

EPIDEMIOLOGY OF INTERDIALYTIC AMBULATORY HYPERTENSION IN HEMODIALYSIS PATIENTS

P. Georgianos,¹ A. Karpetas,¹ A. Bikos,¹ G. Koutroumbas,² V. Raptis,¹ G. Tzanis,¹ C. Syrganis,² K. Mavromatidis,³ V. Liakopoulos,¹ P. Sarafidis⁴

1) Section of Nephrology and Hypertension, 1st Department of Medicine, AHEPA University Hospital, Thessaloniki, Greece;

2) Hemodialysis Unit, General Hospital of Volos, Volos, Greece;

3) Hemodialysis Unit, General Hospital of Rodopi, Komotini, Greece

4) Department of Nephrology, Hippokration University Hospital, Thessaloniki, Greece

Introduction: Among hemodialysis (HD) patients, epidemiology of hypertension has been described mainly using routine blood pressure (BP) recordings obtained shortly before or after dialysis [1-3]. However, peridialytic BPs are highly variable and provide inaccurate estimates of the actual interdialytic BP burden recorded with the use of ambulatory BP monitoring (ABPM) [4,5]. This study investigated the prevalence, treatment and control of hypertension in HD patients using the “gold-standard” method of 44-hour interdialytic ABPM.

Methods: A total of 153 consecutive patients receiving thrice-weekly dialysis for at least 3 months underwent 44-h interdialytic ABPM with the Mobil-O-Graph device (IEM, Germany). Hypertension was defined as an average 44-h ambulatory systolic BP ≥ 135 mmHg or diastolic BP ≥ 85 mmHg, or the use of antihypertensive medications. Hypertensive patients with an average 44-h ambulatory BP $< 135/85$ mmHg were considered as adequately controlled.

Results: The baseline characteristics of study participants are depicted in Table 1. Study participants had a mean age of 63.0 ± 13.4 years and were receiving dialysis for a mean period of 38.9 ± 15.5 months. As shown in Table 2, the prevalence of interdialytic ambulatory hypertension was as high as 88.2%. Although 94.8% of patients were being treated with a mean number of 2.2 ± 1.1 antihypertensive drugs, hypertension was adequately controlled only in 43.7%. Prevalence of hypertension was higher in males than in females (93.3% vs 81.3%, $P < 0.05$); the rates of hypertension treatment and control were no different between males and females (Table 2). Patients with untreated hypertension had higher mean 44-hour ambulatory systolic and diastolic BP as compared to treated hypertensives and normotensives (Figure 1). As shown in Table 3, in univariate analysis, higher body mass index (BMI), greater antihypertensive drug use, higher hemoglobin and serum albumin were associated with lower odds, whereas shorter delivered dialysis (< 4 hours/session) with higher odds for poor hypertension control. In multivariate analysis, short dialysis regimen [Odds Ratio (OR): 2.99; 95% Confidence Intervals (CIs): 1.07-8.43, $P < 0.05$] and BMI (OR: 0.89; 95% CIs: 0.81-0.98, $P < 0.05$) were the independent determinants of poor hypertension control.

Conclusion: Hypertension is highly prevalent and difficult-to-control in HD patients. Providing adequate duration to the delivered dialysis therapy appears as an attractive tool for improving hypertension control in the dialysis population.

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Table 1: Baseline demographic, clinical and routine biochemical characteristics of study participants

N	153
Age (years)	63.0 \pm 13.4
Gender (Male/Female)	89/64
Body weight (kg)	73.4 \pm 14.8
Height (m)	1.67 \pm 0.1
BMI (kg/m ²)	26.6 \pm 7.7
Dialysis vintage (months)	38.9 \pm 15.5
History of diabetes mellitus	51, 33.9%
History of CHD	35, 22.9%

Table 2: Prevalence, treatment and control of interdialytic ambulatory hypertension in hemodialysis patients.

	Overall	Males	Females	P
Prevalence, n (%)	135, (88.2%)	83, (93.3%)	52, (81.3%)	<0.05
Treatment, n (%)	128, (94.8%)	77, (92.8%)	51, (98.1%)	0.25
Control, n (%)	59, (43.7%)	35, (42.2%)	24, (46.2%)	0.72

Figure 1: Mean 44-hour SBP and DBP levels in normotensive, treated hypertensive and untreated hypertensive dialysis patients

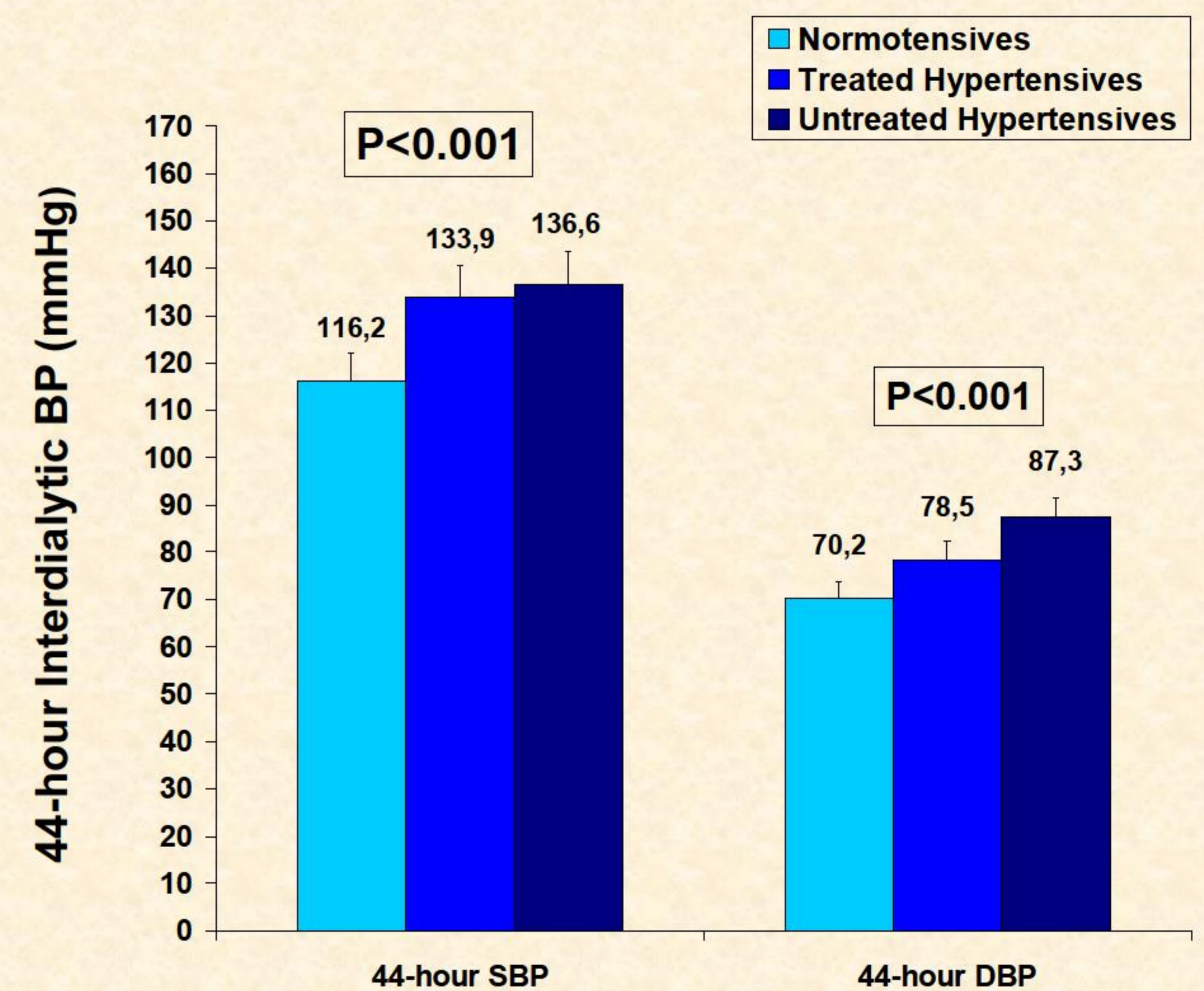


Table 3: Factors associated with poor 44-hour interdialytic ambulatory BP control in univariate and multivariate logistic regression analysis

Parameter	Univariate analysis			Multivariate analysis		
	OR	95% CI	P	OR	95% CI	P
Age (years)	0.99	0.97-1.01	0.56			
Male gender	1.17	0.58-2.36	0.65			
BMI (kg/m ²)	0.92	0.84-0.99	<0.05	0.89	0.81-0.99	<0.05
Dialysis vintage (months)	0.47	0.21-1.05	0.07	0.82	0.28-2.39	0.72
Shorter dialysis (<4hours)	1.67	0.81-3.45	0.16	2.99	1.07-8.43	<0.05
Smoking	1.35	0.52-3.53	0.54			
Presence of diabetes	0.69	0.33-1.45	0.33			
History of CHD	0.91	0.41-2.06	0.93			
History of stroke	1.56	0.50-4.98	0.43			
>3 antihypertensive agents	0.47	0.23-0.98	<0.05	0.46	0.28-2.39	0.72
IDWG (kg)	0.95	0.79-1.15	0.62			
Hemoglobin (g/l)	0.78	0.59-1.03	0.08	0.87	0.62-1.21	0.40
Serum albumin (g/dl)	0.39	0.15-0.97	<0.05	0.39	0.13-1.22	0.11

