Left Atrial Enlargement is Associated with Postoperative Respiratory Failure and Mortality

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Methods:
This retrospective study evaluated patients undergoing high risk vascular surgery at Lehigh Valley Hospital between 2004 – 2008. High risk vascular surgery was defined as non-cardiac, intra-thoracic or intra-abdominal vascular surgery. We identified a group of 121 patients who had undergone preoperative cardiac imaging with an echocardiogram within six months of surgery. The RAS and left atrial volume index was recorded for each patient. LAE was defined as a left atrial volume index (LAVI) > 28 mL/m². A high RAS was defined as an echocardiographic score of 40 or greater. PRF was defined as an inability to be extubated 48 hours after surgery or reintubation following initial extubation. The relationship between LAE and the RAS with postoperative respiratory failure was examined in this study. Additional research will be required to determine if the identification of LAE guides treatment to reduce the risk of PRF.

Results:
PRF occurred in 29 (24%) of the 121 patients studied. In the 43 patients with left atrial enlargement, PRF occurred in 15 (35%) patients. In contrast, PRF was observed in 14 (18%) of the 78 patients with normal left atrial size (Pearson’s χ² = 4.36, p = 0.037). Among 43 patients with high RAS, 19 (44%) had PRF. In comparison 10 (13%) of the patients with lower RAS scores experienced PRF (Pearson’s χ² = 14.97, p < 0.001). The in-hospital mortality in the total study group was 5% (6 patients). Among the subgroup with LAE (43 patients) the in hospital mortality was 12% (5 patients). In the group of patients who died, 83.3% had LAE (OR = 10.13; 95% CI – 1.1-89.6; p = 0.021).

Conclusion:
In patients undergoing high risk vascular surgery, LAE on a preoperative echocardiogram is associated with postoperative respiratory failure. Importantly, LAE is also associated with in-hospital mortality. A high RAS was also associated with PRF. The relationship between LAE and PRF due to heart failure, as opposed to other causes of respiratory failure, was not analyzed in this study. Additional research will be required to determine if LAE is an independent risk factor for PRF due to heart failure. An evaluation of patients with normal ejection fraction and LAE undergoing high risk vascular surgery may be particularly valuable. Finally, additional analysis will be required to determine if the identification of LAE guides treatment to reduce the risk of PRF.

References:
•  Lang, R.M. et al. “Recommendations for Chamber Quantification.” A report from the American Society of Echocardiography’s Guidelines and Standards Committee and the Chamber Quantification Writing Group, developed in conjunction with the European Association of Echocardiography, a branch of European Society of Cardiology. JASE 2005, 18, 1440.