Baseline hemoglobin level, anemia and adverse events in patients with acute coronary syndromes; Lessons from ACUITY and HORIZONS-AMI

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BACKGROUND The association between anemia at admission and adverse outcome in patients with acute coronary syndromes (ACS) has been recently emphasized. A more granular analysis between baseline hemoglobin and adverse events has not been reported.

METHODS Anemia was defined as serum hemoglobin <12 g/dl in women and <13 g/dl in men in two large ACS trials - ACUITY and HORIZONS-AMI. We plotted gender-specific hazard functions for all-cause mortality at 1 year and major bleeding at 30 days according to baseline hemoglobin, and analyzed time to events according to tertiles of hemoglobin.

RESULTS Among 16,421 patients, 2,558 (15.6%) had anemia at baseline. Patients with anemia were older, more often women, and had higher rates of CAD risk factors. They were also significantly more likely not to undergo revascularization. The hemoglobin level on admission was 11.7±1.0 g/dl in anemic and 14.6±1.2 g/dl in non-anemic patients (P<0.001). The incidence of ischemic events in the two groups is shown in Table 1. Death and MI were significantly more common in anemic patients at 30 days and at 1 year, while rates of ST, TIMI and TVR were similar. Non-CABG major bleeding was 2x as common in the anemic patients (8.4% vs. 3.6%, P<0.001), and transfusions were administered 5x more often (7.5% vs. 1.5%, P<0.001). Patients in the highest tertile of hemoglobin (>14.8 g/dl) has the lowest 1-year mortality, compared with the middle tertile (13.5-14.8 g/dl) and lowest tertile (<13.5 g/dl): 3.0% vs. 3.4% vs. 5.8%, P<0.0001, respectively. There was no significant difference between the middle and highest tertile of baseline hemoglobin (P=0.08). Gender-specific spline transformations of the hazard for death at 1 year as a function of hemoglobin level on admission showed that the lowest mortality was observed at a baseline hemoglobin level of 14.6 g/dl for men and 13.2 g/dl for women. Below and above these levels mortality increased (U-shaped curve). The lowest rate of major bleeding events occurred at similar hemoglobin levels as for mortality.

CONCLUSIONS Baseline hemoglobin carries important prognostic information and appears to have a non-linear association with both death and major bleeding events. The risk for mortality and major bleeding increases with hemoglobin levels below and above 14.6 g/dl for men and 13.2 g/dl for women.