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Clinical implications of home blood pressure monitoring in maintenance hemodialysis patients

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Objectives: Proper blood pressure (BP) control is an important topic for hemodialysis (HD) patients and accurate BP measurement is mandatory. The authors aimed to investigate which BP measurement method is most appropriate for HD patients and discuss the usefulness of home BP measurement.

Methods: Subjects that underwent maintenance HD from July 2018 to March 2019 were screened, and 40 patients with available home and ambulatory BP monitoring (ABPM) data were analyzed. Dialysis unit BPs were the averages of pre-, intra-, and post-HD BP during the study period. Home BP was defined as the average of morning and evening BPs. The BPs data used in this study are the average dialysis unit BP and home BP for two weeks, which are closest to the date of ABPM's implementation. ABPM was performed once for 24 hours on the day of no dialysis during the study period. In addition, the characteristics of subjects that experienced or did not experience intradialytic hypotension were compared.

Results: Mean patient age was 64.9 ± 14.4 years and 52.5% were male. Average BPs were as follows: dialysis unit BP, $141.0 \pm 17.1 / 54.2 \pm 7.7$ mmHg; home BP, $135.0 \pm 18.8 / 69.8 \pm 18.4$ mmHg; and ambulatory BP, $129.8 \pm 20.9 / 76.2 \pm 8.9$ mmHg. Significant differences were found between dialysis unit SBP and home SBP ($P = 0.002$) and ambulatory SBP ($P < 0.001$), and between home SBP and ambulatory SBP ($P = 0.042$). However, no significant difference was observed between ambulatory SBP and evening home SBP ($P = 0.719$). Intra-HD SBP was not significantly different from home SBP ($P = 0.906$) or ambulatory SBP ($P = 0.115$).

Conclusions: Intra-HD SBP might be useful for predicting home BP and ABPM in HD patients. However, regular home BP monitoring is important, because dialysis unit BP alone does not reflect BP status in HD patients.

Table. Comparison of home blood pressure, office blood pressure, and ambulatory blood pressure monitoring measurements

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	SBP (mmHg)	DBP (mmHg)
Office BP		
Average of total office BP	141.0 ± 17.1	54.2 ± 7.7
Pre-HD BP	145.8 ± 20.8	73.0 ± 11.8
After 2hrs-HD BP	135.3 ± 19.4	70.0 ± 11.9
Post-HD BP	141.9 ± 18.2	73.7 ± 10.0
Pre-post HD BP	143.8 ± 17.6	73.3 ± 10.0
Home BP		
Average of total home BP	135.0 ± 18.8	69.8 ± 18.4
Dialysis day BP	134.7 ± 18.7	69.9 ± 18.6
Non-dialysis day BP	135.0 ± 18.8	69.9 ± 18.4
Morning BP	135.1 ± 19.1	70.1 ± 18.5
Evening BP	128.0 ± 35.1	66.18 ± 24.2
ABPM		
Average of total BP	129.8 ± 20.9	76.2 ± 8.9
Daytime BP	130.1 ± 20.8	76.5 ± 9.1
Nighttime BP	121.9 ± 35.7	71.2 ± 19.3

BP: blood pressure; SBP: systolic blood pressure; DBP: diastolic blood pressure; HD: hemodialysis; ABPM: ambulatory blood pressure monitoring

Table. Comparison of blood pressure measurements between patients with IDH and patients without IDH

Table. Comparison of blood pressure measurements between patients with IDH and patients without IDH

	SBP			DBP		
	IHD group (n = 13)	Non-IHD group (n = 27)	P	IHD group (n = 13)	Non-IHD group (n = 27)	P
Office BP						
Mean office BP	138.2 ± 14.8	143.1 ± 13.4	0.301	70.8 ± 7.6	74.1 ± 10.2	0.305
Pre-HD BP	151.4 ± 23.1	143.1 ± 13.6	0.157	74.3 ± 10.3	73.4 ± 10.9	0.790
Intra-HD BP	124.8 ± 13.7	140.3 ± 14.3	0.002	65.2 ± 7.9	73.2 ± 10.9	0.024
Post-HD BP	138.5 ± 13.7	146.0 ± 16.4	0.160	73.0 ± 7.7	75.9 ± 9.9	0.138
Home BP						
Mean home BP	133.6 ± 20.9	136.0 ± 15.6	0.591	71.4 ± 8.3	75.3 ± 7.6	0.156
Dialysis day BP	134.4 ± 21.2	136.4 ± 14.7	0.735	71.6 ± 8.4	69.4 ± 21.2	0.735
Non-dialysis day BP	133.2 ± 20.9	136.2 ± 15.7	0.612	71.3 ± 8.3	69.4 ± 21.1	0.757
Morning BP	136.3 ± 23.7	137.1 ± 17.0	0.912	72.2 ± 8.8	74.8 ± 7.6	0.352
Evening BP	129.6 ± 18.2	136.3 ± 23.7	0.204	70.6 ± 8.5	75.4 ± 8.0	0.096
ABPM						
Mean ambulatory BP	132.8 ± 25.4	128.3 ± 18.7	0.525	75.3 ± 8.8	76.6 ± 9.1	0.682
Daytime BP	133.5 ± 25.6	128.4 ± 18.3	0.475	75.7 ± 8.9	76.9 ± 9.3	0.710
Nighttime BP	130.5 ± 26.4	127.2 ± 20.4	0.675	74.7 ± 11.4	75.0 ± 10.0	0.932

BP: blood pressure; SBP: systolic blood pressure; DBP: diastolic blood pressure; HD: hemodialysis; ABPM: ambulatory blood pressure monitoring