一般口演 | 画像診断 1

2026年7月9日(木) 14:30 ~ 15:35 | 第５会場（Room 603）
[OR05] 一般口演 05（I-OR05）
画像診断1

座長:Yiu-Fai Cheung(The University of Hong Kong)
座長:小平 真幸(慶應義塾大学病院)

[I-OR05-02] Fontan循環における超低流速成分による停滞評価：4D flow MRI研究

○稲毛 章郎[1,3,4], 水野 直和[2], 吉敷 香菜子[3], 佐藤 麻朝[3], 齋藤 美香[3], 嶋 侑里子[3], 松村 雄[3], 上田 知実[3], 嘉川 忠博[3], 松井 彦郎[3] (1.日本赤十字社医療センター 小児科, 2.榊原記念病院 放射線科, 3.榊原記念病院 小児循環器内科, 4.東京女子医科大学附属病院 足立医療センター 放射線科)

キーワード：4D flow MRI、Fontan circulation、very-low-velocity flow

Objective: Fontan circulation features slow venous flow, but its hemodynamic impact remains unclear. We assessed Fontan-pathway flow on 4D flow MRI, focusing on very-low-velocity components.
Methods: Ten post-Fontan patients (age, 18.1 ± 3.5 years; range, 13 ~ 25 years) underwent 4D flow MRI at the Sakakibara Heart Institute. Hemodynamics were analyzed using iTFlow (Cardio Flow Design, Japan). We quantified voxel volume with velocities ＜ 0.01 m/sec. The slow-flow fraction was defined as the voxel volume at ＜ 0.01 m/sec divided by the segmented Fontan-pathway (ROI) volume. Energy loss (EL) was standardized as mean EL/kinetic energy (KE) and mean EL/KE/volume. Wall shear stress (WSS), helicity, and vorticity were also evaluated.
Results: Slow-flow fraction ranged from 2.7% to 30.4% (median, ~9%) and increased as mean velocity decreased, supporting its use as a stasis marker. Mean WSS tended to be higher with lower slow-flow fraction. Standardized EL showed no consistent relationship with slow-flow fraction, suggesting contributions from local high-velocity jets and pathway geometry. Helicity and vorticity varied across patients and were not simply related to slow-flow amount, indicating complementary information on rotational and secondary flow.
Conclusions: Very-low-velocity quantification may characterize stasis in the Fontan pathway, whereas EL and vortex-related metrics reflect other geometry-dependent hemodynamic features.