Abstract: P905

Association of ionized serum magnesium with progression of aortic valve calcification

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Background: Calcific aortic valve disease (CAVD) is the most common heart valve disease among adults. It is a progressive disease whose final step leads to severe aortic stenosis (AS). Pharmacotherapeutic strategies aimed to limit the progression of valve leaflet calcification could be beneficial to slow-down the CAVD progression and to preserve left ventricular function. Several recent clinical studies demonstrated that lower serum magnesium (Mg) level is associated with vascular calcification. Whether serum magnesium is a determinant of aortic calcific stenosis progression remains unknown.

Methods: In an ongoing prospective cohort of AS patients (COFRASA/GENERAC) we studied the association between serum Mg with the aortic valve calcification prevalence and progression. Serum Mg was measured at baseline in both its ionized (iMg) and total (tMg) forms. AS stenosis severity was evaluated at baseline and yearly thereafter using mean pressure gradient (MPG), the aortic valve area indexed to body surface (AVAi) assessed by echocardiography and the degree of aortic valve calcification (AVC) assessed by computed tomography. Annual progression was calculated as: (final measurement-baseline measurement)/follow-up duration.

Results: We enrolled 356 patients (73.1 ±10 years, 73% men), the mean follow-up duration was 2.5 ± 2 years. There was a highly significant correlation between iMg and t Mg concentrations values \( r = 0.85, p<0.0001 \). Approximately 37% and 25% of patients have respectively iMg values = 0.45 mmol/L (normal range 0.45-0.60 mmol/L) and t Mg = 0.80 mmol/L (normal range 0.80-0.95 mmol/L). At baseline, lower i Mg and t Mg were significantly associated with sex, diabetes, lower haemoglobin and hypertension but not with AVC neither with MPG or AVAi. After mean follow-up of 2.5 ± 2 years, the annual mean Log AVC progression was significantly greater \( p = 0.01 \) in patients with values of iMg = 0.45 mmol/L (2.04 ± 0.73) as compared to patients with iMg > 0.45 mmol/L (1.78 ± 0.94). Annual Mean MGP and AVAi also progressed greater in patients with low iMg but without reaching a significant level. Similar association was not found with tMg. In multivariate analysis, iMg remained significantly associated with the progression of AVC (odds ratio per 0.1 mmol/L increment [95% confidence interval] = 0.36 [0.15-0.83] ; \( p = 0.015 \) independently of age, tMg, glucose, type 2 diabetes, tobacco use, baseline AVC, MPG and AVAi.

Conclusion: In a prospective cohort of asymptomatic patients with a wide range of AS severity, low serum ionized Mg but not low total Mg was independently associated with AVC progression.