

Vascular Model Repository

Specifications Document



0089_1001

Species	Human
Anatomy	Pulmonary
Disease	Pulmonary Arterial Hypertension
Procedure	-

Clinical Significance and Background

Pulmonary

The pulmonary arteries are blood vessels that carry systemic venous blood returning to the right side of the heart through to the microcirculation of the lungs. Unlike in other organs where arteries supply oxygenated blood, the blood carried by the pulmonary arteries is deoxygenated, as it is venous blood returning to the heart. The main pulmonary arteries emerge from the right side of the heart, and then split into smaller arteries that progressively divide and become arterioles, eventually narrowing into the capillary microcirculation of the lungs where gas exchange occurs.

Pulmonary Arterial Hypertension

Pulmonary hypertension is a type of high blood pressure that affects the arteries in the lungs and the right side of the heart. In one form of pulmonary hypertension, called pulmonary arterial hypertension (PAH), blood vessels in the lungs are narrowed, blocked or destroyed. The damage slows blood flow through the lungs, and blood pressure in the lung arteries rises. The heart must work harder to pump blood through the lungs. The extra effort eventually causes the heart muscle to become weak and fail. Changes in the cells that line the pulmonary arteries can cause the walls of the arteries to become stiff, swollen and thick. These changes may slow down or block blood flow through the lungs, causing pulmonary hypertension.

Clinical Data

General Patient Data

Age (yrs)	50
Sex	Female

Specific Patient Data

BSA (m ²)	2
P pulm SP cath	110
P pulm DP cath	42
P pulm MP cath	68

Notes

See below for information on the image data and boundary conditions associated with the model.

Image Modality: MR

Image Type: DICOM

Image Source: TLAB

Image Manufacturer: GE MEDICAL SYSTEMS

Boundary Conditions: Refer to boundary conditions in the SimVascular file.

Publications

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

Tang, B. T., Pickard, S. S., Chan, F. P., Tsao, P. S., Taylor, C. A., & Feinstein, J. A. (2012). Wall shear stress is decreased in the pulmonary arteries of patients with pulmonary arterial hypertension: an image-based, computational fluid dynamics study. *Pulmonary circulation*, 2(4), 470-476.
<https://www.doi.org/10.4103/2045-8932.105035>

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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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