and older-age individuals. This study was designed to explore the relationships between carotid artery function and cardiovascular risk factors in young, healthy adults. A sample of 516 subjects aged 25-37 years (mean age 32 years, 71% white, 39% male) who participated in the Bogalusa Heart Study were examined. Arterial elasticity was measured from M-mode ultrasonography of the common carotid artery by calculation of Peterson’s elastic modulus (Ep). Elevated values indicate deterioration in elasticity. Risk factor variables included in the analyses were age, race, gender, systolic (SBP) and diastolic blood pressures (DBP), LDL cholesterol, HDL cholesterol, triglycerides, total to HDL cholesterol ratio, BMI, waist circumference, insulin, glucose, heart rate times pulse pressure (PP) product, cigarette smoking and parental history of hypertension or diabetes. After controlling for age, blacks and males had higher Ep values (P<0.01). Males also had higher systolic and DBP levels (P<0.01) with blacks demonstrating higher mean SBP than whites (P<0.0001). Males had higher values than females and whites higher than blacks for total cholesterol, LDL cholesterol, VLDL cholesterol and triglyceride with males and whites having lower HDL cholesterol than females and blacks respectively (P<0.05). Black females had higher BMI and waist circumference than white females (P<0.0001). In univariate analyses, all risk factor variables listed above except LDL cholesterol and HDL cholesterol were correlated with Ep (P<0.05). In multivariate analyses, the independent predictors of Ep were SBP, heart rate x PP, age, log of triglycerides and BMI explaining 38% of the variance. Subjects were grouped according to number of risk factors with elevated values (top race and gender specific quartile). There was a linear relationship (P<0.0001) between Ep and number (0, 1, 2, 3, 4 or more) elevated risk factor levels. Abnormal carotid artery elasticity is associated with elevations in levels of cardiovascular risk factors. Even in asymptomatic young adults, clustering of abnormal risk factor levels may predict decreased vascular function underscoring the need for beginning preventive measures early in life.

Key Words: Carotid Artery, Elasticity, CV Risk Factors

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SMOKING WHILE DRINKING COFFEE: A HARMFUL, SYNERGISTIC EFFECT ON ARTERIAL STIFFNESS
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Aortic stiffness is a prognosticator of cardiovascular risk and is involved in the pathogenesis of hypertension. We have shown that caffeine increases large artery stiffness. In contemporary lifestyle, the habitual consumption of caffeine is often associated with smoking; however, their combined effect on large artery stiffness has not been investigated.

We studied 10 healthy volunteers (age 30±5 yrs) in a randomized, placebo-controlled, crossover fashion (200 mg of caffeine orally-equivalent to 1-2 cups of coffee- and 60 min later smoking one standard cigarette –1.1 mg nicotine- or placebo and sham-smoking, left figure). Furthermore, the subjects were studied on two separate occasions with smoking and sham-smoking alone (right figure). Aortic stiffness was evaluated by carotid-femoral pulse wave velocity (PWV) using a validated automated, non-invasive device (Comprior®).

Caffeine led to a substantial increase in PWV (by 0.24 m/sec) and smoking increased further PWV (by 0.44 m/sec, left figure), an increase larger than that produced by smoking alone (by 0.34 m/sec, right figure). Pressures increased (systolic: by 16.8 with caffeine and by an additional 7.5 mmHg with smoking; diastolic: by 10.8 with caffeine and by an additional 5.1 mmHg with smoking). Smoking and caffeine have a synergistic adverse effect on arterial stiffness. This finding has important implications for pulsatile load of the heart and provides new insights into the combined effects of smoking and caffeine on the cardiovascular system.

Key Words: smoking, caffeine, arterial stiffness/compliance

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COMPARISON OF BRACHIAL ARTERY DIAMETER MEASURED BY OSCILLOMETRY AND ULTRASOUND
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Introduction: Volume oscillometry is a non-invasive method to measure isobaric arterial compliance. An ordinary blood pressure cuff applied on the upper arm performs the measurement. Oscillations in the cuff around the upper arm are transformed into changes of volume during concomitant pressures registration allowing for calculation of arterial compliance as a function of transmural pressure.

The volume of the large arteries under the cuff is determined by summation of the compliance over the transmural pressure range from approximate ~50 mmHg to subjects actual mean arterial pressure.

Methods: Twelve healthy postmenopausal women of age 69 (55-73) years were examined by 4 occasions with 2 weeks between. Measurements were made at baseline, and after sublingual glyceryl trinitrate (GTN). Each ultrasonic diameter was measured 4 times followed by 4 oscillometric measurements on the other arm. Brachial arterial compliance was measured using a volume-oscillometric method (Artcomp®, Critikon®).

Results: There was no significant change in BT before and after GTN. The oscillometry seems to systematic overestimate the artery volume under the cuff by 21% (before )and 15% (after GTN), but without any significant difference. We would expect a higher volume because there is more than one large artery under the cuff. A second problem is that the ultrasonic arterial volume was measured on the right arm, while the oscillometry was measured on the left.

Conclusions: It is possible to determine brachial artery volume using oscillometric compliance measurement with a satisfying result. Indirectly verifying that the oscillometric isobaric measurement of arterial compliance is giving realistic values.

Key Words: Compliance, Arterial volume, Oscillometry