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Microbiota thrombus colonization may influence athero-thrombosis in hyperglycemic patients with ST segment elevation myocardial infarction (STEMI). Marianella study

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ABSTRACT

Objectives: We examined the association of the coronary thrombus microbiota and relative metabolites with major adverse cardiovascular events (MACE) in hyperglycemic patients with ST segment elevation myocardial infarction (STEMI).

Background: Hyperglycemia during STEMI may affect both development and progression of coronary thrombus via gut and thrombus microbiota modifications.

Methods: We undertook an observational cohort study of 146 first STEMI patients treated with primary percutaneous coronary intervention (PPCI) and thrombus-aspiration (TA). Patients were clustered, based on admission blood glucose levels, in hyperglycemic (≥ 140 mg/dl) and normoglycemic (< 140 mg/dl). We analyzed gut and thrombus microbiota in all patients. Moreover, we assessed TMAO, CD40L and von Willebrand Factor (vWF) in

Abbreviations: HDL, high-density lipoprotein; LDL, low-density lipoprotein; MACE, major adverse cardiovascular events; PPCI, primary percutaneous coronary intervention; RCA, right coronary artery; STEMI, ST-segment elevation myocardial infarction; TA, thrombus aspiration; TMAO, Trimethylamine-N-oxide.; vWF, von Willebrand Factor

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coronary thrombi. Cox regressions were used for the association between *Prevotellaspp.* and TMAO tertiles and MACE. MACE endpoint at 1 year included death, re-infarction, unstable angina.

Results: In fecal and thrombus samples, we observed a significantly different prevalence of both *Prevotellaspp.* and *Alistipesspp.* between patients with hyperglycemia (n = 56) and those with normal glucose levels (n = 90). The abundance of *Prevotella* increased in hyperglycemic vs normoglycemic patients whereas the contrary was observed for *Alistipes*. Interestingly, in coronary thrombus, the content of *Prevotella* was associated with admission blood glucose levels (p < 0.01), thrombus dimensions (p < 0.01), TMAO, CDL40 (p < 0.01) and vWF (p < 0.01) coronary thrombus contents. Multivariate Cox-analysis disclosed a reduced survival in patients with high levels of *Prevotella* and TMAO in coronary thrombus as compared to patients with low levels of *Prevotella* and TMAO, after 1-year follow up.

Conclusions: Hyperglycemia during STEMI may increase coronary thrombus burden via gut and thrombus microbiota dysbiosis characterized by an increase of *Prevotella* and TMAO content in thrombi.

Clinical Trial Registration: NCT03439592. September 30, 2016.

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