Predictive Power of White Blood Cells in Patients with Aortic Stenosis

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Aims: The pathophysiology of aortic stenosis (AS) involves inflammatory features including infiltration of the aortic valve (AV) by activated macrophages and T-cells, deposition of lipids and heterotopic calcification. We sought to probe the ability of WBC differential counts to predict AS development and progression.

Methods: We identified from our institution echocardiography lab registry 150 consecutive patients with AS who underwent two repeated echo studies spaced greater than six months apart in the interval between 2007 and 2010 and evaluated the association between the average of repeated WBC differential counts sampled 3 years earlier and subsequent echocardiographic AS indices. We excluded 14 patients with malignant or chronic inflammatory disease, or who had been on chronic steroid or immunosuppressive treatment, or with blood counts that were higher or lower than 2 SDs of all the collective blood counts.

Results: There was no significant difference in total white blood cell, lymphocyte or eosinophil count among mild, moderate or severe AS groups. There was a progressive decrease in monocyte count with AS severity (p=0.046); more prominent when comparing the mild and severe groups. There was a negative correlation between AV peak velocity or peak or mean gradient and monocyte count in the entire group (r = -0.31, -0.24, and -0.25 respectively, all $p \leq 0.01$). Similar partial correlations controlling for age, gender, hypertension, smoking, dyslipidemia and ejection fraction remained significant but were abolished upon inclusion of aortic calcification to these factors. A mean total white blood cell count lower than 7100/ml predicted an increase in peak aortic valve velocity greater than 0.3 m/sec/year in patients with calcific severe AS.

Conclusions: Severe AS is associated with decreased total monocyte count whereas decreased WBC count predicts a more rapid progression in patients with calcified severe AS.