

LOW BLOOD PRESSURE AND MARKED WEIGHT LOSS IN INCIDENT DIALYSIS PATIENTS ARE ASSOCIATED WITH HIGH MORTALITY

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INTRODUCTION and AIMS

Blood pressure (BP) and water balance are frequently altered in patients with chronic kidney disease, and may be corrected by dialysis therapy once patients reach end-stage renal disease.

Early changes in BP and body weight (BW) in incident dialysis patients could be associated with mortality.

METHODS

PATIENTS. Patients incident to hemodialysis in 2004-2010 in 2 centers (NDSG, Sète; NephroCare, Castelnau-le-Lez) and surviving 90 days were followed-up for up to until December 31st, 2011 (up to 8 years).

OUTCOME. Comorbidities and outcome (deaths or dialysis refusal) were obtained from the French REIN registry.

EXPOSURE. BW and BP observed over the initial 90 days on dialysis were obtained from dialysis records. Estimated baseline level and slopes of change in pre-dialysis BP and BW were obtained using mixed linear models allowing for a change of slope after one month on dialysis. Associations with outcome were assessed by Cox regression models.

RESULTS

STUDY POPULATION

From the original cohort (n = 385), 357 patients had sufficient BP and BW data to be included in the study. A total of 164 (46%) patients died or refused dialysis treatment during follow-up. Baseline characteristics of patients grouped by outcome are displayed in **table 1**. Patients presenting the outcome had higher rates of comorbidities, emergency dialysis start and lower rates of functional arteriovenous fistulae.

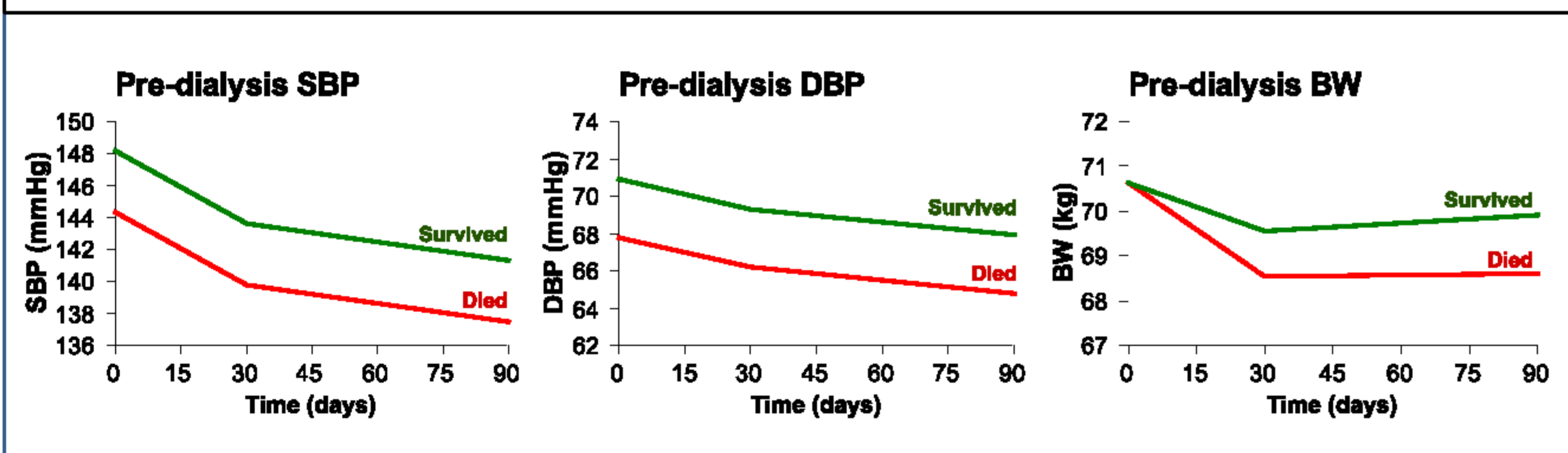
CHANGES IN BP AND BW

After 90 days, pre-dialysis systolic (SBP), diastolic blood pressure (DBP) and BW were significantly reduced (all P<0.001):

- baseline SBP: 146.4 ± 1.2 mmHg SBP at day 90: 139.6 ± 1.2 mmHg
- baseline DBP: 69.5 ± 0.6 mmHg DBP at day 90: 66.5 ± 0.7 mmHg
- baseline BW: 70.6 ± 0.9 kg, BW at day 90: 69.3 ± 0.8 kg

In addition, there were significant differences in SBP level, DBP level and BW change between patients presenting the outcome or not (all P ≤ 0.02), **Figure 1**.

Figure 1. Estimated change in pre-dialysis SBP, DBP and BW grouped by outcome observed during follow-up



UNIVARIATE ASSOCIATIONS WITH OUTCOME

In univariate analyses, lower SBP or DBP and decreasing BW were significantly associated with higher mortality (P < 0.05) and their effects were independent as illustrated with SBP and BW slope 2 (**Figure 2**).

ADJUSTED ASSOCIATIONS WITH OUTCOME

After adjusting on baseline comorbidities, a 10 mmHg higher SBP intercept was associated with a 7% reduction of risk and a 1 kg/month higher BW slope was associated with a 28% risk reduction (**table 2, model 1**).

Comorbidities such as active malignancy, chronic respiratory disease, peripheral vascular and dysrhythmia increased the risk of mortality, while the use of fistula lowered the risk of mortality (**table 2, model 2**).

Table 1. Patients baseline characteristics according to outcome

Characteristics	Survived (n = 193)	Died (n = 164)	P-Value
Age (year)	72.6 (60.0 – 79.3)	77.8 (72.0 – 83.0)	<0.001
Gender (% female)	38.3%	34.8%	0.5
Comorbidities (%)			
Diabetes	40.6%	38.5%	0.7
Coronary heart disease	31.0%	44.7%	0.008
Peripheral vascular disease	26.2%	42.9%	0.001
Dysrhythmia	17.7%	36.0%	<0.001
Chronic resp. disease	11.8%	21.7%	0.01
Active malignancy	10.7%	13.0%	0.5
Myocardial infarction	8.6%	11.2%	0.4
Stroke	9.1%	8.7%	0.9
First dialysis in emergency (%)	25.1%	35.6%	0.03
Vascular access (%)			<0.001
Catheter	34.7%	40.2%	
Arteriovenous fistula	52.9%	26.8%	
Other	12.4%	32.9%	

P-value obtained from Wilcoxon rank-sum test or χ^2 test according to distribution.

Figure 2. Survival curves of patients grouped by baseline SBP (mmHg) and BW slope on days 30-90 (kg/month).

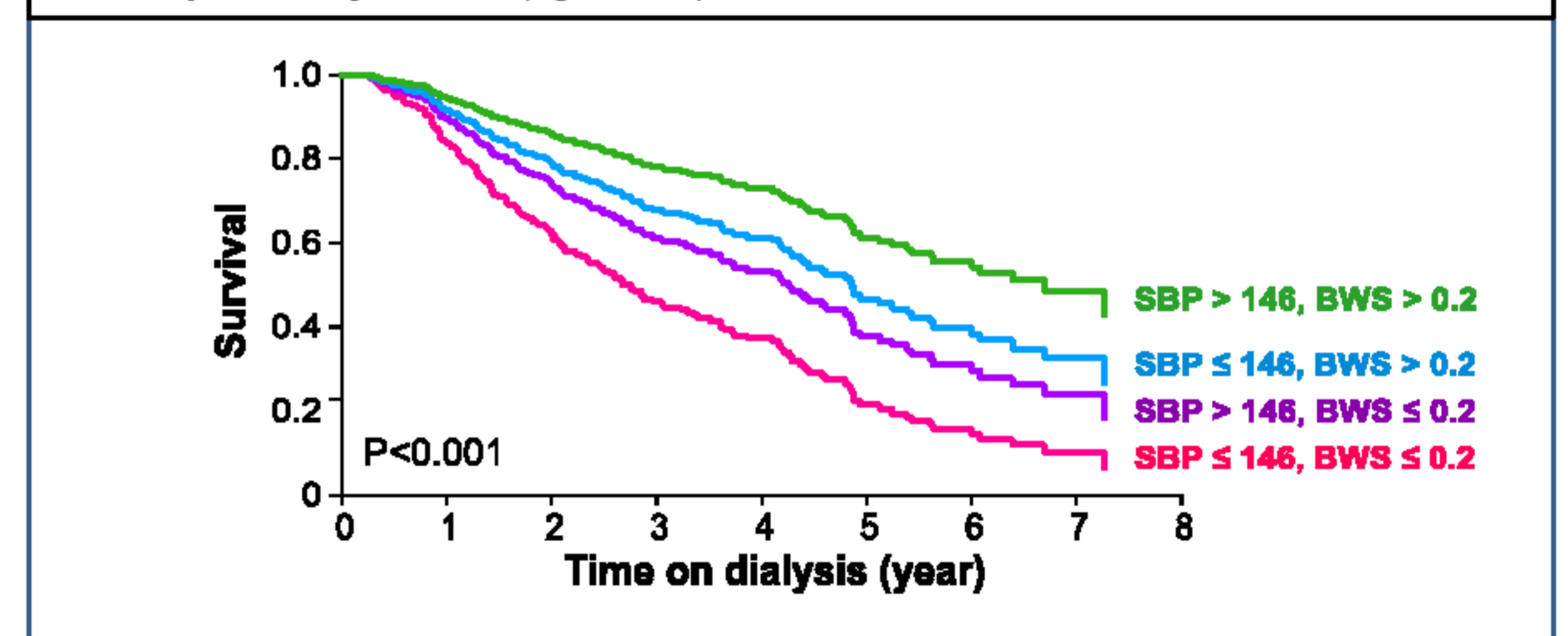


Table 2. Hazard ratios of mortality.

Multivariate estimates	Model 1		Model 2	
	Hazard Ratio and 95%CI	P-value	Hazard Ratio and 95%CI	P-value
SBP Intercept (for each 10 mmHg increase)	0.93 [0.86 ; 0.99]	0.04	0.96 [0.88 ; 1.03]	0.3
Weight slope 2 (for each 1 kg/month increase)	0.72 [0.61 ; 0.85]	<0.001	0.73 [0.62 ; 0.85]	<0.001
Fistula (vs Catheter)	0.39 [0.25 ; 0.60]	<0.001	0.36 [0.23 ; 0.57]	<0.001
Active malignancy (Yes)	1.82 [1.12 ; 2.95]	0.02	1.95 [1.20 ; 3.18]	0.01
Chronic resp. disease (Yes)	2.05 [1.36 ; 3.09]	<0.001	1.92 [1.26 ; 2.93]	0.002
Myocardial infarction (Yes)	0.82 [0.48 ; 1.41]	0.5	0.74 [0.42 ; 1.30]	0.3
Diabetes (Yes)	0.92 [0.64 ; 1.32]	0.7	0.87 [0.60 ; 1.25]	0.5
Emergency start (Yes)	0.94 [0.64 ; 1.39]	0.8	0.83 [0.56 ; 1.24]	0.4
Coronary failure (Yes)	1.34 [0.94 ; 1.90]	0.1	1.15 [0.80 ; 1.66]	0.5
Stroke (Yes)	1.20 [0.68 ; 2.13]	0.5	0.99 [0.55 ; 1.77]	0.9
Peripheral vascular disease (Yes)			1.80 [1.26 ; 2.56]	0.001
Dysrhythmia (Yes)			1.86 [1.29 ; 2.70]	0.001

Results from Cox regression models adjusting on age, gender and study center.

CONCLUSIONS

In the first months on dialysis, patients face important changes in BP and BW. In contrast with the general population, higher BP and BW gain were protective in dialysed patients. In this population, elevated BP are expected, and diverging from this path appears to be a sign of future adverse events. Similarly, although weight loss is expected to occur, even more importantly on the first month, important weight loss was a sign of negative outcome.

ACKNOWLEDGEMENTS

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