The Correlation between Coronary Microcirculatory Blood Flow and the Degree of Atherosclerosis in the Carotid Arteries in Patients with Angina Pectoris and Normal Coronary Arteries

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Background:
The phenomenon of slow coronary flow (SCF) in the presence of normal coronary arteries may indicate endothelial dysfunction, which is characteristic of an early stage in the development of atherosclerosis. Measurement of the Carotid Intima-Media Thickness (CIMT) allows identification of early stages of atherosclerosis. Endothelial dysfunction is a possible common stage in the pathogenesis of atherosclerosis and SCF, making the association between them a source of interest and research. Previous studies show conflicting results regarding the relationship between these two phenomena. In the present study we examined the association between coronary flow velocity and the degree of CIMT in patients with angiographicaly normal coronary arteries. Finding a correlation between these factors could help in the differential diagnosis between a cardiac pain and a non-cardiac pain in patients presenting with chest pain.

Methods:
Coronary arterial blood flow velocity was measured using angiography films of 75 patients with normal coronary arteries, using two methods - Corrected Thrombolysis in Myocardial Infarction (TIMI) Frame Count (CTFC) and Coronary Clearance Frame Count (CCFC). In addition, we measured the level of the CIMT and other variables that may be related to the SCF phenomenon.

Results:
No correlation was found between the level of the CIMT and coronary flow velocity according to CTFC (p=0.499) and CCFC (p=0.553). In addition, CIMT was similar both in the SCF and the Normal coronary flow (NCF) groups (0.796 mm vs. 0.805 mm, respectively, p=0.733). However, the SCF group had higher levels of Hematocrit (39.9% vs. 36.1%, p0.001), LDL cholesterol (101.1 mg/dl vs. 85.8 mg/dl, p=0.01) and higher rate of current smokers (28.9% vs. 10.8%, p=0.05).

Conclusions:
We found no correlation between increased CIMT and SCF. However, current smoking and higher LDL Cholesterol and Hematocrit levels are all related to slower coronary blood flow.