

Relation of central and brachial blood pressure to volume status in peritoneal dialysis patients

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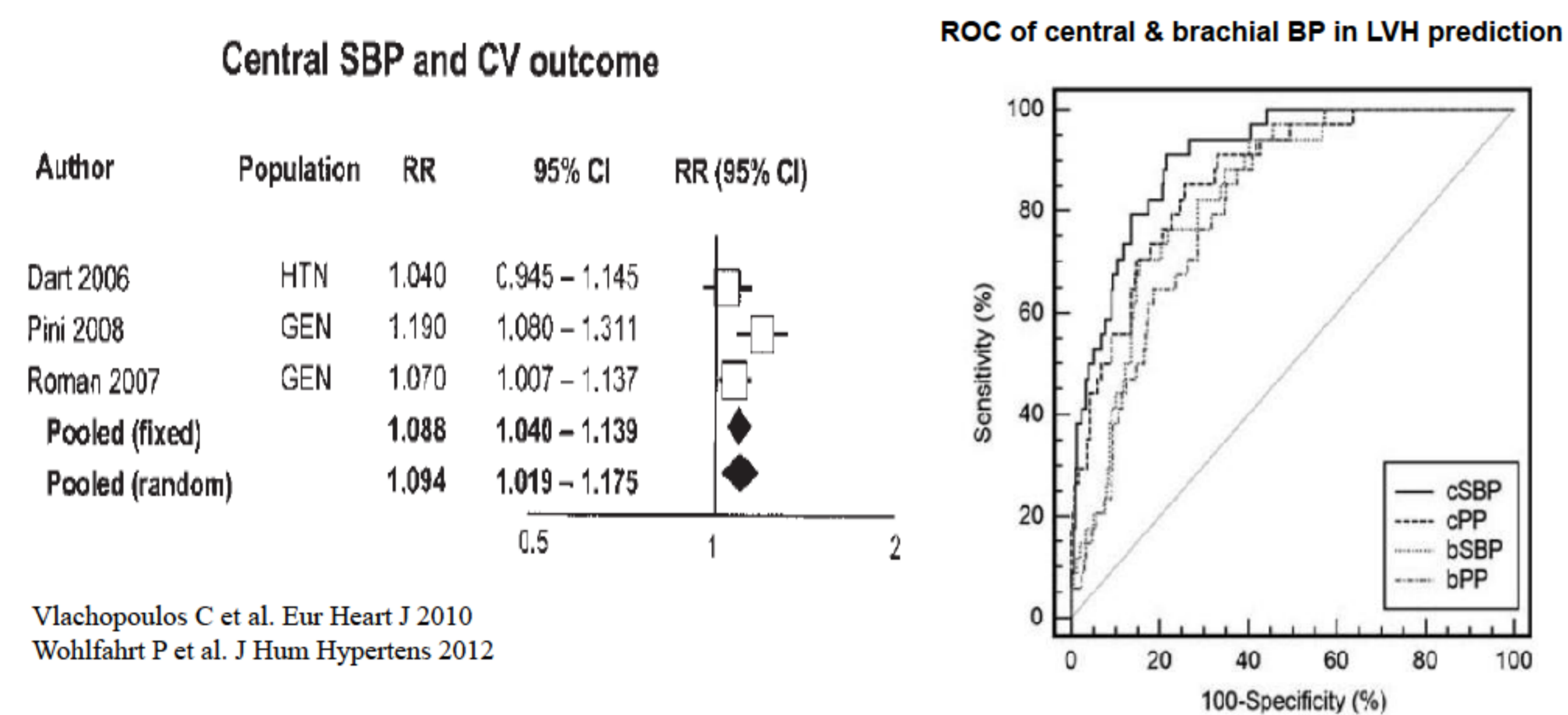
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Introduction

Volume status is an important predictor of outcome in patients on renal replacement treatment (RRT)

- Chronic clinical and subclinical volume overload occurs frequently in end stage renal disease (ESRD) patients
- Volume overload is associated with hypertension, left ventricular hypertrophy, heart failure, and eventually increased mortality and morbidity.
- Blood pressure (BP) is one of the routinely used clinical surrogate parameters to evaluate volume status in ESRD patients

Central blood pressure (CBP) has been shown to be a better predictor for target organ damages compared with peripheral brachial BP



Vlachopoulos C et al. Eur Heart J 2010
Wohlfahrt P et al. J Hum Hypertens 2012

BCM measurements

Variables	Value
LV mass index (g/m ²)	114.6±34.9
LVEF (%)	64±10
PCWP	14.6±3.6
TBW (L)	33.8±7.2
ECW (L)	16.5±3.9
ICW (L)	17.4±3.7
ECW/TBW	0.49±0.03
Lean tissue mass (kg)	36.8±9.0
Fat tissue mass (kg)	17.5±9.3
BCM	20.5±6.0
OH (L)	2.9±2.1
Overhydration (OH≥1.1)	41 (78.8%)

BP by measurement method

	Systolic blood pressure (mmHg)	Diastolic blood pressure (mmHg)
Office blood pressure	140.7±19.2	88.8±11.6
Central blood pressure	139.8±26.3	
Ambulatory blood pressure		
24-hour	142.5±22	87.6±13.7
Daytime	140.0±20.9	88.7±12.4
Nighttime	139.2±26.3	84.1±15.7

Aim

- To evaluate comparative values of central BP and peripheral brachial BP for determining volume status in PD patients

Materials and Methods

Cross-sectional designed & non-interventional study

Subjects

- Prevalent PD patients older than 18 years, wanted to sign informed consent
- Exclusion criteria
 - Contraindication for BCM : implanted electronic medical device (pace maker, ICD)
 - Pregnancy
 - Mixed modality (HD+PD)
 - Uncontrolled hypertension (>180/100mmHg)
 - Severe heart failure (NYHA Class III, IV)
 - Recent peritonitis or disease (cardiovascular event, pneumonia..) in 1month

Measurement for volume status

- Body Composition Monitor (BCM)
 - Overhydrated status : OH ≥1.1L

Central blood pressure measurement

- Renal artery tonometric method (non-invasive)

Clinical parameters including BP of study populations by volume status

	Euvolemic (n=11)	Overhydrated (n=41)	P value
Age (years)	56.4±11.0	50.2±12.9	0.135
Male (n)	3 (27.3%)	22 (53.7%)	0.120
PD duration (months)	31 (20.0-73)	29 (11.5-58.5)	0.394
BMI (kg/m ²)	22.89±3.37	23.71±3.82	0.522
Number of antihypertensive drugs	2.0 (1.0-4.0)	4.0 (1.5-5.0)	0.060
Diabetes	0 (0%)	17 (41.5%)	0.010
Coronary artery disease	0 (0%)	5 (12.2%)	0.571
Peri-Kt/V	1.71±0.29	1.63±0.38	0.532
Renal Kt/V	0.08 (0.001-0.82)	0.23 (0.023-0.58)	0.444
Edema score	0.2±0.4	1.5±1.0	<0.001
LV mass index (g/m ²)	96.4±25.5	118.7±35.7	0.082
Office SBP (mmHg)	125.0±22.6	144.8±16.0	0.002
Office DBP (mmHg)	81.2±11.6	90.8±10.9	0.013
Central SBP (mmHg)	114.2±15.5	146.6±24.4	<0.001
24-Hour ambulatory SBP (mmHg)	122.7±17.7	147.8±20.1	<0.001
24-Hour ambulatory DBP (mmHg)	78.8±13.3	90.0±12.9	0.014
Daytime ambulatory SBP (mmHg)	125.8±16.4	148.8±19.4	0.001
Daytime ambulatory DBP (mmHg)	81.4±13.0	90.6±11.6	0.027
Nighttime ambulatory SBP (mmHg)	116.2±18.6	145.4±24.7	0.001
Nighttime ambulatory DBP (mmHg)	73.7±12.6	86.9±15.4	0.012

Area Under the ROC Curve, crude and adjusted OR of Overhydration

	Mean±SD	Area Under ROC Curve	Crude OR (95% CI)	Adjusted OR (95% CI)
Office SBP (mmHg)	140.7±19.2	0.756 (0.596-0.926)	1.063 (1.016-1.112)	1.085 (1.014-1.161)
Central SBP (mmHg)	139.8±26.3	0.874 (0.765-0.982)	1.097 (1.034-1.165)	1.110 (1.019-1.210)
24ABPM SBP (mmHg)	142.5±22.0	0.834 (0.718-0.950)	1.062 (1.021-1.106)	1.094 (1.021-1.173)

Conclusion

- Office central BP was more strongly related to volume status than out-of-office ambulatory brachial BP as well as office brachial BP, suggesting that central BP was more valuable than brachial BP in assessing volume status in PD patients

Results

Baseline characteristics of study population

Variables	Value
Patients (n)	52
Age (years)	51.5±12.7
Male (n,%)	25 (48.1%)
BMI (kg/m ²)	23.5±3.7
Cause of ESRD	
Diabetes	16 (30.8%)
Hypertension	23 (44.2%)
Glomerulonephritis	9 (17.3%)
Others	9 (7.7%)
PD duration (months)	29 (16-63)
PD modality	
Automated PD	3 (5.8%)
Continuous ambulatory PD	49 (94.2%)
Diabetes	35 (67.3%)
Coronary artery disease	5 (9.6%)
Smoking	9 (17.3%)
Antihypertensive drugs	
RAS blocker	44 (84.6%)
Calcium channel blocker	31 (59.6%)
Beta blocker	30 (57.5%)
Diuretics	19 (36.5%)
vasodilator	4 (7.7%)

