

## Augmentation index predicts mortality in patients with aortic stenosis. An echo-tracking study

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**Objective.** Aortic valve stenosis (AS) shares similarities with the atherosclerotic process which is known to be responsible of arterial stiffness, but little is known on the direct effect of the mechanical properties of large arteries on the outcome in patients with significant AS and even less is known on the effect of the local stiffness of the large elastic arteries.

The aims of the study were 1) to determine the relationship between indexes of local (carotid) arterial stiffness/compliance and the severity of AS and 2) to identify whether local arterial stiffness is independently associated with mortality.

**Methods.** 133 patients with severe isolated AS and preserved left ventricular (LV) ejection fraction (EF) were prospectively recruited. Patients underwent data collection on cardiovascular risk factors and coronary artery disease, standardized transthoracic echocardiographic examination and local carotid stiffness evaluation by means of high-definition echo-tracking ultrasound system with the calculation of arterial stiffness/compliance and augmentation index (Alx). All cause death and the requirement of valvular interventions were recorded during the follow-up period until the occurrence of death or censoring. Deaths were confirmed by reviewing the electronic patient records.

**Results.** None of the local AS parameters were significantly associated with AS severity. During a mean follow-up of  $51.6 \pm 39.4$  months, 70 patients received aortic valve replacement and 45 died. Patients who died were older ( $79.2 \pm 6.9$  vs  $73 \pm 8.8$  years,  $p < 0.0001$ ), they had higher carotid stiffness (Alx) ( $21.3 \pm 14$  vs  $16 \pm 12\%$ ,  $p = 0.028$ ). In multivariate Cox regression analysis Alx was independently associated with mortality also after the inclusion of age and renal function ((HR 1.048, 95% CI 1.01-1.07,  $p = 0.001$ ). The Kaplan-Meier survival free event curve showed that there was an association with Alx and the curves were statistically different in the group with no surgery ( $p = 0.016$ ).

**Conclusion.** In patients with severe AS and normal LVEF, Alx measured by means of echo-tracking system was higher in patients who deceased. Alx was independently associated with death and mortality was higher in the group of patients with higher Alx who did not undergo surgery. These data emphasize the importance of arterial stiffness that not only causes an increase in LV afterload but is also a harbinger of a long-term atherosclerotic burden.

Hemodynamic, echocardiographic data