AEPC-YIA Session

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[AEPCYIA] AEPC-YIA Session（II-AEPCYIA）

Chair:Jan Janoušek（Children's Heart Centre, Motol and Homolka University Hospital, Prague, Czech Republic）
Chair:Mikiko Ishido（Department of Pediatric and Adult Cardiology, Tokyo Women's Medical University）

[II-AEPCYIA-5] Association Between Blood Biomarkers and Hemodynamic Parameters in Adolescents and Adults After the Fontan Procedure: A Retrospective Cohort Study

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Background and Aim:

Background: As the population of adolescent and adult patients with Fontan circulation continues to grow, long-term outcomes remain constrained by Fontan circulatory dysfunction, characterized by elevated central venous pressure (CVP) and reduced cardiac output. Red blood cell distribution width (RDW) is an inexpensive and widely available hematological parameter and a known prognostic marker in heart failure; however, its relationship with invasive hemodynamics in Fontan patients has not been fully elucidated. Objectives: To investigate the association between RDW and invasive hemodynamic parameters in adolescent and adult Fontan patients and to evaluate the utility of RDW as a noninvasive circulatory marker.

Methods:

Methods: This single-center retrospective study included consecutive Fontan patients aged ≥16 years who underwent routine cardiac catheterization ≥5 years after surgery between June 2014 and July 2025. Laboratory data and catheter-derived hemodynamic parameters were analyzed. The primary endpoint was the correlation between RDW and CVP, and the secondary endpoint was the correlation between RDW and central venous oxygen saturation ($ScvO_2$).

Results:

Results: Forty patients (median age, 22 years) were analyzed. The median RDW was 13.3%, and the median CVP was 11.0 mmHg. RDW showed a significant positive correlation with CVP ($\rho = 0.57$, $P < 0.001$) and significant negative correlations with $ScvO_2$ ($\rho = -0.66$, $P < 0.001$) and cardiac index ($\rho = -0.34$, $P = 0.03$). Patients with elevated RDW (>14.5%) had significantly higher CVP (14.5 vs. 10.5 mmHg, $P < 0.001$) and lower $ScvO_2$ (63.8% vs. 76.1%, $P < 0.001$) than those with normal RDW. Multivariable analysis identified RDW as an independent predictor of $ScvO_2$ ($P < 0.001$).

Conclusions:

Conclusions: In adolescent and adult patients after the Fontan procedure, RDW was significantly associated with elevated CVP and reduced $ScvO_2$ and independently predicted impaired systemic oxygen delivery. RDW is inexpensive, widely accessible, and may serve as a

practical noninvasive biomarker for identifying patients at risk of Fontan circulatory dysfunction and optimizing the timing of invasive assessment during long-term follow-up.