with increasing duration of diabetes. This tendency is more prominent in female patients. Prevalence of diabetic complications such as macro-, microangiopathies and cataract by duration. Frequency of complications increased with increasing duration of diabetes.

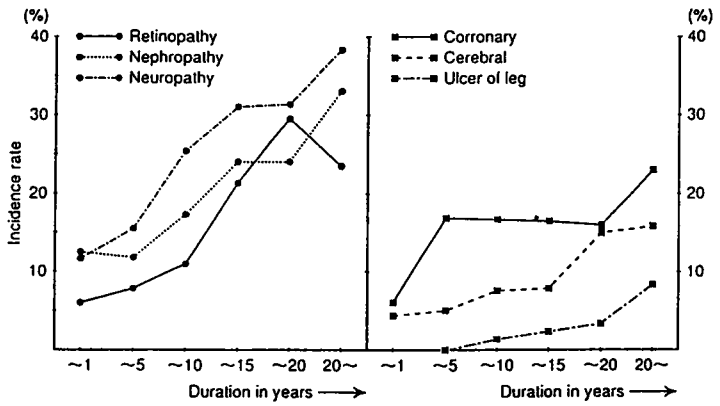

Fig.6.

Prevalence of neuropathy, micro- and macroangiopathy by duration. Clinical manifestation of diabetic microangiopathy is appeared in earlier stage than those of macroangiopathy.

DISCUSSION

Diabetes mellitus in Japan has markedly increased in recent years, and the number of patients with the disease was 50 times larger in 1989 than in 1955. [7] Currently, one of 10 persons aged 40 years or over is believed to be positive for urine glucose. [1] The number of female diabetic patients is larger than that of male patients in Europe, but in Japan there have been few reports on the relative number of male and female diabetic patients. The age at onset was more advanced in the female patients than in the male patients in the present study, with a higher proportion of elderly female patients than elderly male patients, Hidaka et al. [4] also showed that there are many elderly persons among the female patients. The results of the present study are characterized partly as follows: The incidence of complications rose in the female patients more markedly than in the males as the duration increased inspite of the absence of a sex difference in the incidence of complications at the time of detection of diabetes mellitus. We found that blood pressure, total cholesterol and obesity are the important factors affecting the onset of complications of diabetes. All of them rose in the females more markedly than in the males. These three factors are being noted as disease concept Syndrome X [3, 6] along with the increase in resistance to insulin. In addition, the age at onset was more advanced in the females than in the males, and the disaease occurred after menopause in the females. When these facts are considered, it is highly possible that such endocrinological factors as aging and lack of female hormones are involved in the onset of diabetes mellitus. As the duration of diabetes increased, the incidence of diabetic complications became much higher in the females than in the males. To clarify thecause of this phenomenon, the incidence of all complications was in estigated according to sex and duration of diabetes. Elevation of the frequency of ophthalmologic complications, particularly cataract, was found to be higher in the females than in the males. Bessho [2] and Suzuki [9] have also reported that the incidence of diabetic cataract is significantly higher in the females than in the males and that it rapidly increased with aging and the increase in duration of diabetes. The incidence of diabetic retinopathy has rapidly increased after about 10 years since the diabetes occurred. The frequency of complications is always higher in the female patients than in the male patients. This tendency resembles that reported by Takemoto et al. [10]. According to Ogasawara et al. [5], the incidence of retinopathy is higher in the female patients than in the male patients, and the mean age of female patients is about 8 years older than that of male patients. While the frequencies of cataract and retinopathy were always higher in female patients, the frequencies of renal complications tended to be higher in male patients than in female patients. With increase of duration of diabetes, the increase of macroangiopathies such as coronary heart disease, cerebrovascular disease and leg ulcer, was slower than that of the increase in retinopathy, nephropathy and neuropathy. These macroangiographic complications occurred later than the microangiographic complications

Cerebrovascular disease appeared later than coronary heart disease, and leg ulcer appeared much later than the cerebrovascular disease. In other words, the extent of the increase in microangiopathic complications due to the increase in duration of diabetes was more marked than that of the increase in macroangiopathic complications. The reason for this finding may be that macroangiopathy is attributed to arteriosclerosis [11], while cytotoxicity directly due to a high glucose level is highly involved in microangiopathy [8] Thus, a difference in etiology of the onset of complications was considered to have been reflected in the epidemiological pattern. Clinical features of Japanese diabetics are found to be similar to those of western diabetics, especially noted in females. It can be suggested that these results might be due to the changing life style of Japanese diabetics.

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