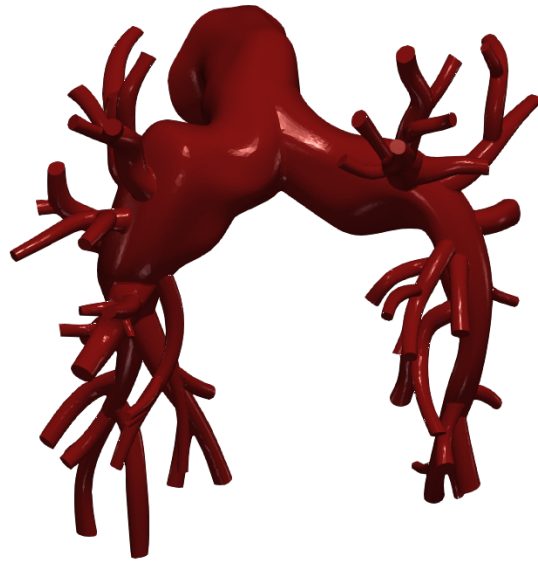


Vascular Model Repository

Specifications Document



0134_0002

Species	Human
Anatomy	Pulmonary
Disease	Congenital Heart Disease Tetralogy of Fallot
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.

Congenital Heart Disease

Congenital heart disease is one or more problems with the heart's structure that exist since birth. Congenital means that you're born with the condition. Congenital heart disease in adults and children can change the way blood flows through the heart. Some types of congenital heart disease may be mild. But complex defects may cause life-threatening complications. However, advances in diagnosis and treatment continue to improve survival for those with congenital heart disease. People with congenital heart disease need lifelong medical care. Treatment may include regular checkups (watchful waiting), medications or surgery.

Tetralogy of Fallot

Tetralogy of Fallot is a rare condition caused by a combination of four heart defects that are present at birth (congenital). These defects, which affect the structure of the heart, cause oxygen-poor blood to flow out of the heart and to the rest of the body. Tetralogy of Fallot includes four defects: pulmonary valve stenosis, ventricular septal defect, shifting of the aorta, and right ventricular hypertrophy.

In pulmonary valve stenosis, the valve that separates the lower right chamber of the heart (right ventricle) from the main blood vessel leading to the lungs (pulmonary artery) is narrowed and blood flow to the lungs is reduced. The narrowing might also affect the muscle beneath the pulmonary valve. Sometimes, the pulmonary valve doesn't form properly (pulmonary atresia).

A ventricular septal defect is a hole in the wall (septum) that separates the two lower chambers of the heart (left and right ventricles). The hole causes oxygen-poor blood in

the right ventricle to mix with oxygen-rich blood in the left ventricle. This causes inefficient blood flow and reduces the supply of oxygen-rich blood to the body. The defect eventually can weaken the heart.

Normally the aorta branches off the left ventricle. In tetralogy of Fallot, the aorta is in the wrong position. It's shifted to the right and lies directly above the hole in the heart wall (ventricular septal defect). As a result, the aorta receives a mix of oxygen-rich and oxygen-poor blood from both the right and left ventricles.

Right ventricular hypertrophy is the thickening of the right lower heart chamber. When the heart's pumping action is overworked, the muscular wall of the right ventricle becomes thick. Over time this might cause the heart to stiffen, become weak and eventually fail.

Some children or adults who have tetralogy of Fallot may have other heart defects such as a hole between the heart's upper chambers (atrial septal defect), a right aortic arch or problems with the coronary arteries.

Clinical Data

General Patient Data

Age (yrs)	31
Sex	Male

Specific Patient Data

Height (m)	167.64
Weight (kg)	78.93
CI (L/min/m ²)	2.9
Cardiac Output (L/min)	5.68
F PA index MRI	2.88
F PA MRI	5.5

Notes

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

Image Modality: MR

Image Type: DICOM

Image Source: STAN

Image Manufacturer: GE MEDICAL SYSTEMS

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

Publications

There are no publications associated with the featured model.

License

Copyright (c) Stanford University, the Regents of the University of California, Open Source Medical Software Corporation, and other parties.

All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this data to use the data for research and development purposes subject to the following conditions:

The above copyright notice and the README-COPYRIGHT file shall be included in all copies of any portion of this data. Whenever reasonable and possible in publications and presentations when this data is used in whole or part, please include an acknowledgement similar to the following:

"The data used herein was provided in whole or in part with Federal funds from the National Library of Medicine under Grant No. R01LM013120, and the National Heart, Lung, and Blood Institute, National Institutes of Health, Department of Health and Human Services, under Contract No. HHSN268201100035C"

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

THE DATA IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE DATA OR THE USE OR OTHER DEALINGS IN THE DATA.