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

In-Soo Kim  
Jong-Youn Kim  
Pil-Sung Yang  
Hee Tae Yu  
Tae-Hoon Kim  
Jae-Sun Uhm  
Hui-Nam Pak  
Moon-Hyoung Lee  
Byoung Kwon Lee  
Boyoung Joung

**Introduction:** 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.

**Result:** 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 relationships were 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.