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Predictors of Infarct Size and Microvascular Obstruction Assessed by Cardiac Magnetic Resonance Imaging in patients with Acute ST elevation MI

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Background: Time-to-reperfusion, electrocardiographic and angiographic parameters are of prognostic relevance in ST-elevation myocardial infarction (STEMI) patients. We sought to evaluate predictors of Infarct size (IS) and presence of microvascular obstruction (MO) using delayed hyper-enhancement magnetic resonance imaging (CMR).

Methods and results: We analyzed 128 consecutive STEMI patients reperfused by primary PCI within 12 hours after symptom onset. IS and MO were assessed by delayed hyper-enhancement MRI as percentage of LV mass, 4±2 days after acute MI. Reperfusion times, TIMI-flow grades pre and post PCI, 90 min ST-segment resolution, cardiovascular risk factors, Killip-class, and infarct location were assessed. In patients with TIMI flow 0-1 before PCI, IS was significantly higher compared to patients with TIMI-flow 2-3 (22±12% versus 16±15%; p<0.01). Similarly, the extent of MO occurrence was affected by the pre PCI TIMI flow. A trend toward higher final IS and MO was noted in post PCI TIMI flow. Patients with TIMI flow 0 to <3 IS was 28±11% versus 20±12% in TIMI-flow =3 (p=0.067). The ST-segment resolution correlated inversely with final IS and presence of MO (IS r=-0.34, p<0.01; MO r=-0.31, p<0.01). IS was significantly higher in anterior AMI versus inferior AMI (24±16% versus 17±12%; p<0.01 as well as MO (9.8±7.8%vs. MO 4.8±3.7%; p=0.01). In a multivariable model the strongest predictors of IS and MO were pre-PCI TIMI-flow, infarct location, admission Killip class, and 90 minute ST-segment resolution (p<0.05 for all).

Conclusions: The pre-PCI TIMI flow, infarct location, Killip class and ST-segment resolution are the strongest predictors of IS and extent of MO as assed by delayed Hyper-enhancement MRI. CMR allow for strong evaluation in STEMI patients, giving important information regarding prognostic.

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Circulating secreted phospholipase A2 activity: an early prognostic marker in unselected patients presenting to the emergency department with suspected acute coronary syndrome

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sPLA2 and Lp-PLA2 are currently being evaluated as potential markers and therapeutic targets in coronary artery disease. We hypothesized that their measurement, in parallel with CRP, could correlate to the risk of death or myocardial infarction (MI) in patients with suspected acute coronary syndromes (ACS), providing thereby important prognostic information. We therefore analysed a cohort of 419 unselected consecutive patients (mean 61.1 years old ; 63.9 % male) presenting in the emergency room of a large tertiary hospital, without ST-segment elevation (NSTE) on the baseline ECG, with chest pain (72 %) or other clinical features considered indicative of ACS. Clinical history, basal troponin I (cTnI) and CRP measurements were obtained. Final discharge diagnoses were assigned to the following categories: NSTE-ACS including NSTE-MI and unstable angina (UA), other cardiac diseases (OCD) or non cardiac diseases (NCD). Follow-up was obtained in all patients at 40 days. sPLA2 mass, sPLA2 and Lp-PLA2 activities were measured on the serum samples collected at presentation. The median sPLA2 activity was significantly higher in NSTE-ACS patients (1.89), than in OCP and NCP patients (1.45 and 1.43 respectively; p< 0.001). A significant association between sPLA2 mass and diagnosis (p<0.02) was also found, while the Lp-PLA2 activity appeared not to be associated with the final diagnosis. Patients with sPLA2 activity or mass at presentation in the highest quartile had a statistically higher incidence of cardiac death and MI than those with sPLA2 activity or mass in the lowest quartile (37.5% versus 13.4 %, p=0.0001 and 33.6% versus 16%; p=0.0047, respectively). On the other hand, no association was observed with Lp-PLA2 activity. Therefore, a single measurement of sPLA2 activity in unselected patients presenting with suspected ACS and no ST-segment elevation, provides better independent prognostic information than either CRP, sPLA2 mass or Lp-PLA2, on the risk of death or MI.

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Red Blood Cell Transfusion Increase Platelet Aggregation: a potential mechanism for increased mortality in transfused patients

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Background: Erythrocytes transfusion is an independent risk factor for recurrent ischemic events and mortality in patients suffering from acute coronary syndrome. There is no evidence regarding the underlying mechanism of such association.

Aim: We hypothesized that red blood cell transfusion would activate platelet aggregation and we sought to identify which are the pathway involved in this activation process.

Methods: Healthy volunteers (n=15) provided blood samples that were mixed with red blood cell (tRBC) obtained from transfusion packs. We explored platelet activation using light transmission agregometry with four different agonist (ADP, Arachidonic Acid (AA), Collagen and Epinephrin) in 10 volunteers and with flow cytometry for P-selectin and VASP in 5 volunteers. Measures were obtained at baseline (whole blood from healthy volunteers), after in vitro transfusion with a 1:4 ratio of tRBC and after in vitro transfusion with a 1:4 ratio of tRBC and hematocrit adjustement with platelet poor plasma. All experiment were performed in duplicates.

Results: Theses are preliminary results from the ongoing TRANSFUSION study. Numerical values are given in table 1. 1/ RBC transfusion activates platelet aggregation thought ADP and AA pathway. 2/ This effect was confirmed by increase in P-Selectin platelet content with flow cytometry and is independent of an increase in hematocrit. 3/ P2Y12 activation pathways is involved with an increase in VASP.

Conclusions: Red Blood Cell transfusion activates platelet thought ADP and AA pathway in healthy volunteers. This may explain the independent association between transfusion and recurrent ischemic events including mortality in ACS patients.

Results of tRBC induced platelet aggregation

	n=10				n=5		
Technique	**Aggregometry (Residual Platelet Aggregation %)**				**P-Selection %**		**PRI (%)**
Agonist	ADP	AA	Collagen	Epinephrin	20µM ADP	50µm ADP	VASP
Baseline	58,0	79,5	61,6	65,0	33,6	40,2	68,4
After tRBC (no adjustement)	70,3	89,1	72,5	59,6	50,5	56,4	83,9
After tRBC (adjusted with PPP)					48,1	54,5	74,8
p value	0,03*	0,04*	0,13	0,15	ND	ND	ND

(<0,05; ND=not done)*

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Anemia for Risk Assessment of Patients With Acute Coronary Syndromes

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Background: In patients admitted with acute coronary syndromes (ACS), those with anemia are at higher risk. However, current risk score systems do not take into account the presence of anemia.