Visceral Fat Predicts Coronary Atherosclerosis Independently from the Metabolic Syndrome in Asymptomatic Diabetic Patients – a 64 Slice CT Study

Alla Khashper [1], Tamar Gaspar [1], Idit Dobrecky-Mery [2], Mali Azencot [2], Nathan Peled [1], David A Halon [2]

[1] *Radiology,* [2] *Cardiovascular Medicine, Carmel Medical Center, Haifa, Israel*

Background: Non-alcoholic fatty liver disease (NAFLD) may accompany the metabolic syndrome, is common in diabetics and may be a marker of pre-clinical atherosclerosis. Recent studies suggest that visceral adiposity (accumulation of fat in the intra-abdominal cavity) may predict adverse coronary events. We examined relation of abdominal fat distribution and NAFLD to presence of coronary atheroma on 64 slice coronary CT angiography (CTA) in asymptomatic subjects with diabetes mellitus (DM) enrolled, in an ongoing prospective outcomes study.

Methods: Non-enhanced chest CT was performed in 318 pts to determine abdominal fat distribution and cardiac CTA (Philips, Brilliance 64 scanner) to determine coronary atheroma. Fatty liver was diagnosed when liver density was 10 HU or more below spleen density. Increased internal abdominal diameter was taken to represent visceral abdominal fat accumulation. Metabolic syndrome was diagnosed from clinical characteristics according to NCEP III criteria. Patients with alcohol abuse were excluded.

Results: Extent of pre-hepatic fat pad and internal abdominal diameter were increased in pts with multi-vessel coronary plaque (MVCP) (fat pad 15.8±6.7 vs 13.5±5.6 mm, $p=0.005$; abdominal diameter 158.4±33.6 vs 135.8±27.7 mm, $p<0.001$). Fatty liver was common (29.2% pts) and its presence correlated with prevalence of several adverse risk factors [BMI ($p<0.001$), waist circumference ($p<0.001$), lower HDL cholesterol ($p=0.005$) and higher triglycerides ($p=0.001$)], but did not correlate with presence of coronary plaque or MVCP. Metabolic syndrome was present in 266 (83.6%) pts and predicted more MVCP [162 (61.1%) pts with vs 21 (40.4%) pts without metabolic syndrome, $p=0.006$]. Prehepatic fat ($p=0.008$) and internal abdominal diameter ($p<0.001$) predicted MVCP independently from the presence of metabolic syndrome.

Conclusions: In asymptomatic subjects with DM and no history of CAD: 1) Visceral fat as evidenced by pre-hepatic fat pad and internal abdominal diameter predicted presence of multi-vessel coronary plaque independently from the presence of the metabolic syndrome. 2. Fatty liver did not predict presence of coronary atheroma. 3. These data support recent suggestions that visceral fat may play a role in the pathogenesis of coronary heart disease.