Liposcale: a novel advanced lipoprotein test based on 2D diffusion-ordered 1H NMR spectroscopy

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EAS-0864.
COMPARISON OF SERUM TIMP-2, NGAL AND ANGIOPOIETIN-2 LEVELS TO IDENTIFY CORONARY ARTERY STENOSIS

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Objectives: Coronary artery artherosclerosis involves lipid metabolism as well as vascular inflammation/activation. We aimed to compare the diagnostic values of new biomarkers regarding vascular inflammation/activation (NGAL, TIMP2, IL-8, GRO alpha, angiopoietin-2, bFGF and EGF) to identify angiographically significant coronary artery stenosis.

Methods: Serum levels of NGAL, TIMP2, IL-8, GRO alpha, angiopoietin-2, bFGF, EGF and hsCRP were measured in 70 patients who undertook coronary angiography.
Results: Serum TIMP-2, NGAL and angiopoietin-2 levels were significantly elevated in patients with coronary artery stenosis ($p = 0.002$, $p = 0.01$ and $p = 0.01$, respectively). They were also statistically correlated with the numbers of the stenotic coronary artery and its angiographical severities based on the modified Gensini score. Receiver operating characteristic curves of TIMP-2, NGAL and angiopoietin-2 showed significantly increased area under the curve (0.795, 0.728, 0.722, respectively). Multivariate analysis revealed that the elevated serum angiopoietin-2 level, old age and current smoking were statistically strong predictors for coronary artery stenosis ($p = 0.22$, $p = 0.006$ and $p = 0.004$, respectively).
Conclusion: Serum TIMP-2, NGAL and angiopoietin-2 levels were useful predictors for the presence and severity of coronary artery stenosis.

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EAS-0403.
CIRCULATING PRO-ATHEROGENIC OXIDIZED-LDL/β2-GLYCOPROTEIN I COMPLEXES ARE DETECTED IN ARTERIAL AND VENOUS DISEASES AND ARE INDEPENDENT PREDICTORS OF CAROTID ARTERIAL DISEASE

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Objectives: Statin-modifiable and pro-atherogenic oxLDL/β2GPI complexes have been implicated in the initiation and progression of atherosclerotic CVD and associated with disease severity and adverse outcomes. However, the presence and significance of these complexes in idiopathic venous disease (IVD) have not been evaluated.

Methods: 146 study subjects recruited from a vascular surgery outpatient clinic were enrolled: 61 had arterial disease (21 CarAD, 17 PAD, and 23 AAA), 32 had IVD, and 53 were healthy controls. Serum was obtained to measure oxLDL/β2GPI by ELISA and the results were expressed in U/mL (mean±SD).
Results: One-hundred subjects not taking statins were further studied. OxLDL/β2GPI levels were significantly elevated in arterial (0.69±0.50, p=0.004) and venous groups (0.54±0.37, p=0.025) compared to controls (0.39±0.33). Among arterial disease patients, oxLDL/β2GPI levels were 0.85±0.59 for CarAD, 0.72±0.54 for PAD and 0.52±0.38 for AAA. There was a significant positive association of oxLDL/β2GPI with the following demographic and clinical variables: sex (male 0.55 vs female 0.26, p=0.005); age (r=0.299, p=0.002); hypertension (0.54 vs 0.27, p=0.024) and history of previous thrombotic episodes (0.95 vs 0.37, p=0.035). Subjects with oxLDL/β2GPI levels above the median (0.25 U/mL) were significantly more likely to have arterial disease (OR 4.5, 1.54-13.14, p=0.004) and venous disease (OR 4.1, 1.38-11.99, p=0.008). Multivariate regression models with oxLDL/β2GPI as a dependent variable indicated male gender (t=2.34, p=0.021), high cholesterol (t=-2.58, p=0.011) and the CarAD phenotype (t=2.32, p=0.023) were significant predictors of oxLDL/β2GPI. Excluding venous disease, only CarAD remained as a significant independent predictor of oxLDL/β2GPI levels.
Conclusion: The coexistence of oxLDL/β2GPI complexes in arterial and venous disease suggests a common underlying oxidative inflammatory mechanism that is particularly significant as an independent predictor for CarAD.

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EAS-0594.
LIPOSCALE: A NOVEL ADVANCED LIPOPROTEIN TEST BASED ON 2D DIFFUSION-ORDERED ^{1}H NMR SPECTROSCOPY

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Objectives: Type 2 diabetic subjects (T2DM) tend to present atherogenic dyslipidemia (AD), characterized by high triglycerides, low HDL cholesterol (HDL-C) levels, and a preponderance of small LDL particles. Moreover, the number of LDL particles (LDL-P) has been suggested to be a better predictor of cardiovascular risk than LDL cholesterol (LDL-C) in patients with high cardiometabolic risk. We developed a novel advanced lipoprotein test (ALT) based on 2D diffusion-ordered ^{1}H NMR spectroscopy (DOSY) to compare the lipid and lipoprotein profiles of T2DM subjects with and without AD.

Methods: First, we used a cohort of 177 subjects to set up a novel ALT based on DOSY. This methodology allows the determination of particle size and particle concentration of different lipoprotein classes and subclasses. These samples were also analyzed with a reference technique for validation purposes. Second, we used a cohort of 323 subjects to define the lipid and lipoprotein profile of AD. To associate these profiles with cardiovascular risk, we measured the intima media thickness (IMT).
Results: VLDL particles were higher in T2DM subjects with AD, while medium HDL particles and total HDL-C were decreased. Despite we found no difference in LDL-C levels, mean levels of total LDL-P were higher in T2DM subjects with AD. We further analyzed the cases when these measures were discordant on the basis of population percentiles, i.e., when LDL-C was increased and LDL-P was normal (cholesterol-enriched particles predominate) and when LDL-P was increased but LDL-C was normal (cholesterol-depleted particles predominate). For those individuals with cholesterol-depleted LDL particles, only LDL-P was associated with IMT (r=0.29).
Conclusion: We used a novel ALT that permitted a profound characterization of AD in T2DM subjects. For individuals with cholesterol-depleted LDL particles, the LDL-attributable atherosclerotic risk was associated with LDL-P but not with LDL-C.

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EAS-0097.
RATIOS OF SERUM EICOSAPENTAENOIC (EPA) AND DOCOSAHEXAENOIC (DHA) ACID TO ARACHIDONIC ACID (AA) AND CORONARY AND AORTIC PLAQUE INSTABILITY

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