NEW INDEX-PULMONARY VASCULAR INDEX-FOR EVALUATION OF PULMONARY FLOW RESISTANCE IN CONGENITAL HEART DISEASE

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It is generally recognized that pulmonary flow profiles should be changed with progression of pulmonary hypertension (PH). In normal, pulmonary velocity profile shows symmetric pattern, that is, it arrives at peak around the mid of ejection interval. However in advanced stage of PH, velocity profile changes to be asymmetric pattern. Timing of peak moves ahead resulting short acceleration time (AcT). And systolic notch appears in down slope of pulmonary velocity profile in patients with PH resulting decreasing of mean velocity of pulmonary flow. Pulsatile Index (PI) has been used for one of the markers that stand for vascular resistance especially in fetal brain or umbilical circulations. We modified PI and devised new pulmonary vascular index (PVI) expressing as a formula “PVI=Peak velocity/mean velocity”. In present study, we evaluate feasibility of PVI in patients with PH.

Patients and Methods: We enrolled 5 patients (pts) with mild PH (pulmonary vascular resistance was less than 5 Units, mean age 7.5 ± 7.8 y), 3 pts with severe PH (Eisenmenger syndrome, 12.9 ± 3.8 y) and 60 healthy children as control (3.6 ± 4.5 y). We measured not only PVI but also AcT/ET scanned at pulmonary trunk using Doppler echocardiography (ET: ejection time).

Results: PVI was 1.72 ± 0.43 in mild PH, 2.1 ± 0.15 in severe PH and 1.51 ± 0.11 in control. PVI in pts with severe PH was significantly elevated compared to others (P < 0.0001). On the other hand, AcT/ET was lower in pts with mild to severe PH, but those differences were not statistically significant (0.26 ± 0.01 in mild PH, 0.15 ± 0.13 in severe PH and 0.30 ± 0.14 in control).

Conclusions: Both PVI and AcT/ET are useful markers for diagnose of PH. PVI is more accurate marker for diagnosis of severity of PH.