Predictors of Mortality in Hemodialysis

Pages with reference to book, From 58 To 60

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Abstract

One hundred and five patients enrolled in the maintenance haemodialysig programme at The Kidney Centre were studied retrospectively to identifLpg ac_t§f§§c§v_a§§gciated _incr,e3t.Sed.mortalitys. t Hypertension (relative risk 10.03, P<0.001), serum albumin <3 G/dl (relativierisk 2.60, p<0.05), diabetes mellitus as a cause of End Stage renal disease (relative risk 2.54, p<0.001), age >55 years (relative risk 1.8, p) were associated with higher risk of mortality, while sex had no statistically significant effect JPMA 46:58, 1996).

Introduction

Dialysis decreases the mortality and morbidity of patients with End Stage Renal Disease (ESRD), however, all patients do not benefit to the same extent. Various factors including age[1-3], race[1,2], sex[1] , diabetes mellitus as a cause of renal failure[2-4] . low serum albumin[2,5-7], low serum choles- terol[2,7] , low urea reduction ratio[5] and coexisting illness like left ventricular failure[3], ischemic heart disease[4] and hypertensions[8] are associated with increased risk of mortality in these patients.
This study was carried out to study some of the risk factor identified in the literature which predict the mrotality of patients with ESRD on maintenance haemodialysis and to ascertain the extent to wich the survival of these patients can be predicted.

Patients and Methods

All patients who entered the maintenance haemodialysis programme at. The Kidney Centre from July 1, 1989 to July 1, 1992 were included in the analysis.
Their medical records were scrutinized for their age at initiation of haemodialysis, ‘sex, duration on dialysis, cause of end stage renal disease, predialysis serum albumin before enrollment, presence or absence of hypertension, diabetes mellitus and ischemic heart disease (IHD). All patients underwent acetate dialysis for four hours twice weekly.
The medical records were studied till July 1, 1994 ie, study termination, death of the patient or if he left the Centre. The survival results are presented in terms of relative risk (RR) and survival rates are based on Kapalan Meiers methods[9].

Results

Of 105 patients studied, 40 expired during follow-up, 13 left the Centre, (9 for a transplant and 4 for dialysis at other Centres). Fifty two patients were alive at the temiination of study. There were 63 males and 42 females, with a male to female ratio of 1.5:1. Theirage ranged from 18-80 years (mean 48+14.1 years, median 47 years). The mean duration on dialysis was 31+14.8 months.
Diabetes mellitus was the leading cause of End Stage Renal Disease, followed by Chronic Glonienilonephiitis and hypertensive nephropathy (Table I).

Table I. Etiology of end stage renal disease.

	At risk		Expired	
	No.	(%)	No.	(%)
Diabetic nephropathy	32	(35)	23	(7)
Chronic nephritis	28	(30)	11	(39)
Hypertensive nephropathy	10	(11)	5	(50)
Chronic pyelonephritis	9	(10)	1	(11)
Adult polycystic kidney disease	9	(10)	Nil	
Others	4	(4)	Nil	

Mortality was highest (72%)in the diabetics and hypertensives (50%). All patients with adult polycystic kidney disease (APKD) were alive at the termination of study, their mean duration on dialysis being 43.2 months (range 28-53 months).

To see the effect of age on mortality, the patients were divided into three groups, below 45 years, between 45-55 years and over 55 years. The mortality in these groups was 28% 48% and 58% respectively (Table II),

Table II. Patients characteristics and risk for mortality.

Characteristics	Patients Mortality No.	%	RR	95% CI	p-Value
Age (years)					
<45	36	(28)	1		
45-55	25	(48)	1.73	0.89-3.36	N.S.
>55	31	(58)	2.09	1.27-3.43	<0.05
Sex					
Males	58	(43)	1		
Females	34	(44)	1.02	0.63-1.65	N.S.
Cause of ESRD					
Non-diabetic	60	(28)	1		
Diabetics	32	(72)	2.54	1.61-4.01	<0.001
Serum albumin					
>5 G/dl	8	(12)	0.32	0.05-2.17	N.S.
4.1-5 G/dl	26	(38)	1		
3.1-4 G/dl	31	(55)	1.42	0.80-2.55	N.S.
<3 G/dl	6	(100)	2.60	1.60-4.23	<0.05
Hypertension					
Absent	20	(5)	1		
Present	72	(54)	10.83	1.58-74.05	<0.001

(RR = Relative risk, CI = Confidence Interval, ESRD = End stage renal disease, IHD = Ischaemic heart disease, DM = Diabetes mellitus).

with the male to female ratio being 43% to 44% (Table II). Comparison of diabetics and non-diabetics is shown in (Table III).

Table III. Comparison of diabetics and non-diabetics.

	Diabetics N=32	Non-Diabetics N=60
Age		
Mean ± SD (Yrs)	57.9±8.2	44.3±14
Median	58	42
Sex		
Males No. (%)	20 (62)	38 (63)
Females	12 (37)	22 (37)
Duration on dialysis		
Mean±SD (Months)	23.2± 11.2	38.7±1.2
Median	21	38
Fate		
Alive N (%)	9 (28)	43 (72)
Expired	23 (72)	17 (28)

Mortality increased as serum albumin decreased with a 100% mortality in those having senim albumin <3 G/dl in Er-it—rast to 12% in those having serum albumin >5 G/dl (Table II). The survival curves of diabetic and non-diabetics are shown in Figure 1,

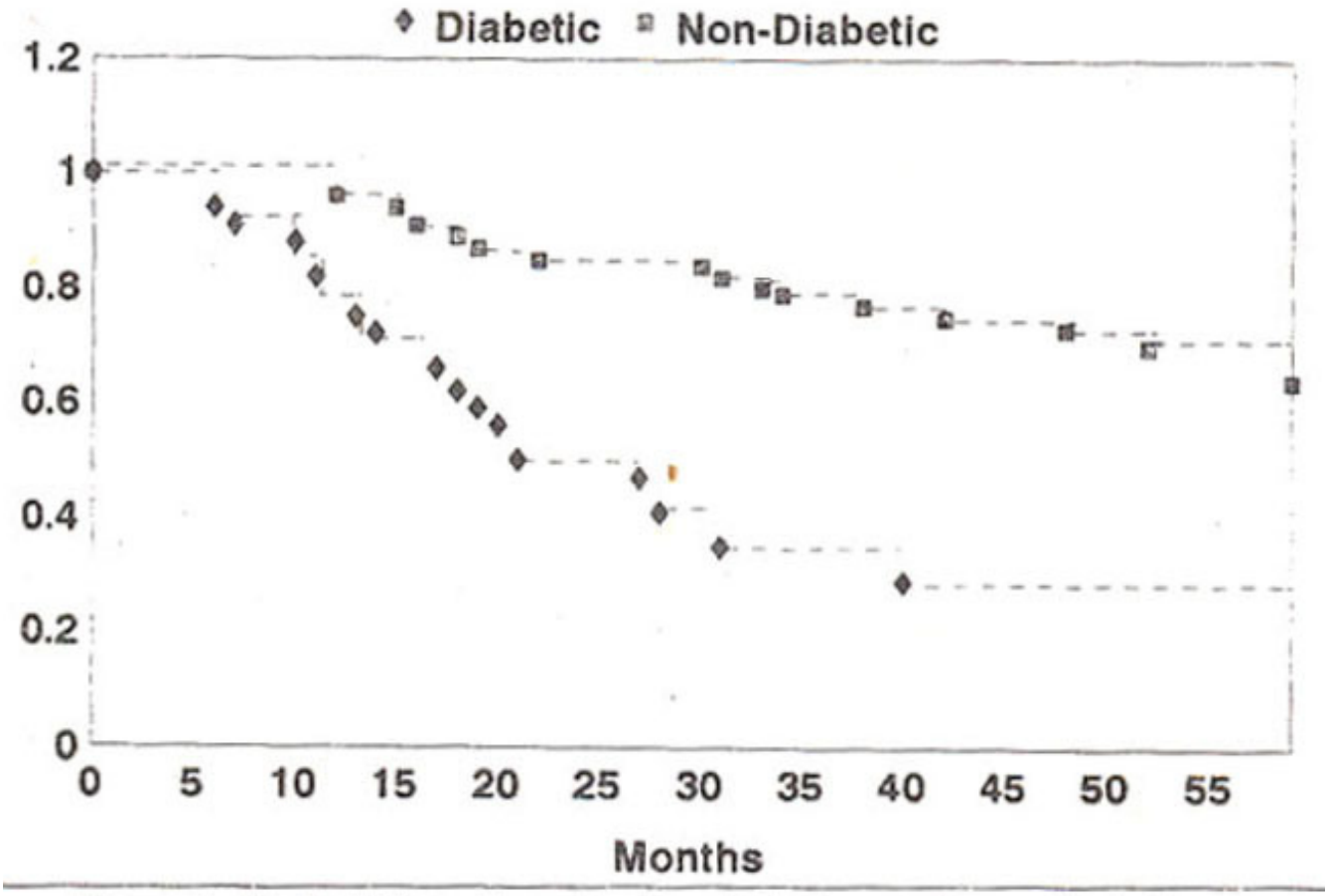

Figure 1. Probability of survival in diabetics and non- diabetics .

hypertensives and non-hypertensives in

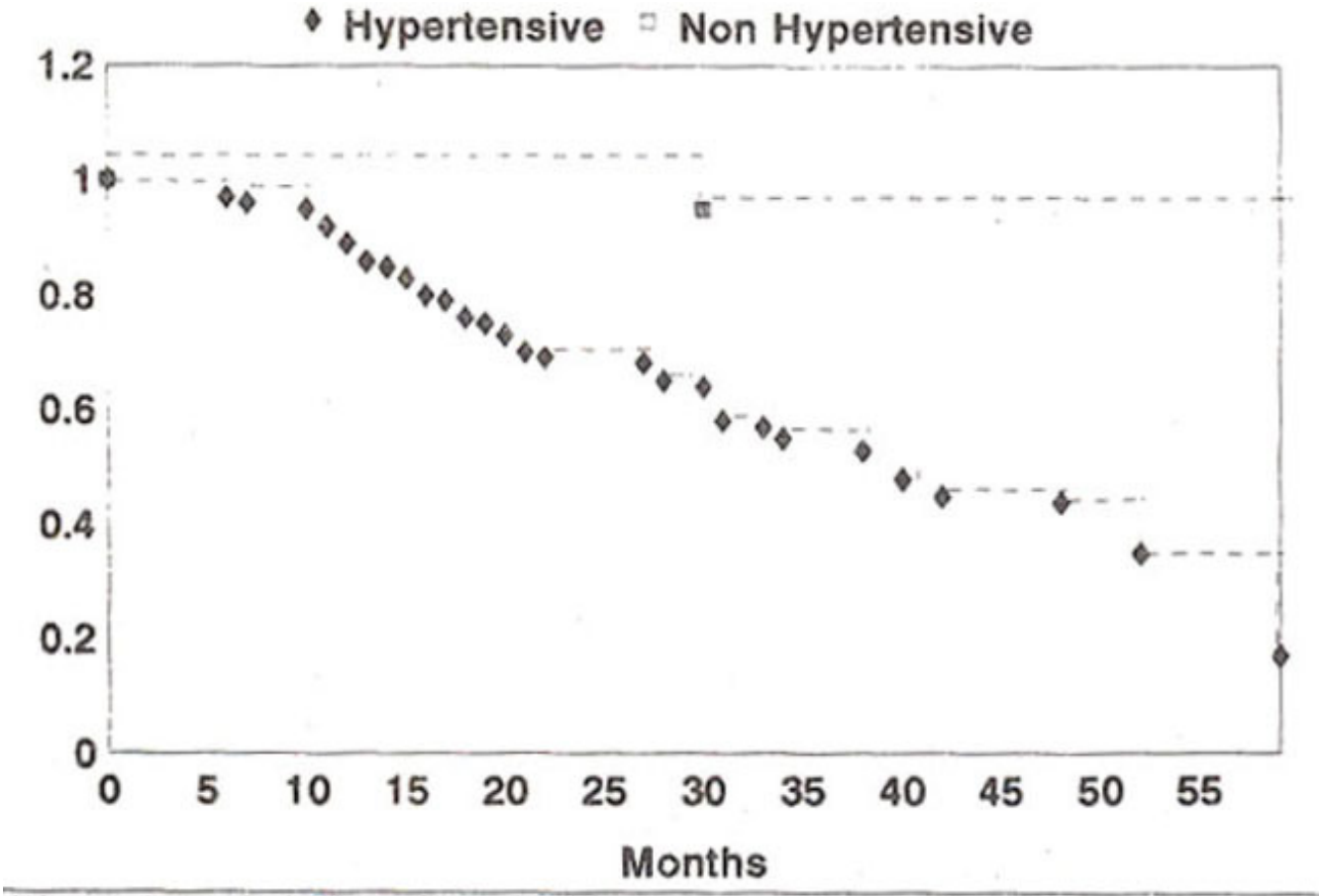

Figure 2. Probability of survival in hypertensives and non-hypertensives.

Figure 2 and those based on serum albumin in Figure 3.

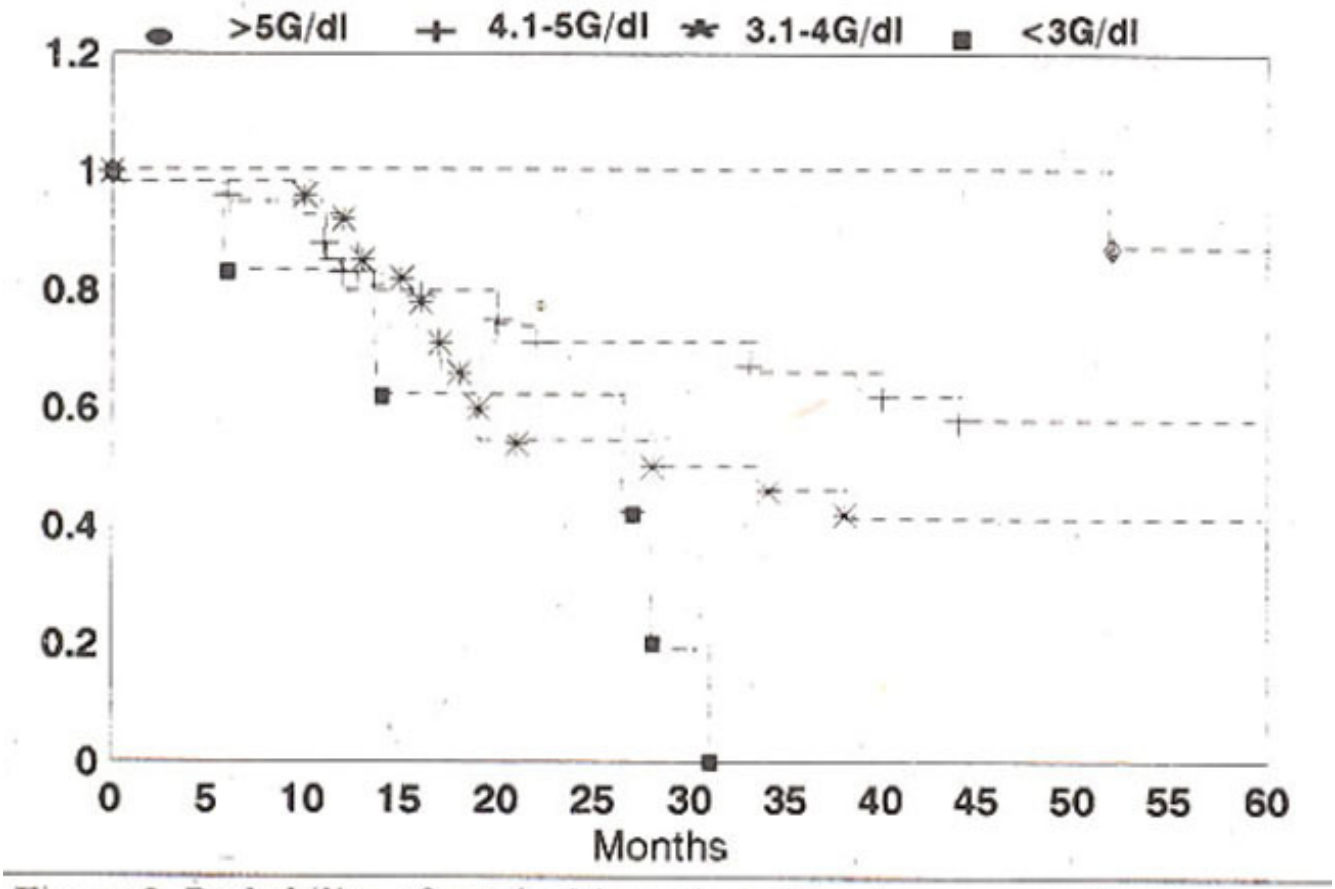

Figure 3. Probability of survival in patients based on serum albumin levels.

Discussion

Age is a recognised risk factor affecting mortality of patients on haemodialysism[1,2], with a risk of death approxi- mately doubling every 10 years[3] . This fact was confirmed in the presented study. Males are described to be at a higher risk of death, than females[1,2], however in this study this was not true. A similar finding is reported by Mac Clellan et al[4].

The relative risk of death in diabetes was 2.54 as compared to non-diabetics in this study. This has been shown in other studies[5]. Hutchison et al[3] have described duration of diabetes to be the strongest predictor of prognosis. The mean survival of diabetics in this study was 24 months which is far less as compared to the western figures. Watanabe et al[6] showed a 50% survival of 60 months on haemodialysis. This might be due to the acetate dialysis which is poorly tolerated by these patients as compared to bicarbonate dialysis. In this study patients with adult polycy stic kidney disease had abetter survival. Similar findings are reported in literature[7,8]. This is attributed partially to higher average hemoglobin levels which protect them to some extent from ischemic cardiac deaths[8].

Mortality was high in patients with low serum albumin and all subjects having a serum albumin <3 g/dl died within 2 years of initiation of maintenance haemodialysis. Serum albumin <4 g/dl has been described as a powerful predictor of death[2,9,10] and a serum albumin <3 g/dl was associated with greater probability forhospitalization forany cause[11]. Foley et al[12] found that serum albumin <3 g/dl was not associated with early death i.e., within six months of initiation of haemodialysis. Low senim albumin is an indicator of malnutrition in these patients[13]. Intensive assessment of malnutrition and

aggressive therapeutic intervention improves the survival of cases on dialysis[14].
Hypertension was associated with a greater risk of mortality in this study. Adequate control of hypertension by aggressive ultrafiltration improves survival of patients on dialysis[7,15] . Ischeniic heart disease affects long teim[7] as well as short term[12] survival of these cases.
Of the various risk factors identified in this study, the two which can be corrected are low serum albumin and diet counselling for the fomier and aggressive ultra-filtration combined with medication for the latter, provides a relative reduction in the mortality risk for patients on maintainence haemodialysis.

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