Effect of a restrictive vs. liberal blood transfusion strategy among patients with acute myocardial infarction and anemia according to heart failure. A subgroup analysis of the REALITY trial

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Background/Introduction: The optimal Red Blood Cell (RBC) transfusion strategy in patients with acute myocardial infarction (MI) and anemia remains debated. In REALITY, the largest randomized trial to date in this population (n=666), a restrictive compared with a liberal transfusion strategy resulted in a noninferior rate of major adverse cardiovascular events (MACE; composite of all-cause death, stroke, recurrent myocardial infarction, or emergency revascularization prompted by ischemia) at 30 days, but did not achieve non-inferiority at 1 year.

One of the main concerns with RBC transfusion is the risk of fluid overload and acute heart failure (HF). Therefore, the balance of benefit and risk of transfusions strategies may differ between patients with and without heart failure.

Purpose: We aimed to evaluate the potential interaction between HF and RBC transfusion on outcomes in REALITY.

Methods: HF was defined as either a history of heart failure or Killip class > 1 at randomization (data available for 658 patients). All events until day 30, including HF, were adjudicated by a Critical Event Committee blinded to the transfusion arm and hemoglobin levels. The primary clinical outcome was MACE at 30 days. Secondary endpoints included MACE at one year, individual components of MACE and new onset of heart failure at 30 days and 1 year.

Results: Among 658 patients, 311 (47.3 %) had HF. HF patients had a higher rate of MACE and a higher rate of new HF than patients without HF at 30 day and at 1 year (Fig 1). There was no interaction between HF and the effect of randomized assignment on the primary outcome or on new HF. In contrast, a liberal strategy was associated with increased all-cause death at 30 days and at 1 year in patients with HF but not in pts without HF (interaction p = 0.0088 and p = 0.049 respectively, Fig 1).

Conclusion(s): Heart failure is frequent in MI patients with anemia (nearly half of the patients) and is associated with higher risks of MACE and of HF. While no interaction was observed between HF and transfusion strategies on the primary outcome of MACE, a liberal transfusion strategy was associated with higher all-cause mortality than a restrictive strategy both at 30-days and 1 year. The mechanism of this interaction deserves further investigation.