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Commentary: Another tool for the chronic thromboembolic pulmonary hypertension toolbox

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CENTRAL MESSAGE

Pulmonary artery to ascending aorta ratio may help predict perioperative mortality for surgery, but should still be used in conjunction with thorough workup and multidisciplinary evaluation.

Careful patient selection and comprehensive assessment are the cornerstones to success in pulmonary thromboendoarterectomy. Improved technology in cross sectional imaging has allowed for more precise localization of disease. However, operability is ultimately determined by experience of the institution and individual surgeons, which has limited widespread adoption of this procedure. Current indicators for increased operative risk revolve mainly around assessment of right ventricular function and pulmonary vascular resistance, with decompensated right heart failure[1] being a marker of high operative mortality.

Boehm and colleagues[2] report on their experience of 149 patients, using pulmonary artery to ascending aorta (PA:AA) ratio to determine operative mortality at 30 days. Their data supported a cutoff PA:AA ratio of 1.136 to predict 30-day mortality, with a lower ratio having 97% survival versus 89% for patients with a higher ratio.[2] The use of computed tomography measurements to predict outcomes is appealing because of the convenience of a noninvasive study and easy reproducibility. In nonoperative chronic thromboembolic pulmonary hypertension, use of measurements of the right ventricular to left ventricular ratio has correlated with poor outcome,[3] and PA:AA ratio predicts severity and outcome in pulmonary hypertension.[4] These computed tomography measurements have also been used to predict the development of chronic thromboembolic pulmonary hypertension following pulmonary embolism.

The pitfalls of this technique relate to indirect correlation and confounding. The main correlation with PA size was pulmonary arterial pressure, as measured invasively with right heart catheterization (RHC). RHC is routinely performed on all patients being considered for pulmonary thromboendoarterectomy or balloon pulmonary angioplasty and is still the gold standard of hemodynamic measurement of pulmonary arterial pressure. Any benefit that measurement of PA:AA ratio confers would be need to be: (1) in addition to RHC, (2) in a population in whom such invasive measurements are not performed, (3) to stratify patients need for RHC, or (4) to monitor patients postoperatively in a noninvasive fashion.

Confounding of PA:AA ratio occurs due to the known phenomenon of increasing ascending aortic diameter with age. In this study, there was a negative correlation between PA:AA ratio and age. It is therefore an interesting finding that PA:AA ratio relates to mortality, as it suggests this effect is independent of age, a known risk factor of all cardiovascular procedures.

Objective, easily reproducible, and easily obtained data such as PA:AA ratio are useful tools for clinicians to quickly screen patients for operative risk and add another tool for physicians to identify greater-risk patients. However, multidisciplinary discussion and thorough surgical assessment by an experienced center remains the gold standard for all patients with CTEPH.[5]

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