

Central Blood Pressure Predicts The Changes of Left Ventricular Remodeling in Maintenance Dialysis Patients

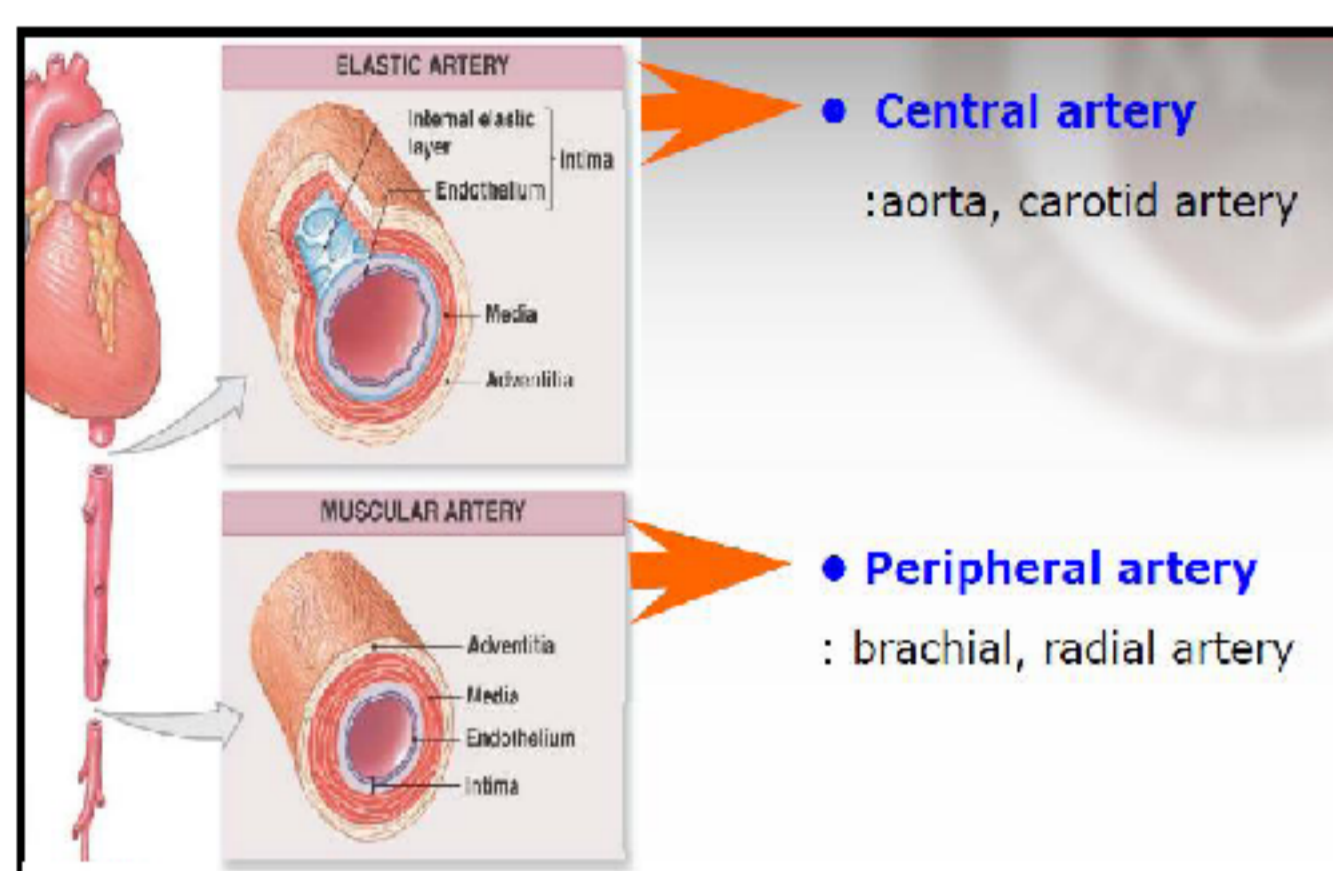
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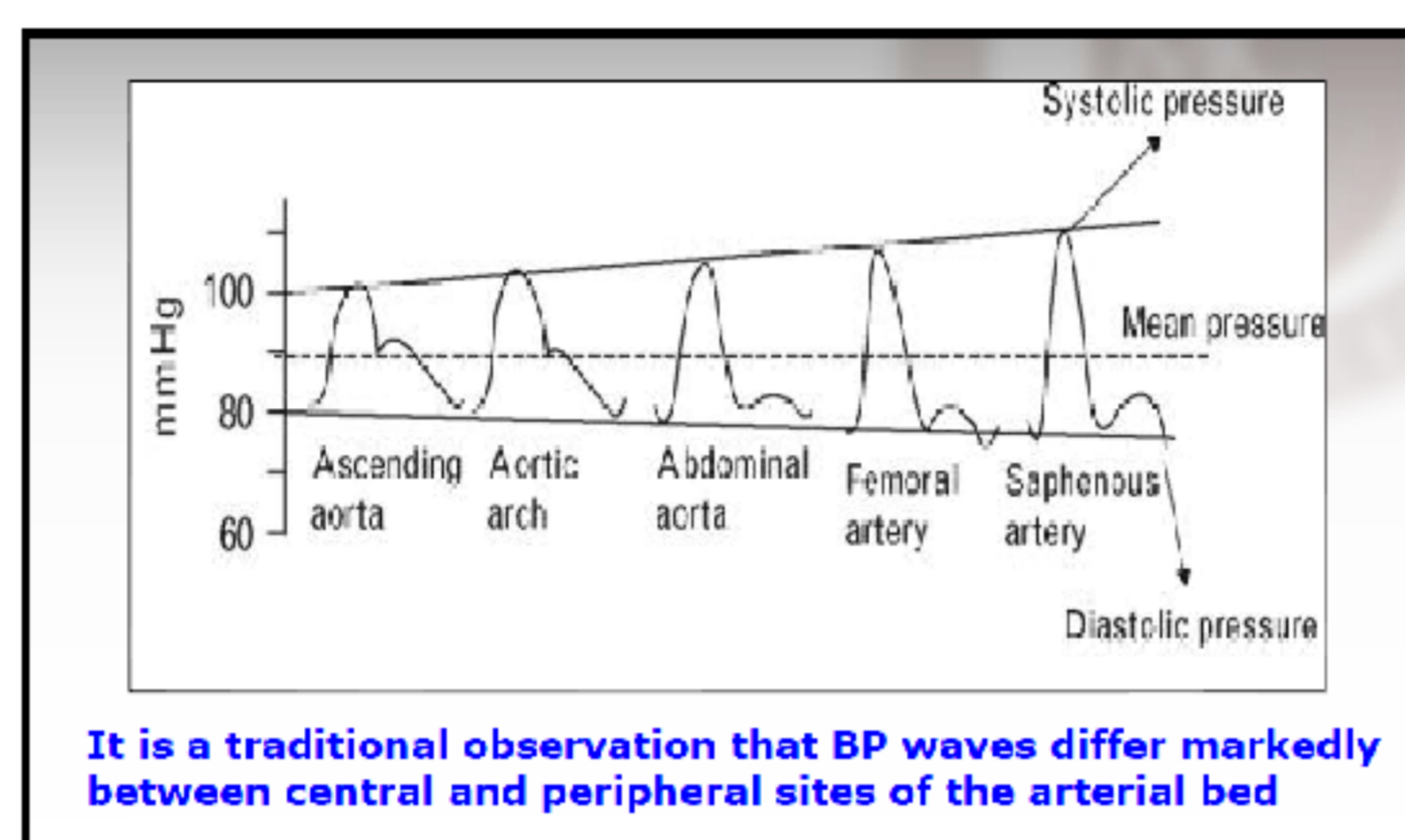
Introduction

- Brachial blood pressure is predictive of cardiovascular outcome; however, central blood pressure may better represent the load imposed on the coronary and cerebral arteries and thereby bear a stronger relationship to vascular damage and prognosis.
- The present study was undertaken to examine the relations of central and conduit arterial stiffness to the changes of left ventricular (LV) remodeling in patients with end-stage renal disease.

Central vs. Peripheral artery



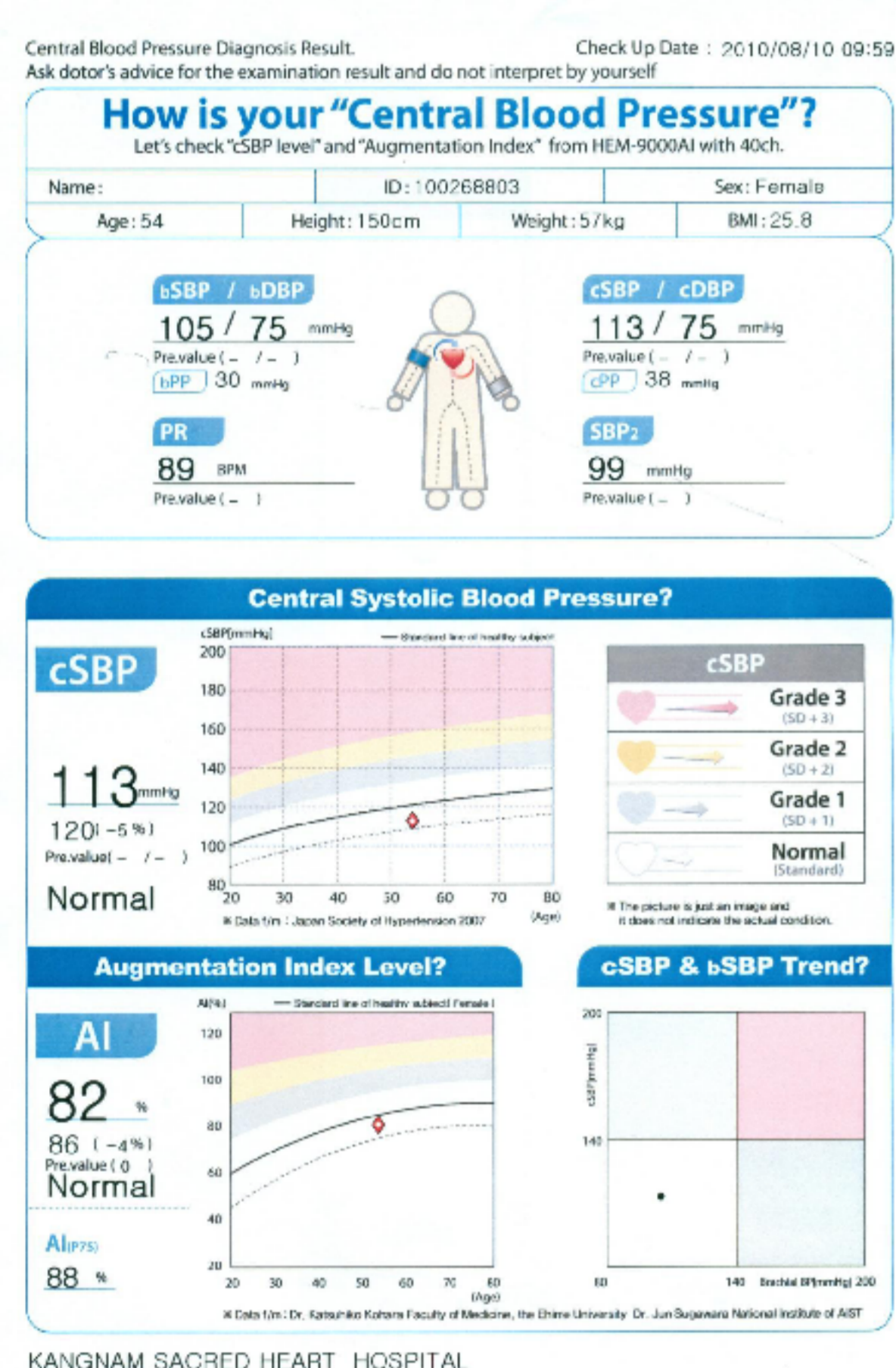
Blood Pressure Amplification



Methods

- We conducted a prospective observational study of 75 patients (47 women; 54.8 ± 12.4 years) receiving maintenance dialysis.
- At baseline and 12 months, we measured brachial blood pressure, brachial-ankle pulse wave velocity (PWV), abdominal aorta calcification, and echocardiography of each patient.
- Central blood pressure was monitored using radial applanation tonometry (HEM-9000AI), and the interrelationships among the measured parameters and their contributions to the changes of left ventricular remodeling were evaluated.

Non-invasive Method (HEM-9000AI)



Left Ventricular Remodeling

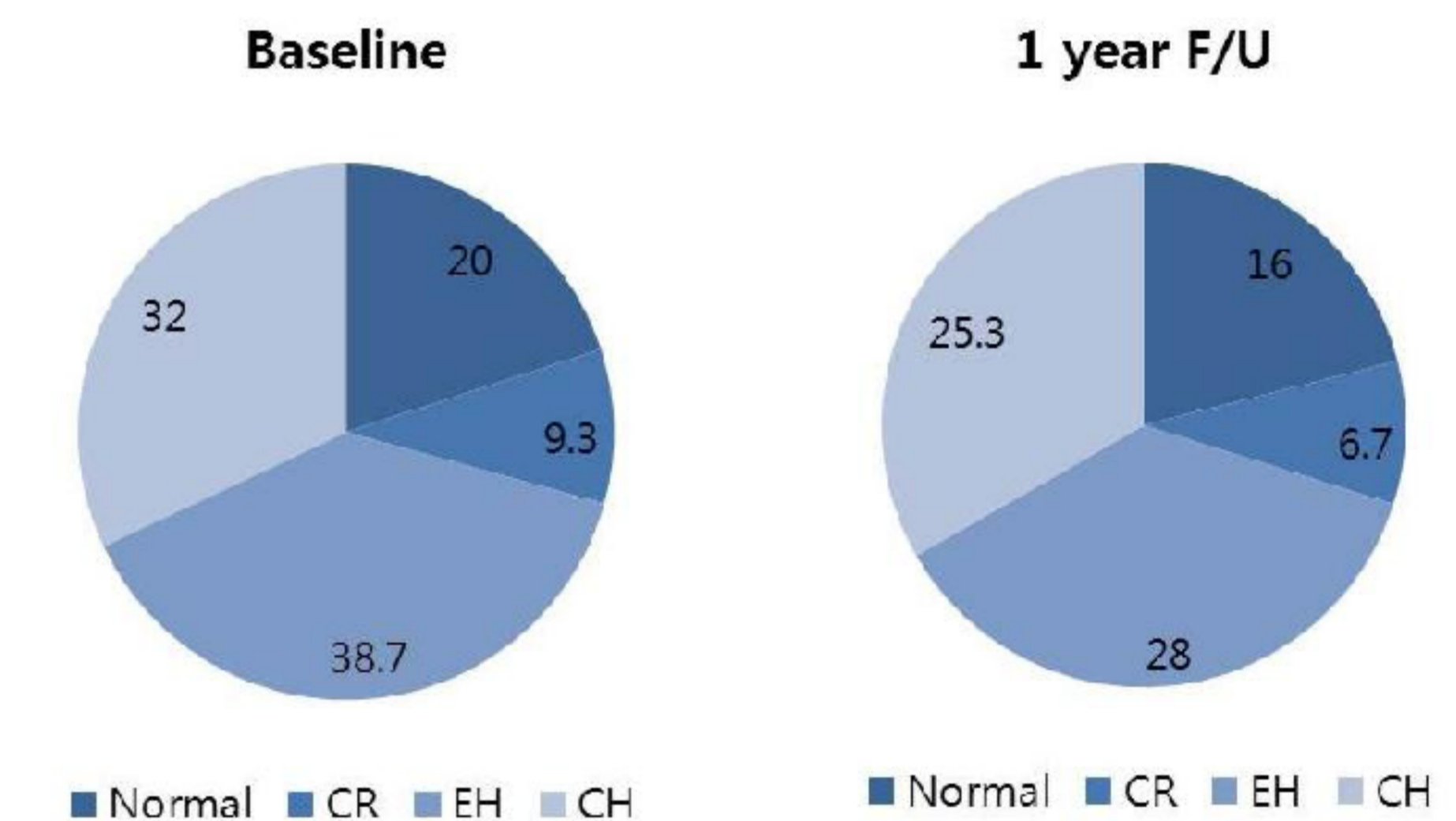
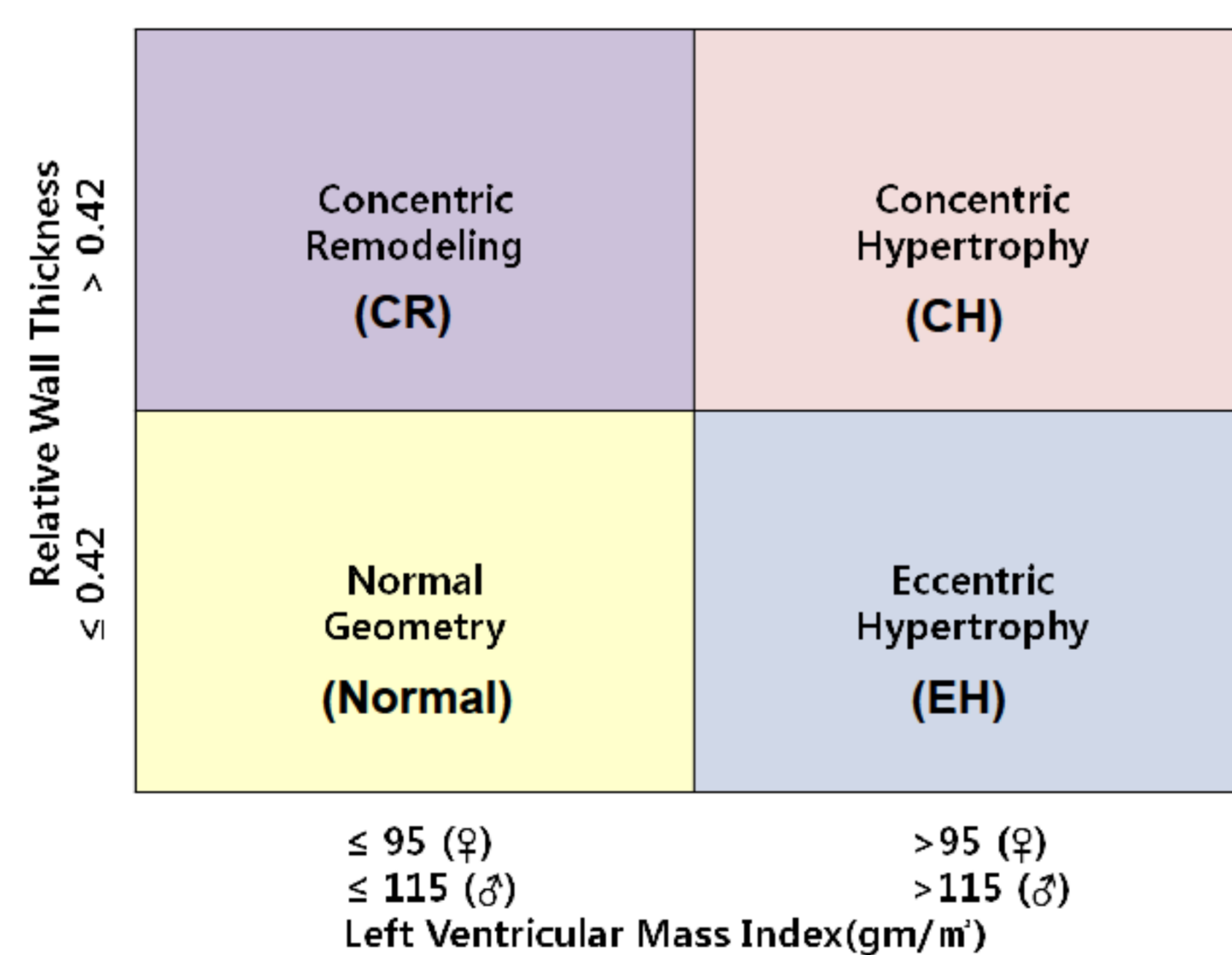


Figure 1. LV remodeling at baseline and after 1 year

Table 1. Correlation analysis between PWV and clinical parameters

Variable	r	P-value
Central SBP	0.57	<0.001
Central DBP	0.21	0.10
Central pulse pressure	0.56	<0.001
Alx	0.40	0.001
Alx@75	0.44	<0.001
SBP	0.58	<0.001
DBP	0.21	0.11
Pulse pressure	0.53	<0.001
Age	0.53	<0.001
Dialysis vintage	0.13	0.30
Aorta calcification	0.50	<0.001
Pulmonary artery pressure	0.14	0.27
LV mass index	0.02	0.88

Table 2. Central blood pressure and LV remodeling

	Normal (n=15)	Concentric remodeling (n=7)	Eccentric hypertrophy (n=29)	Concentric hypertrophy (n=24)
Age (years)	52.0±8.7	57.4±13.0	58.0±18.7	52.6±11.4
Female gender (%)	60.0%	69.0%	42.9%	62.5%
Diabetes (%)	53.3%	41.4%	42.9%	50.0%
Pervious CVD (%)	20.0%	44.8%	57.1%	33.3%
Dialysis vintage (years)	2.9±1.8	4.2±4.7	4.7±5.7	4.3±2.9
Brachial SBP (mmHg)*	135.9±22.3	135.0±16.7	154.1±24.0	157.7±22.4
Brachial DBP (mmHg)	76.8±11.5	73.4±17.1	78.8±14.8	83.3±11.6
Brachial PP (mmHg)	59.2±20.6	61.6±17.0	75.4±21.3	74.3±21.3
Central SBP (mmHg)*	140.6±24.5	132.6±22.4	160.5±28.5	159.1±29.8
Central DBP (mmHg)	76.5±11.6	73.4±17.1	78.8±14.8	83.3±11.7
Central PP (mmHg)*	63.5±22.2	59.2±23.3	81.9±23.6	75.7±26.7
Alx (%)	80.6±13.9	69.6±14.7	86.2±16.2	78.6±17.6
Alx@75 (%)	81.70±14.7	71.63±14.1	86.29±14.5	78.4±16.7

Table 3. Clinical and laboratory parameters with LV remodeling change

Variable	LV remodeling Progression (-)	LV remodeling Progression (+)	P-value
Age (years)	54.6±13.4	56.9±14.1	0.40
Female gender (%)	75.0%	55.6%	0.16
Diabetes (%)	14.3%	88.9%	<0.001
Pervious CVD (%)	21.4%	44.4%	0.22
Dialysis vintage (years)	4.5±5.0	2.7±2.7	0.31
Brachial SBP (mmHg)	145.3±24.8	149.8±25.3	0.64
Brachial DBP (mmHg)	82.4±12.2	69.2±14.9	0.01
Brachial PP (mmHg)	62.8±21.2	81.0±27.2	0.04
Central SBP (mmHg)	151.7±30.0	154.9±28.1	0.78
Central DBP (mmHg)	82.4±12.2	68.8±14.7	0.009
Central PP (mmHg)	69.0±25.5	86.1±28.3	0.09
Alx (%)	82.5±17.6	86.0±8.0	0.58
Alx@75 (%)	83.5±15.7	84.7±11.1	0.84

Results

- Central pulse pressure and systolic pressure was strongly related to PWV, abdominal aorta calcification, LV mass index, and pulmonary artery pressure (all P < 0.001, Table 1).
- Our study provides evidence that patients had a prevalence of abnormal LV geometry in 80% (Figure 1).
- The concentric LV hypertrophy (LVH) and eccentric LVH groups had significantly higher central pulse pressure and systolic blood pressure compared with the normal geometry and concentric remodeling groups (Table 2).
- After 12 months, progression of LV remodeling was observed in 24%. Central pulse pressure and diabetes were significant predictors of the changes of LV remodeling (Table 3).

Conclusions

- These data suggest that central pulse pressure is more important in stimulating left ventricular hypertrophy and remodeling.
- Central blood pressure is closely associated with aortic calcification and cardiac hypertrophy in maintenance dialysis patients, and could be a useful marker for management of these patients.