Prevalence of Unrecognized Lower Extremity Peripheral Arterial Disease and the Associated Factors in Chinese Hypertensive Adults

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We aimed to examine the prevalence of lower-extremity peripheral artery disease (LE-PAD) and its associated factors in 3,128 Chinese hypertensive adults 45 to 75 years old without known cardiovascular disease, PAD, chronic kidney disease, diabetes, and dyslipidemia. A cross-sectional investigation was carried out in a rural area of Lianyungang, China. An ankle–brachial index ≤0.90 in either leg was used to define LE-PAD. Prevalence of LE-PAD was 9.0% (10.0% in women and 7.4% in men). In the multivariable logistic regression model, odds ratios (95% confidence interval) of having LE-PAD, were 1.82 (1.27 to 2.61) for participants 65 to 75 versus 45 to 55 years old, 1.48 (1.00 to 1.20) for participants with a waist circumference ≥90 versus <90 cm, 1.47 (1.05 to 2.04) and 1.62 (1.15 to 2.27) for participants with grade 2 and 3 hypertension versus controlled blood pressure or grade 1 hypertension, 1.35 (1.00 to 1.83) and 1.61 (1.16 to 2.23) for participants with heart rate at rest 70 to 80 and ≥80 versus <70 beats/min, and 1.41 (1.00 to 1.97) for participants with poor versus good sleeping quality. For other risk factors, gender-related differences were observed. Adjusted odds ratios of having LE-PAD for men and women were 1.07 (0.66 to 1.74) and 0.65 (0.47 to 0.90) for inland versus coastal residents and 1.03 (0.57 to 1.86) and 1.62 (1.09 to 2.41) for participants with body mass index ≥25 versus <25 kg/m^2. In conclusion, there was a high prevalence of LE-PAD in Chinese hypertensive adults without known cardiovascular disease, PAD, chronic kidney disease, diabetes, and dyslipidemia, particularly in women in coastal areas and in participants with higher heart rate and poor sleeping quality. Therefore, ankle–brachial index determinations should be encouraged in clinical practice in Chinese hypertensive adults. **(Am J Cardiol 2012;110:1692–1698)**

Patients with symptomatic or asymptomatic lower-extremity peripheral artery disease (LE-PAD) have a significantly increased risk for premature mortality and cardiovascular events.[1,2] The primary noninvasive test for diagnosis of LE-PAD is the ankle–brachial index (ABI) at rest, and typically an ABI ≤0.90 is used to define LE-PAD.[3] Numerous studies have identified hypertension as 1 of the major risk factors for LE-PAD.[4] In recent guidelines for the management of hypertension, presence of LE-PAD based on ABI measurement has been listed as a prognostic factor for risk stratification to be used in planning hypertension management.[5,6] This study aimed to examine the prevalence of LE-PAD and its associated factors in Chinese hypertensive adults 45 to 75 years old without known cardiovascular disease, PAD, chronic kidney disease, diabetes, and dyslipidemia in a rural area of Lianyungang, Jiangsu Province, China. As such, our results may reveal a high underlying risk of cardiovascular disease burden owing to LE-PAD in Chinese hypertensive adults.

Methods

The study subjects were participants of the ongoing China Stroke Primary Prevention Trial (CSPPT). CSPPT is a multicenter randomized controlled trial designed to study if enalapril maleate and folic acid tablets combined is more effective in preventing stroke in patients with hypertension compared to enalapril maleate alone. Details regarding inclusion/exclusion criteria, treatment assignment, and out-

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Table 1
Population characteristics by gender

Variable	Total (n = 3,128)	Men (n = 1,236)	Women (n = 1,892)	p Value
Age (years)	59.2 ± 7.5	59.9 ± 7.6	58.8 ± 7.4	<0.001
Age group (years)				
45–55	989 (31.6%)	355 (28.7%)	634 (33.5%)	<0.001
55–65	1,346 (43.0%)	520 (42.1%)	826 (43.7%)	
65–75	793 (25.4%)	361 (29.2%)	432 (22.8%)	
Systolic blood pressure (mm Hg)	167.2 ± 20.5	165.3 ± 20.8	168.5 ± 20.2	<0.001
Diastolic blood pressure (mm Hg)	95.2 ± 12.0	97.0 ± 11.9	94.1 ± 11.8	<0.001
Hypertension grades				
1 or controlled blood pressure*	937 (30.0%)	376 (30.4%)	561 (29.7%)	0.411
2	1,230 (39.3%)	497 (40.2%)	733 (38.7%)	
3	961 (30.7%)	363 (29.4%)	598 (31.6%)	
Ankle–brachial index	1.03 ± 0.09	1.05 ± 0.10	1.02 ± 0.09	<0.001
Body mass index (kg/m^2)	25.6 ± 3.6	24.9 ± 3.3	26.1 ± 3.6	<0.001
Waist circumference (cm)	85.7 ± 9.7	85.9 ± 9.9	85.5 ± 9.6	0.266
Current smoker	716 (22.9%)	646 (52.3%)	70 (3.7%)	<0.001
Current alcoholic drinker	711 (22.7%)	665 (53.8%)	46 (2.4%)	<0.001
Antihypertensive treatment	1,465 (46.8%)	541 (43.8%)	924 (48.8%)	0.005
Heart rate (beats/min)				
<70	1,170 (37.4%)	529 (42.8%)	641 (33.9%)	<0.001
70–80	1,218 (38.9%)	459 (37.1%)	759 (40.1%)	
≥80	740 (23.7%)	248 (20.1%)	492 (26.0%)	
Counties				
Ganyu (coastal)	1,065 (34.0%)	460 (37.2%)	605 (32.0%)	0.002
Donghai (inland)	2,063 (66.0%)	776 (62.8%)	1,287 (68.0%)	
Living standards				
Poor	374 (12.0%)	119 (9.6%)	255 (13.5%)	<0.001
Medium	2,402 (76.8%)	947 (76.6%)	1,455 (76.9%)	
Good	352 (11.3%)	170 (13.8%)	182 (9.6%)	
Red meat consumption				
<1 time/week	1,983 (63.4%)	642 (51.9%)	1,341 (70.9%)	<0.001
1–2 times/week	826 (26.4%)	402 (32.5%)	424 (22.4%)	
≥3 times/week	319 (10.2%)	192 (15.5%)	127 (6.7%)	
Fruit and vegetable consumption				
<500 g/week	37 (1.2%)	20 (1.6%)	17 (0.9%)	0.084
500–1,500 g/week	573 (18.3%)	239 (19.3%)	334 (17.7%)	
≥1,500 g/week	2,518 (80.5%)	977 (79.0%)	1,541 (81.4%)	
Sleeping quality				
Good	1,222 (39.1%)	632 (51.1%)	590 (31.2%)	<0.001
Medium	1,307 (41.8%)	438 (35.4%)	869 (45.9%)	
Poor	599 (19.1%)	166 (13.4%)	433 (22.9%)	
Education				
Illiterate	2,000 (63.9%)	442 (35.8%)	1,558 (82.3%)	<0.001
Primary level	451 (14.4%)	276 (22.3%)	175 (9.2%)	
Elementary or higher levels	677 (21.6%)	518 (41.9%)	159 (8.4%)	
Physical activity				
Low	1,191 (38.1%)	459 (37.1%)	732 (38.7%)	0.162
Moderate	1,220 (39.0%)	507 (41.0%)	713 (37.7%)	
High	717 (22.9%)	270 (21.8%)	447 (23.6%)	

Data are presented as mean ± SD or number (percentage).
* One hundred twenty-one subjects with antihypertensive treatment and controlled blood pressure were included.

come measurements of the trial have been described elsewhere (http://clinicaltrials.gov/ct2/show/NCT00794885). In this study we included subjects from Lianyungang who participated in the screening phase of the CSPPT.

Briefly, we conducted a community-based screening in 20 townships within 2 counties (Ganyu, which is coastal, and Donghai, which is inland) in Lianyungang from October 2008 to September 2009. The inclusion criteria were (1) age 45 to 75 years and (2) seated systolic blood pressure (SBP) ≥140 mm Hg and/or seated diastolic blood pressure (DBP) ≥90 mm Hg at the 2 screening visits (with ≥24 hours between visits) or currently under antihypertension treatment. Participants were excluded if they reported a history of myocardial infarction, stroke, heart failure, cancer, or serious mental disorders or if they were unwilling to participate in the survey. This study was approved by the ethics committee of the Institute of Biomedicine, Anhui Medical University, Hefei, China.