

CURRENT STATUS OF ELDERLY DIABETIC PATIENTS ON MAINTENANCE HEMODIALYSIS IN NARA PREFECTURE

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Abstract : The clinical characteristics of elderly hemodialysis patients with diabetes mellitus (DM) were compared with those with non-diabetic renal diseases (NDM). The subjects were 432 patients over 65 years of age undergoing maintenance hemodialysis at 28 dialysis centers in Nara Prefecture. The presence or absence of 8 different co-morbid illnesses was ascertained for each study patient. These conditions included congestive heart failure (CHF), ischemic heart disease (IHD), cerebrovascular disease (CVD), peripheral vascular disease (PVD), serious infections, severe visual disturbance, malnutrition and dementia. The prevalence of complications related to CHF, IHD, CVD, PVD, and severe visual disturbance was significantly higher in DM than in NDM. Activities of daily living (ADL) status was also evaluated. Degree of conditions of ADL was divided into four classes : no disability, needs assistance, wheelchair use, and bedridden. Disability of ADL was observed in 34.9 % of DM patients and 22.3 % of NDM patients ($p < 0.01$). The mean numbers of co-morbid illnesses in the no disability and bedridden classes were significantly higher in DM than in NDM. We conclude that cardiovascular complications and visual disturbance are the main causes of disability in elderly diabetic patients undergoing hemodialysis.

Index Terms

activities of daily living (ADL), diabetes mellitus, the elderly, hemodialysis

INTRODUCTION

Currently, 32.9 % of individuals undergoing hemodialysis are older than 65 years of age¹⁾. During the past 10 years, the number of diabetics undergoing hemodialysis has increased nearly fivefold. For elderly patients with diabetes as the cause of end-stage renal disease (ESRD), mortality is considerably higher than that for those with non-diabetic renal disease. Unfortunately, however, detailed information about elderly diabetic patients undergoing hemodialysis in local communities is not available. This study was designed to compare co-morbid medical conditions and status of activities of daily living (ADL) of elderly hemodialysis patients having diabetes with those of patients having non-diabetic renal diseases in Nara Prefecture. Additionally, although the term "elderly" is arbitrarily defined in the literature, persons of 65 years and over are treated as the elderly in this study.

PATIENTS AND METHODS

Patients

The subjects were 432 patients over 65 years of age undergoing maintenance hemodialysis at 28 dialysis units in Nara Prefecture. The subjects were divided into two groups: those with diabetes mellitus (DM), and non-diabetics (NDM). Numbers of patients, gender, age at the time of this study, age at the beginning of hemodialysis, and duration of hemodialysis are given in Table 1. The primary cause of renal disease in the NDM group was glomerulonephritis in 81.9 % of patients, nephrosclerosis in 8.7 %, cystic kidney disease in 3.9 %, and other diseases in 5.5 % of patients (Table 2).

Table 1. Patient characteristics

Characteristics	DM	NDM	Statistical significance
Number	123	309	—
Gender (M/F)	82/41	180/129	ns
Age at time of the study (yrs)	71.1±5.2	72.5±6.1	<0.05
Age at the beginning of dialysis (yrs)	68.1±5.9	67.9±7.8	ns
Duration of dialysis treatment (mos)	38.3±34.6	56.1±49.4	<0.05

Table 2. Etiology of underlying renal disease in NDM

Underlying disease	n	percentage
Glomerulonephritis	253	81.9
Nephrosclerosis	27	8.7
Polycystic kidney	12	3.9
Others	17	5.5

NDM, non-diabetic renal disease.

Abbreviations used are : DM, diabetes mellitus ; NDM, non-diabetic renal disease.

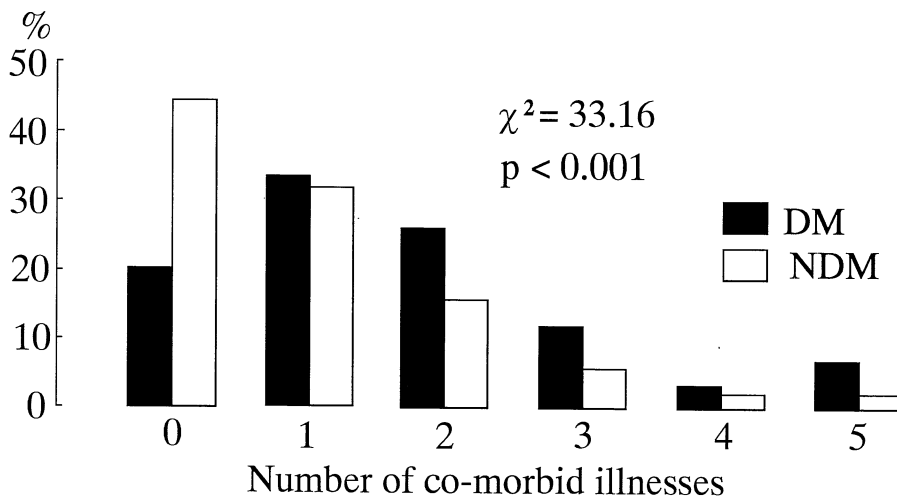


Fig. 1. Number of co-morbid illnesses in elderly hemodialysis patients with diabetes mellitus (DM) and those with non-diabetic renal disease (NDM).

Methods

The presence or absence of 8 different co-morbid medical conditions was ascertained for each patient. These conditions included congestive heart failure (CHF), ischemic heart disease (IHD), cerebrovascular disease (CVD), peripheral vascular disease (PVD), serious infections, severe visual disturbance, malnutrition and dementia. ADL status was also evaluated. ADL status was divided into four grades: no disability, needs assistance, wheelchair use, or bedridden. These data were abstracted by staffs of each dialysis unit using patient records.

Statistical analysis

Results are presented as means \pm SD. Differences between two groups were assessed using either the Mann-Whitney's U test or the chi-square test. Differences in the distribution of numbers of co-morbid illnesses between two groups was also assessed by chi-square test. Probability values less than 0.05 were considered to be significant.

RESULTS

Co-morbid medical conditions

The prevalence of complications related to CHF, IHD, CVD and PVD was significantly higher in DM than in NDM. Visual disturbance was also more frequently observed in DM than in NDM. However, the prevalence of serious infections, malnutrition and dementia was similar in the two groups (Table 3). The numbers of co-morbid illnesses in each group are also shown in Fig. 1. The prevalence of patients with more than one co-morbid illness was significantly higher in DM than in NDM ($p < 0.001$, chi-square test).

ADL status

Disability in ADL was observed in 34.9 % of patients in DM and 22.3 % in NDM ($p < 0.01$). However, the classes with disabilities were almost equally distributed both in DM and NDM (Table 4).

Table 3. Comorbid medical conditions

Comorbid status	DM		NDM		Statistical significance
	n	%	n	%	
CHF	36	29.3	59	19.1	<0.05
IHD	33	26.8	56	18.1	<0.05
CVD	27	21.9	43	13.9	<0.05
PVD	25	20.3	22	7.2	<0.001
Serious infection	21	17.1	46	14.9	ns
Visual disturbance	30	24.4	11	3.6	<0.001
Malnutrition	14	11.4	26	8.4	ns
Dementia	13	10.6	24	7.8	ns

Abbreviations used are: DM, diabetes mellitus; NDM, non-diabetic renal disease; CHF, congestive heart failure; IHD, ischemic heart disease; CVD, cerebrovascular disease; PVD, peripheral vascular disease.

Table 4. Status of activities of daily living (ADL)

Status of ADL	DM		NDM		Statistical significance
	n	%	n	%	
Disability	43	34.9	69	22.3	<0.01
Need assistance	24	55.8	47	68.1	} ns
Wheelchair use	14	32.6	15	21.7	
Bedridden	5	11.6	7	10.2	

DM, diabetes mellitus; NDM, non-diabetic renal disease.

Table 5. Relationships between number of co-morbid illnesses and status of activities of daily living (ADL)

Status of ADL	Number of co-morbid illnesses						Mean total number of co-morbid illnesses
	0	1	2	3	4	5	
No disability	23/125	30/80	19/30	7/5	0/0	1/0	1.17 † /0.65
Need assistance	2/9	8/14	8/11	2/8	1/2	3/3	2.04 /1.79
Wheelchair use	0/3	3/4	5/3	4/2	1/1	1/2	2.43 /2.00
Bedridden	0/0	0/1	0/2	1/2	1/2	3/0	4.40 † /2.71

DM/NDM † p<0.01 vs NDM

Relationships between number of co-morbid illnesses and ADL status

The relationships between the number of co-morbid illnesses and ADL status are summarized in Table 5. Mean numbers of co-morbid illnesses in the no disability and bedridden classes were significantly higher in DM than in NDM, whereas those in the needs assistance and wheelchair use classes were the same in the two groups.

DISCUSSION

Previous studies of hemodialysis patients have demonstrated that risk factors for death include older age²⁻⁶), diabetes as the cause of ESRD⁷⁻⁹), and several co-morbid medical conditions including cardiovascular disease, CHF, and PVD¹⁰⁻¹³). The presence of cardiovascular disease is very high and ischemic and dilated cardiomyopathy are common in elderly dialysis patients¹¹). We confirmed in this study that the prevalence of CHF, IHD and CVD were significantly higher in DM than in NDM. There were also high incidences of amputation of legs and blindness in diabetic patients undergoing hemodialysis. These complications may impair quality of life (QOL). In our study, PVD and severe visual disturbance were more frequent in the DM group than in the NDM group.

On the other hand, in our study the prevalence of serious infections, malnutrition and dementia did not differ significantly between the two groups. Infectious disease are common causes of hospitalization of dialysis patients, and pneumonia, bacteremia and fever of undetermined origin are the main infectious causes of this type of hospitalization¹⁴). Indeed, it is commonly believed that the incidence of infection is higher in diabetic patients than in non-diabetics. The elderly are also at an increased risk of infections due to immunodeficiency resulting from aging and malnutrition¹⁵). Approximately 10 % of hemodialysis patients have moderate to severe malnutrition, and the incidence of malnutrition is even higher in the elderly, by up to 20 %^{16,17}). The high incidence of malnutrition occurs for various reasons, including malabsorption, difficulty with swallowing, impaired taste acuity, carious teeth or ill-fitting dentures, and chronic constipation. Some elderly persons live alone and are unable to prepare adequate meals for themselves. Co-morbid illnesses may cause anorexia and decreased calorie and protein intake. In the present study, we did not examine the causes of serious infections or perform detailed nutritional assessment. Further studies will be needed to confirm these results.

Finally, in the western nations dementia is one co-morbid factor which, when present, may suggest that patients be advised to refuse the offer of dialysis treatment¹⁸). Lowance¹⁹) has suggested the guideline that elderly patients with an estimated life expectancy of less than 2

years should be advised to consider not accepting dialysis. For example, 81 % of American nephrologists would stop dialysis for a patient with advanced Alzheimer disease²⁰. By comparison, cultural, religious and legal factors likely contribute to both patient and physician behavior regarding cessation of dialysis in Japanese society. Public opinion polls indicate a growing interest in Japan under discussion concerning whether the cessation of life-sustaining terminally ill patients is legitimate. Recommendations concerning withdrawal of dialysis treatment should be debated in the future.

We conclude that cardiovascular complications and visual disturbance are the main causes of disabilities in elderly diabetic patients undergoing hemodialysis. Of the increasing number of elderly diabetics disabled due to co-morbid illnesses, some are demented, which has raised socio-medical issues related to hemodialysis therapy. We expect that social hospitalization will increase in the future, and we must become well versed in the care of elderly diabetic patients undergoing hemodialysis.

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