

POSTER PRESENTATION

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The prevalence of microvascular obstruction in acute myocardial infarction: importance of ST elevation, infarct size, transmural extent and infarct age

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Objective

To assess the prevalence of microvascular obstruction (MO) by delayed-enhancement cardiac magnetic resonance (DE-CMR) in patients with first acute myocardial infarction (AMI) and describe its relationship with type of infarction, infarct size (IS), transmural extent, and infarct age.

Background

MO has been associated with poor LV remodeling and adverse prognosis. The clinical and CMR characteristics of MO have predominantly been examined in patients with ST-segment elevation MI (STEMI). There are no prior studies that have included both STEMI and non-STEMI patients to allow direct comparison of the prevalence of MO. Additionally, the relationship of MO with IS, transmural extent, and infarct age are incompletely understood.

Methods

We studied 266 consecutive patients from 2 centers (Duke and Maastricht University) with first AMI (elevated biomarkers and angiographically confirmed CAD). Baseline characteristics and the presence of ST-segment elevation (2-contiguous leads ≥ 0.2 mV in men and ≥ 0.15 mV in women in leads V2-V3 and/or ≥ 0.1 mV in other leads) were recorded. Cine and DE-CMR were performed at 4 ± 3 days. IS and transmural extent were measured by planimetry.

Results

The population consisted of 147 (56%) patients with STEMI, 2 (0.8%) with left bundle branch block, and the remaining 117 (44%) with non-STEMI. The mean age was 59 ± 13 years and 68% were male. The overall observed prevalence of MO was 53%. IS and transmural extent were significantly larger in patients with MO than without (24% vs 7%, $p < 0.0001$; and 83% vs 56%, $p < 0.0001$, respectively). The prevalence of MO was higher in STEMI than non-STEMI (69% vs 31%, $p < 0.0001$, Figure 1), however, when IS was large (upper tertile, $>25\%$) or transmural extent was high (upper tertile, $>80\%$) the prevalence of MO was similar (93% vs 92%, $p = 0.9$; and 90% vs 85%, $p = 0.5$, respectively). The prevalence of MO was dependent on both IS and

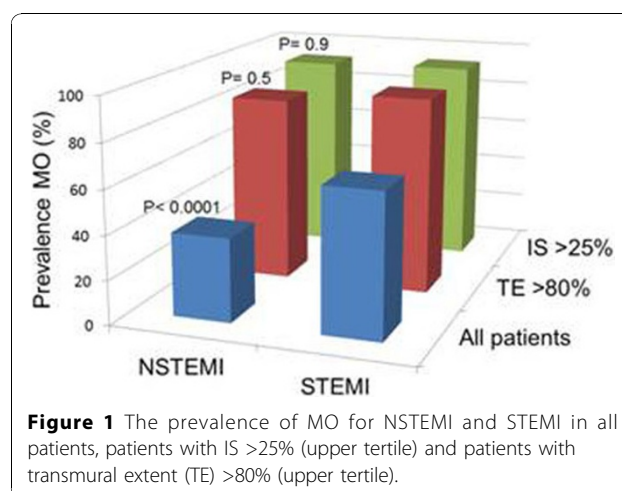
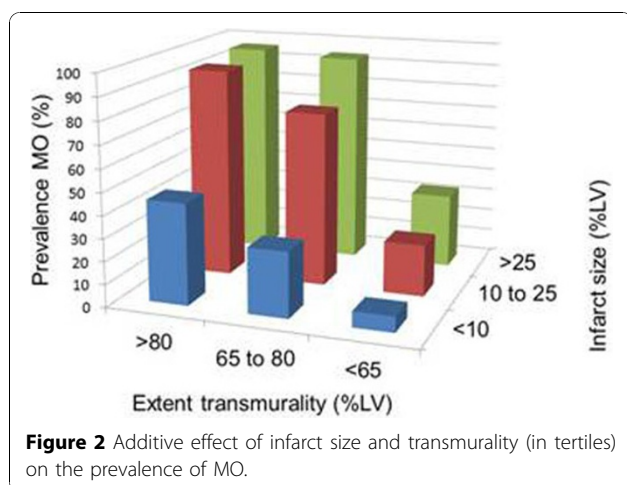


Figure 1 The prevalence of MO for NSTEMI and STEMI in all patients, patients with IS $>25\%$ (upper tertile) and patients with transmural extent (TE) $>80\%$ (upper tertile).

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transmurality (Figure 2). Finally, the prevalence of MO was dependent on infarct age: it was similar over the first 6-days post AMI (days 1-3 =56%, days 4-6 =56%) but decreased over the subsequent week (days 7-9 =42%, days 10-14 =30%). Multivariable analysis demonstrated that only IS, transmural extent, and infarct age were independent predictors of MO ($p < 0.0001$, $p < 0.0001$, $p = 0.05$ respectively).

Conclusions

Microvascular obstruction is more than twice as common in patients with STEMI than non-STEMI, however, the prevalence of MO is similar when accounting for infarct size and transmural extent. Only larger infarct size, greater extent of transmural extent and earlier infarct age are independent predictors of MO.

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