

P5660

Clinical impact of polycythemia on cardiovascular outcome from the general population: a nationwide cohort study

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Background: Although adverse effect of anemia had been reported, effect of polycythemia on cardiovascular outcome from the general population had not been revealed yet.

Methods: We included 451,107 subjects who received national health examinations from the Korean National Health Insurance Service-based National Sample Cohort from 2009–2013. Medical records were screened from January 2002 to investigate the subjects' disease-free baseline period. They were followed until December 2013. We divided male and female subjects into four categories each based on hemoglobin level (normal, moderate to severe and mild anemia, polycythemia) to assess each outcome.

Results: During 1,735,964 person-years, 12,107 major adverse cardiovascular and cerebrovascular events (MACCE), 862 incident acute myocardial infarction (MI), 5,850 incident ischemic stroke, and 2,430 incident atrial fibrillation (AF) were observed.

Compared to normal hemoglobin range group, polycythemia group showed higher MACCE (HR=1.23 [1.12–1.35] in male, HR=1.79 [1.20–2.67] in female, each $p < 0.001$), incident MI (HR=1.37 [1.05–1.79] in male, HR=3.46 [1.06–14.00] in female, each $p < 0.001$), incident ischemic stroke (HR=1.27 [1.10–1.46] in male, HR=1.72 [1.02–2.91] in female, each $p < 0.001$), and incident AF (HR=1.46 [1.21–1.74] in male, HR=2.13 [1.03–4.77] in female, each $p < 0.001$). Each outcome was linearly increased with the increase of hemoglobin among subjects with polycythemia ($p < 0.001$), and with the decrease of hemoglobin among subjects with anemia (each $p < 0.001$, U-shaped relationship). These relationship was more profound in obese female younger than 60-year-old.

Conclusion: Not only anemia but also polycythemia were significantly associated with higher rate of MACCE including death, incident MI, ischemic stroke, and AF among the general population.

