

Vascular Model Repository

Specifications Document



0074_H_CORO_KD

Legacy Name: 0187_0002

Model added: 27 Dec 2021

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)	59
Sex	Male

Specific Patient Data

BSA (m ²)	2.1
P sys SP cuff	140
P sys DP cuff	82
Cardiac Output (L/min)	4.1
Stroke Volume (mL)	91.67
Heart Rate (beats/min)	60

Notes

Paper 1 patient "C". \nSee [paper 1](#) for more details. \nModel of a patient with coronary artery aneurysms related to Kawasaki disease. \nSee [paper 2](#) for more details. See below for information on the image data.

Image Modality: CT

Image Type: VTI

Image Source: UCSD

Image Manufacturer: GE MEDICAL SYSTEMS

Publications

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

Sengupta, D., Kahn, A. M., Kung, E., Esmaily Moghadam, M., Shirinsky, O., Lyskina, G. A., ... & Marsden, A. L. (2014). Thrombotic risk stratification using computational modeling in patients with coronary artery aneurysms following Kawasaki disease. *Biomechanics and modeling in mechanobiology*, 13(6), 1261-1276.
<http://www.doi.org/10.1007/s10237-014-0570-z>

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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AND/OR

N.M. Wilson, A.K. Ortiz, and A.B. Johnson, "The Vascular Model Repository: A Public Resource of Medical Imaging Data and Blood Flow Simulation Results," J. Med. Devices 7(4), 040923 (Dec 05, 2013) doi:10.1115/1.4025983.

AND/OR

Reference the official website for this data: www.vascularmodel.com

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