The clinical and genetic relationship between anemia and atrial fibrillation recurrence after catheter ablation

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**Introduction**: Anemia has been known to be an adverse prognostic factor among the patients with cardiovascular diseases. We investigated whether hemoglobin level is associated with rhythm outcome after atrial fibrillation (AF) catheter ablation (AFCA).

**Methods**: We included 2,627 patients who underwent AFCA and guidelines-based rhythm follow-up (58±10.9 years old, 73% male, 30.6% persistent AF), and evaluated the association of pre-AFCA anemia (hemoglobin, male <13, female <12 g/dL) and rhythm outcome. We also studied mechanistic relationship between anemia and AF recurrence by Mendelian randomization analysis (1,775 subjects) after reviewing 12 genetic polymorphisms associated with hemoglobin which found in 11 European population studies.

**Result**: Body mass index (OR 0.88 [0.83-0.93], p<0.001), paroxysmal AF (OR 1.95 [1.37-2.79], p<0.001), warfarin use (OR 1.42 [1.05-1.92], p=0.023), and baseline red cell distribution width (OR 1.97 [1.70-2.27], p<0.001) were independently associated with anemia in patients with AF. During a 23-months (IQR 9~48) follow-up, clinical recurrence of AF was significantly higher in patients with anemia than those without (Log rank p=0.001; propensity score matched Log rank p=0.004). This pattern was more significant in male patients (Log rank p<0.001) or paroxysmal AF patients (Log rank p<0.001). Anemia (HR 1.45 [1.17-1.80], p=0.001), left atrial diameter (HR 1.03 [1.01-1.04], p=0.001), and persistent AF (HR 1.58 [1.36-1.84], p<0.001) were independently associated with post-AFCA clinical recurrence. In Mendelian randomization, we could not find significant direct causal relationship of anemia with AF recurrence in genetic level.

**Conclusion**: Pre-AFCA anemia is an independent predictor for post-AFCA clinical recurrence, especially in male, without genetically direct causal relationship.