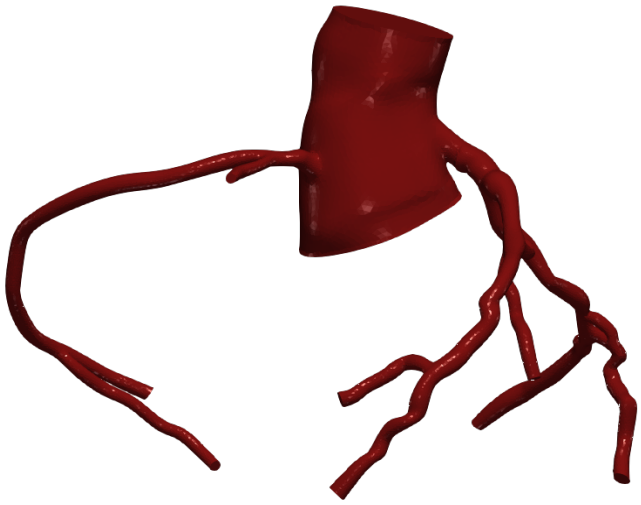
Vascular Model Repository Specifications Document



0171_H_CORO_KD

Legacy Name: KD1

Model added: 14 Feb 2023

Species	Human
Anatomy	Coronary
Disease	Kawasaki Disease
Procedure	None

Clinical Significance and Background

Coronary

Just like every tissue in the body, the heart itself also requires oxygenated blood to function. The coronary arteries supply blood to the heart and stem from the root of the ascending aorta. The two main coronary arteries are the left main and right coronary arteries, and they wrap around the outside of the heart.

The left main coronary artery (LCMA) supplies blood to the left side of the heart muscle and divides into two branches: the left anterior descending (LAD) artery and the left circumflex (LCX) artery which supply blood to the front left and outer backside of the heart respectively.

The right coronary artery (RCA) supplies blood to the right ventricle, the right atrium, and the SA (sinoatrial) and AV (atrioventricular) nodes, which regulate the heart rhythm. Together with the left anterior descending artery, the right coronary artery also helps supply blood to the middle or septum of the heart.

Kawasaki Disease

Kawasaki disease (KD), also known as Kawasaki syndrome, is an acute febrile illness of unknown cause that primarily affects children younger than 5 years of age. The disease was first described in Japan by Tomisaku Kawasaki in 1967, and the first cases outside of Japan were reported in Hawaii in 1976. Kawasaki disease causes swelling (inflammation) in children in the walls of small to medium-sized blood vessels that carry blood throughout the body as well as inflammation of the coronary arteries, which supply oxygen-rich blood to the heart. Inflammation of the coronary arteries can lead to the weakening and bulging of the artery wall (aneurysm). Aneurysms increase the risk of blood clots, which could lead to a heart attack or cause life-threatening internal bleeding.

Children with Kawasaki disease might have a high fever, swollen hands and feet with skin peeling, and red eyes and tongue. But Kawasaki disease is usually treatable, and most children recover without serious problems if they receive treatment within 10 days of onset.

Clinical Data

General Patient Data

Age (yrs)	N/A
Sex	N/A

Specific Patient Data

Summary of patient data.
BSA: Body surface area. HR: Heart rate. BP: Blood pressure (systolic/diastolic).
CO: Cardiac output. EF: Ejection fraction.
LAD: Left anterior descending artery. LCX: Left circumflex artery.
RCA: Right coronary artery. LM: Left main coronary artery.
CAA: Coronary artery aneurysm.

BSA (m^2)	0.95
HR (bpm)	78
BP (mmHg)	106/48
CO (L/min)	3.8
EF (%)	51
CAA Sizes (Z-scores)	LAD: 0.6, LCX: 1.1, RCA: -0.2

Notes

Model of a patient with coronary artery aneurysms related to Kawasaki disease. \nSee paper for more details. See below for information on the image data.

Publications

See the following publications which include the featured model for more details:

Menon, K., Seo, J., Fukazawa, R. et al. Predictors of Myocardial Ischemia in Patients with Kawasaki Disease: Insights from Patient-Specific Simulations of Coronary Hemodynamics. J. of Cardiovasc. Trans. Res. (2023). https://doi.org/10.1007/s12265-023-10374-w

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