Pulmonary artery pulsatility index

A study aimed to investigate whether mortality following cardiac surgery was associated with the pulmonary artery pulsatility index (PAPi): pulmonary artery pulse pressure divided by central venous pressure (CVP), and a novel index: mean pulmonary artery pressure (mPAP) minus CVP.

This retrospective analysis investigated all cardiac surgery patients in the Society of Thoracic Surgeons registry at a single academic medical center from January 2017 through March 2020 (n = 1510). The primary and secondary outcomes were mortality at 1 year and serum creatinine increase during index surgical admission, respectively. CVP, mPAP, PAPi, mPAP-CVP gradient, mean arterial pressure (MAP), and cardiac index (CI) were sampled continually from invasive hemodynamic monitors post-operatively. Associations with mortality were tested with univariate and multivariate analyses. The relationship with serum creatinine was investigated with Pearson's correlation at alpha = .05.

One-year mortality was observed in 44/1200 patients (3.7%). On univariate analysis, mortality was associated with minimums for mPAP, MAP, and CI and maximums for CVP, mPAP, PAPi, mPAP-CVP gradient, and CI (all P < .10). Model selection revealed that the only independently predictive parameters were minimum MAP (AOR = .880 [.819-.944]), maximum mPAP-CVP gradient (AOR = 1.082 [1.031-1.133]), and maximum CI (AOR = 1.421 [.928-2.068]), with model c-statistic = .770. A maximum mPAP-CVP gradient >20.5 predicted mortality with 54.5% sensitivity and 79.30% specificity, maintaining significance on survival analysis (P < .001). Peak increase in serum creatinine from baseline demonstrated a weak association with all parameters (max |r| = .33).

Mortality was not predicted by the post-operative PAPi; rather, it was independently predicted by the mPAP-CVP gradient, MAP, and CI [1].

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Knio ZO, Thiele RH, Wright WZ, Mazimba S, Naik BI, Hulse MC. A Novel Hemodynamic Index of Post-operative Right Heart Dysfunction Predicts Mortality in Cardiac Surgical Patients. Semin Cardiothorac Vasc Anesth. 2022 Mar 25:10892532221080382. doi: 10.1177/10892532221080382. Epub ahead of print. PMID: 35332827.