

Metabolic Syndrome, Intrathoracic Fat and Coronary Artery Atherosclerosis in Asymptomatic Diabetic Patients – a 64 Slice CT Study

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BACKGROUND: Recent studies suggest that mediastinal fat is metabolically active and may be implicated in the pathogenesis of coronary heart disease (CHD). Metabolic syndrome is common in type 2 diabetics and may predict adverse outcomes. We examined the independent predictive value of intrathoracic and intrapericardial fat distribution for the presence of coronary atheroma on 64 slice coronary CT angiography (CTA) and its relation to the presence of the metabolic syndrome in asymptomatic subjects with diabetes mellitus enrolled, in an ongoing prospective outcomes study.

METHODS: We performed non-enhanced chest CT in 318 pts to determine intrapericardial and extrapericardial intrathoracic fat distribution and cardiac CTA (Philips, Brilliance 64 scanner) to determine coronary atheroma. Extent of fat was assessed as thickness of fat deposits at predefined sites measured from an axial view and coronary disease was assessed as absent/single vessel or multivessel coronary plaque (MVCP). Metabolic syndrome was diagnosed from clinical characteristics according to NCEP III criteria and risk scores assessed from baseline characteristics.

RESULTS: Metabolic syndrome was found in 266 (83.6%) pts and its presence predicted more MVCP [162 (61.1%) vs 21 (40.4%) pts, p=0.006]. Extent of both extra-pericardial fat and intra-pericardial fat were increased in pts with MVCP. Right sided extra-pericardial and intra-pericardial fat independently predicted MVCP after adjustment for Framingham risk or metabolic syndrome whereas left sided extra-pericardial fat independently predicted MVCP after adjustment for Framingham, UK Prospective Diabetic Study (UKPDS) CHD risk or presence of metabolic syndrome (see table).

Predictors of Multi-Vessel Coronary Plaque

Site	Multi-Vessel plaque	Mean \pm SD (mm)	p-univariate	P - adjusted Framingham	p- adjusted UKPDS	p-adjusted metabolic syndrome
Left extra-pericardial fat pad	Pos	17.8 \pm 8.1	<0.001	0.001	0.005	0.029
	Neg	14.2 \pm 7.3				
Right extra-pericardial fat pad	Pos	18.8 \pm 7.0	0.02	0.002	0.26	0.07
	Neg	16.9 \pm 7.2				
Intra-pericardial fat	Pos	5.9 \pm 2.9	0.02	0.035	0.12	0.01
	Neg	5.0 \pm 2.4				

CONCLUSION. In asymptomatic subjects with DM and no history of CAD: 1) Extra-pericardial and intra-pericardial fat predicted presence of multi-vessel coronary plaque independently of well recognized predictors of adverse outcomes. 2. These findings support recent reports highlighting the metabolic role of intrathoracic fat in coronary heart disease.