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Biohumoral predictors of coronary atherosclerosis progression in patients with suspected coronary artery disease from the SMARTool Study

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Background: The SMARTool study aims to build a multiparametric predictive model of coronary atherosclerosis (ATS) progression in a population of patients (pts) with suspected coronary artery disease (CAD).
Purpose: This analysis is aimed to assess the role of metabolic and inflammatory biomarkers as determinants of coronary ATS progression in the SMARTool population.
Methods: In 257 pts with suspected CAD, blood sampling and CT coronary angiography (CTCA) were performed at enrollment and after 6±1yrs. In this period 49 pts underwent coronary revascularization and were excluded. Circulating biomarkers and CTCA were evaluated in CoreLabs. Coronary ATS was defined by the presence of detectable plaques in at least one of 17 segments and ATS formation/progression by an increase in total N of plaques at follow-up. Obstructive plaques were defined as causing >50% lumen stenosis at CTCA.
Results: Of the 208 pts included (61±8yrs,119males), 157 had coronary plaques (obstructive in 36). At follow-up, 108 pts had ATS formation/progression (N plaque from 3.3 to 5.3,P<0.0001,obstructive in 19), 64 pts had no ATS progression (N plaque from 4.5 to 4.3,P=0.0063,obstructive in 22) and 36 pts had persistently normal vessels. Biomarkers assessed at baseline and follow-up are compared among the three groups in Table1. At multivariate analysis, after correction for age, gender, risk factors, and drug treatment, ATS formation/progression was not related with any biomarkers at enrollment but was independently related with high IL6 at follow-up (OR 8.02,95% CI 1.03–62.34,p=0.046). Interestingly, only pts with ATS formation/progression had significant increase of IL6, despite a similar frequency of statin treatment (83% and 73%) and LDL reduction in ATS pts, without or with ATS formation/progression (Figure 1).

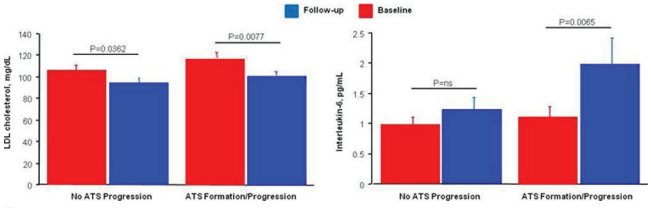

Figure 1

Conclusion: Increased IL6 is relatated with ATS formation/progression independently of changes in lipid profile in pts with suspected CAD. These results are in keeping with the emerging role of inflammation in CAD pts treated with lipid lowering drugs.
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Acute coronary syndromes: mechanistic insights and risk prediction through lipoprotein lipidomics

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Background: Although acute coronary syndromes (ACS) are a major cause of morbidity and mortality worldwide, there remains limited understanding of the precipitating mechanisms, and it is still not possible to accurately identify those who are most vulnerable.
Purpose: We hypothesized that lipidomic profiles of lipoprotein sub-fractions would provide insight into mechanisms of plaque erosion and rupture and better predict future ACS than whole plasma lipidomic profiles.
Methods: One-hundred and thirty individuals with de novo presentation of an ACS (ST-elevation myocardial infarction (STEMI) and non-STEMI) or stable coronary artery disease (CAD) were recruited. Venous blood samples were collected prior to coronary catheterisation and apolipoprotein A (apoA) and apoB subfractions derived by precipitation. For each study participant, an an expanded lipidomic analysis than previously reported was performed on whole plasma as well as both fractions using liquid chromatography electrospray ionization–tandem mass spectrometry. Adjusted logistic regression models with Benjamini-Hochberg correction for false discovery were used to determine the association of each lipid class, subclass and species with ACS both in whole plasma as well as the apoA and apoB subfractions. Multivariate models with optimism correction were developed using risk factors alone, lipids alone or a combination of lipids and risk factors and evaluated using C-statistic and percent accuracy to discriminate ACS from stable CAD.
Results: Plasma obtained at the time of an ACS was characterized by lower phospholipid levels including lyso species and plasmalogens, compared with stable CAD. The majority of these differences were within the apoA fraction, suggesting a significant role for high-density lipoprotein (HDL) lipid species in ACS. In contrast, the plasma and both apoA and apoB fractions in the ACS group were enriched in Cer(d18:1/18:0). The ratio of this ceramide species to the less toxic glycosylated form was a strong marker of ACS. Models based on lipid species improved discrimination between the stable and ACS groups by 0.15 (C statistic) compared to conventional risk factors. Models utilizing plasma lipids or lipids within sub-fractions were similar in their ability to discriminate groups, though plasma yielded the highest C statistic (0.80) and accuracy (75%).
Conclusions: Application of a lipidomic approach to lipoprotein sub-fractions provides insight into markers of coronary plaque rupture and erosion which may be amenable to therapeutic intervention in the critical hours after an ACS. From a risk-prediction perspective the data inform development of future prospective clinical tests for ACS, suggesting that simple plasma testing is equal to more complex analyses involving lipoprotein fractions.
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CORONARY ARTERY DISEASE: MISCELLANEOUS

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Characteristics and prognosis of patients with acute coronary syndrome complicated by ventricular tachyarrhythmia in the last decade

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Background: Ventricular tachyarrhythmia (VTA) is an infrequent yet serious complication of acute myocardial infarction (MI). There is limited data regarding the incidence and prognostic implications of VTA in the last decade.
Methods: 11,079 acute coronary syndrome patients from the Acute Coronary

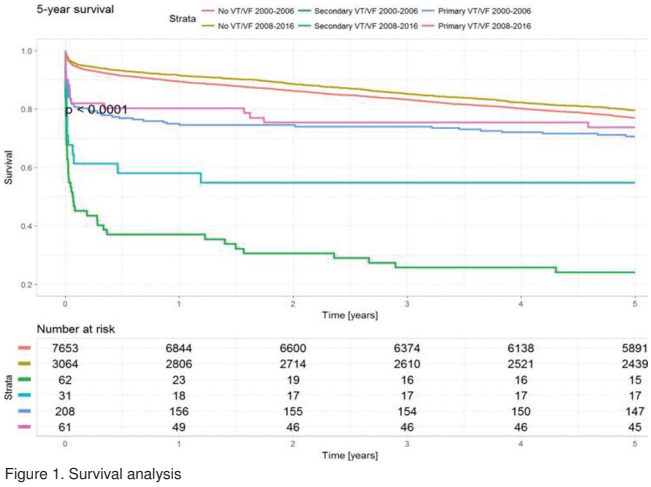

Figure 1. Survival analysis

Abstract P774 – Table 1

	Baseline				Follow-up			
	Normal vessels	No ATS progression	ATS formation-progression	P	Normal vessels	ATS no progression	ATS formation-progression	P
Glucose, mg/dL	98±2.9	108±3.2	107±2.8	ns	103±4.0	103±2.2	108±2.7	ns
Total cholesterol, mg/dL	195±10.5	184±5.7	194±5.5	ns	207±6.1	177±5.1	186±4.4	0.0030
HDL cholesterol, mg/dL	60±4.3	55±2.2	52±1.6	ns	63±3.3	56±1.7	57±1.5	ns
LDL cholesterol, mg/dL	115±7.9	106±4.9	118±4.7	ns	115±5.2	95±4.7	101±3.8	0.0104
C-Reactive Protein, mg/dL	0.199±0.04	0.456±0.10	0.270±0.04	ns	0.200±0.04	0.308±0.05	0.312±0.05	ns
Interleukin-6, pg/mL	0.61±0.10	0.99±0.12	1.12±0.17	ns	1.09±0.14	1.24±0.19	2.00±0.43	0.0301

Syndrome Israeli Survey (ACSIS) were prospectively characterized and followed-up for 5 years. Patients were classified into 3 groups: no VTA, early VTA (≤48h) and late (>48h) VTA. Data was analyzed according to decades of presentation (current decade vs. previous decade)
Results: VTA occurred in 3.2% (362) of patients. The rate of early vs. late VTA were 2.4% (269) and 0.8% (93) respectively. Patients with late VTA were older and had higher incidence of diabetes mellitus and chronic renal failure. ST-elevation MI was complicated more often by early VTA than late VTA. Kaplan-Meier survival analysis showed that mortality rates at 5 years of follow-up were lowest in the no VTA (22%), intermediate in the early VTA group (28%) and very high (65%) in the late VTA group, respectively (log-rank p<0.001 for the overall difference during follow-up ([Figure: left panel]). Late VTA was associated with lower mortality rate in the current decade (2008–2016) compared with last decade (2000–2006) (Fig: right panel).
Conclusions: Late VTA following acute myocardial infarction is associated with very high long-term mortality rates. However, over the past decade there has been a significant improvement in survival rates in this high- risk population, that may be attributed to early and invasive reperfusion therapy, ICD implantation and better medical treatment.

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Incidence and impact of occluded culprit coronary arteries in patients with non-ST-segment elevation myocardial infarction

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Introduction: The accuracy of the 12-lead electrocardiogram (ECG) to diagnose acute coronary artery occlusion, specifically in inferolateral myocardial infarction (MI), is limited. Failure to manifest ST-segment elevation leads to delayed reperfusion in some patients. Studies addressing the outcomes of patients with missed occluded culprit arteries (OCAs) presenting with non-ST-segment elevation MI (NSTEMI) have reported inconsistent results.
Purpose: Evaluate the incidence and prognostic impact of OCAs in patients with NSTEMI.
Methods: We analysed retrospectively all patients admitted consecutively in a coronary care unit with NSTEMI from October 2010 to September 2016 who underwent coronary angiography and had a clearly defined culprit artery. We compared baseline characteristics and both in-hospital and 1-year outcomes between patients with and without OCAs. Statistical analysis was performed in SPSS.
Results: We included 866 patients [mean age 64.6±12 years; 662 (76.4%) men], of whom 221 (25.5%) had an OCA. The OCA was more frequently the left circumflex (LCX) (45.7%vs20.5%, p<0,001) and less frequently the left anterior descending (27.6% vs 49.6%, p<0,001), with no difference regarding the right coronary artery (26.2% vs 20.9%, p=0.1).
Patients with OCAs were younger (62.2 vs 65.4, p=0.001), more likely to be men (82.8% vs 74.3%, p=0.01), to have family history of CAD (10.9% vs 5.9%, p=0.04) and history of angina (43.9% vs 51.9%, p=0.04). There were no differences regarding cardiovascular (CV) risk factors, previous CV disease and major co-morbidities.
Patients with OCAs were more likely to have persistent chest pain on admission (34.7% vs 25.3%, p=0.03) and less likely to underwent percutaneous coronary intervention (PCI) (55.2% vs 72.9%, p<0,001) and be treated with glycoprotein IIb/IIIa inhibitors (39.8% vs 50.5%, p=0.01). The in-hospital stay was more frequently complicated by re-infarction (2.3% vs 0.6%, p=0.04) and mechanical complications (0.9% vs 0, p=0.02). There were no significant differences regarding admission Killip class, ECG, in-hospital medication, left ventricular ejection fraction (61.3% vs 61%) and other major complications.
Regarding outcomes, there were no statistically significant differences concerning in-hospital mortality (1.8% vs 0.9%, p=0.291), 1-year mortality (2.1% vs 4.2%, p=0.177) and 1-year re-hospitalization (15.5% vs 18.8%, p=0.3).
Conclusion: Approximately 1 in every 4 patients with NSTEMI have an occluded culprit coronary artery, which is more frequently the LCX. These patients are younger, more frequently men and more likely to manifest persistent chest pain at admission. In our study, a missed OCA had no impact on in-hospital or 1-year outcomes. Contrary to conventional teaching, OCAs in NSTEMI may not function as the equivalent of transmural infarction in STEMI. One possible explanation is that the greater prevalence of collaterals in patients with OCAs may mitigate the extend of myocardial damage.

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Gender stratified predictive capability of three well-validated risk scores in patients with acute myocardial infarction undergoing primary percutaneous coronary intervention

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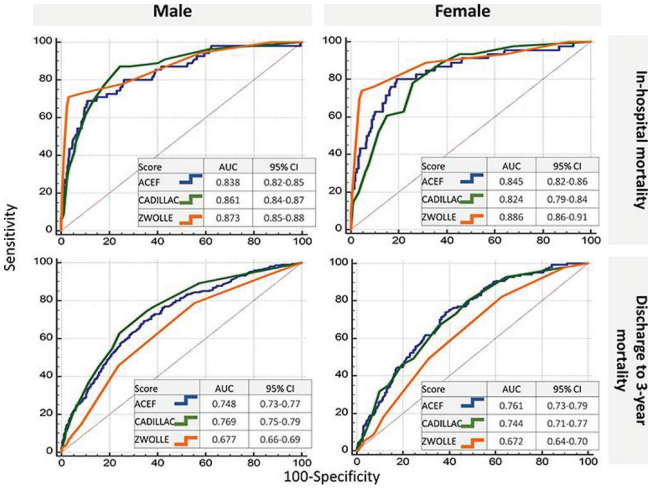
Background: Several risk scores have been developed to predict mortality of patients with acute myocardial infarction (AMI) undergoing primary percutaneous coronary intervention (pPCI), with no data on the comparative prognostic value among different genders.
Purpose: We aimed to compare the prognostic value of 3 validated risk scores for in-hospital and post-discharge to 3-year mortality of patients with AMI undergoing pPCI among genders.
Method: From a prospective electronic registry of a high-volume PCI center in a period 2009–2015, a total of 3137 (30% women) consecutive patients referred for pPCI were identified for analysis. For each patient, Age, Creatinine, and Ejection Fraction (ACEF), Controlled Abciximab and Device Investigation to Lower Late Angioplasty complications (CADILLAC) and ZWOLLE risk score were calculated using required clinical and angiographic characteristics. The predictive discriminatory capacity of the evaluated risk scores was expressed as the c-statistic, which represents the area under the ROC (receiver operating characteristic) curve for predicting in-hospital and post-discharge to 3-year mortality in both, men and women.
Results: Observed mortality rates were significantly higher for women compared to men, for in-hospital (4.8 vs 2.5%; p=0.001) but not for post-discharge to 3-year period (13.1 vs. 11.3%; p=0.156), respectively. Among both, men and women, all three scores ACEF, CADILLAC, and ZWOLE showed high predictive accuracy for in-hospital mortality (Men: c-statistic 0.838, 0.861 and 0.873, respectively; Women: c-statistic 0.845, 0.824 and 0.886, respectively) (Figure). While in men all 3 scores showed equal capacity, among women ZWOLLE score performed best showing better discriminative power compared to CADILLAC (p=0.04) but not to ACEF score (p=0.25). As expected, predictive capability for post-discharge up to 3-years mortality of evaluated scores declined for both groups, in men (c-statistics 0.677–0.769) and in women (c-statistics 0.672–0.761) with ZWOLLE score having the weakest predictive capacity in both groups compared to ACEF and CADILLAC (p<0.001). There was no statistically significant differences in c-statistics for each score accordingly between genders, for both outcome periods.



Conclusion: In both men and women, ACEF, CADILLAC and ZWOLE risk scores enable highly accurate prediction for in-hospital and good predictive capability, with exception of ZWOLLE, for post-discharge mortality. There is variability in predictive accuracy for mortality of evaluated scores within, but not between genders, for both outcome periods.

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Cardiogenic shock in STEMI patients:prevalence, management and acute phase mortality over the last three decades

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Background: Cardiogenic shock (CS) is an ominous complication of ST elevation myocardial infarction (STEMI). However, the widespread use of reperfusion therapies and invasive management could have reduced the prevalence of CS and improved the prognosis of these patients in the last decades.
Purpose: The aim is to analyze the changes over last three decades in the prevalence, management and acute phase prognosis of STEMI patients complicated with CS.
Method: Between February 1989 and December 2017, 7,589 STEMI patients were consecutively admitted in the Coronary Care Unit of a University Hospital and were included in a prospective registry. Depending on the year of admission, patients were classified in five groups: 1989–1994: n=1,337, period 1; 1995–1999: n=960, period 2; 2000–2004: n=1,059, period 3; 2005–2009: n=1,535, period 4 and 2010–2015: n=2,698, period 5). We analyze the trend in prevalence of CS, management and in-hospital mortality over these five periods.
Results: The global prevalence of CS was 6.2% (466 patients), mean age was 67.7 (SD 11.7) years and 68.7% were men. This prevalence remains without rel-