

Blood Borne Microvesicles and Coronary Calcification in Early Menopausal Women

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Objective: Microvesicles (or microparticles) are a circulating, heterogeneous population of phospholipid-rich spheres formed from membranes of activated cells. Microvesicles carry molecular signatures of their cell of origin and provide surfaces for thrombin generation and thus, could indicate early disease processes. Experiments were designed to determine the relationship between the phenotype of circulating microvesicles to quantifiable vascular lesions in early menopausal women.

Methods: Microvesicles were prepared from blood collected into citrate-benzamidine anticoagulant from women being screened for the Kronos Early Estrogen Prevention Study (KEEPS) at Mayo Clinic, Rochester, MN and were evaluated by flow cytometry (FACS Canto™). Coronary arterial calcification (CAC) was evaluated by 64 slice CT scanner (Siemens).

Results: None of the women were hypertensive. Other usual risk factors for atherosclerotic disease were similar among women with low (Agatston scores $0 < 50$; range 0.3-32), high (> 50 ; range 93-315 Agatston units) CAC and negative calcium scores (Table). Only two women, in the low CAC group, were current smokers. However, the total number of microvesicles (Table), and the percentage of those of endothelial and platelet origin expressing surface phosphatidylserine were proportional to CAC. The thrombin generating capacity of microvesicles from the high CAC group (762 ± 310 pM) was also significantly greater than that from individuals with negative calcium scores (260 ± 16 pM).

Conclusion: Phenotypic characterization of blood borne microvesicles may provide value in identifying persons with cardiovascular disease who would not be identified by the usual risk factors.

	Age (years)	Months past menopause	BMI (Kg/m ²)	Total Cholesterol (mg/dL)	LDL (mg/dL)	HDL (mg/dL)	Total Number of micro-vesicles/ μ L Plasma
Negative CAC (n=10)	53.1 \pm 0.3 ^a	21.4 \pm 2.9	26.1 \pm 1.2	208.5 \pm 11.3	125.8 \pm 30.1	62.8 \pm 3.6	584 \pm 94
Low 0<50 CAC Score (n=18)	53.1 \pm 0.4	16.8 \pm 2.1	27.9 \pm 1.0	213.2 \pm 9.5	133.8 \pm 6.9	57.3 \pm 4.4	810 \pm 153
High >50 CAC Score (n=5)	54.8 \pm 1.2	25.0 \pm 3.8	28.6 \pm 3.1	213.0 \pm 12.6	120.68 \pm 10.8	59.05 \pm 8.08	2376 \pm 1169*

^aData are shown as mean \pm ;SEM; * <0.05 from low and negative CAC

