Poor nutritional status assessed by a novel nutritional index predicted the recurrence of atrial fibrillation following pulmonary vein isolation

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Introduction: The association between nutritional status and prognosis in wide range of cardiovascular disease has been recently implicated. In the pathogenesis of atrial fibrillation (AF), previous studies suggested the elevated risk of the AF recurrence after the ablation in individuals with excess of nutrition, overweight. However, the association between poor nutritional status and AF recurrence after the ablation has been rarely addressed. In this study, we evaluated the impact of poor nutritional status on the recurrence after AF ablation by using a simply calculable novel nutritional indicator, Triglycerides (mg/dl) x total Cholesterol (mg/dl) x Body weight (kg)/1000 = TCBI.

Methods: This single center study involved consecutive 336 patients who underwent AF ablation by the pulmonary vein isolation (PVI) from July 2017 to June 2019 at Juntendo University Hospital, Tokyo, Japan. The median and the range of follow-up period for AF recurrence since the procedure were 194 and 90-666 day, respectively. In 106 patients (31.5%), three-dimensional (3D) voltage mapping of left atrium (LA) was obtained before the PVI to detect LA low voltage area (LVA), which defined as areas of bipolar voltage <0.5 mV.

Result: A positive linear correlation between TCBI and a conventional but complex nutritional indicator, geriatric nutritional risk index (GNRI) was demonstrated (r=0.54, \( p < 0.0001 \)). LVA was detected in 80.2% (80/106) of patients and which was inversely correlated with TCBI (r=-0.27, \( p=0.011 \), Fig A) and C-statistics of TCBI indicated the high accuracy to predict the presence of LVA (0.725, \( p=0.008 \)), indicating the progression in the electrical remodeling of LA in patients with poor nutrition. Unadjusted Kaplan–Meier analysis demonstrated increased risk of AF recurrence in patients with lowest tertile of TCBI (TCBI-T1) compared to those who in T2 and 3 (\( p=0.002 \), Fig B). Moreover, multivariate Cox proportional hazard analyses adjusted by age, gender, body mass index, and NT-pro BNP revealed that the lowest tertile of TCBI was an independently associated with the AF recurrence (Fig. C).

Conclusion: This study suggests the association between poor nutritional status and increased risk of atrial remodeling, as well as AF recurrence after PVI. Moreover, a novel nutritional / intrinsic metabolism index, TCBI may be a useful indicator to evaluate the pathogenies of AF.