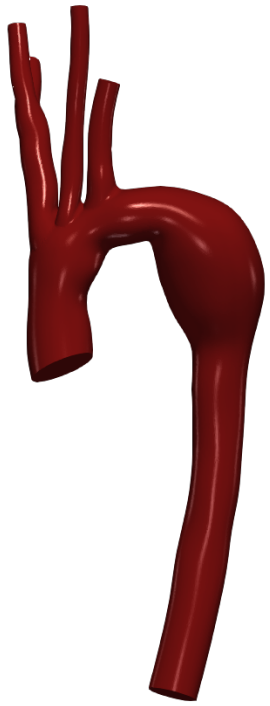
Vascular Model Repository Specifications Document



0174_0000

Species	Human
Anatomy	Aorta
Disease	Marfan Syndrome Aneurysm
Procedure	-

Clinical Significance and Background

Aorta

The aorta is the main and largest artery in the human body, originating from the left ventricle of the heart and extending down to the abdomen, where it splits into two smaller arteries (the common iliac arteries). The aorta distributes oxygenated blood to all parts of the body through the systemic circulation.

The aortic arch loops over the left pulmonary artery and the bifurcation of the pulmonary trunk. In addition to these blood vessels, the aortic arch crosses the left main bronchus. The aortic arch has three major branches: from proximal to distal, they are the brachiocephalic trunk, the left common carotid artery, and the left subclavian artery. The brachiocephalic trunk supplies the right side of the head and neck as well as the right arm and chest wall, while the latter two together supply the left side of the same regions.

Marfan Syndrome

Marfan syndrome is an inherited disorder that affects connective tissue, also known as the fibers that support and anchor your organs and other structures in your body. Marfan syndrome most commonly affects the heart, eyes, blood vessels and skeleton. The most dangerous complications of Marfan syndrome involve the heart and blood vessels. Faulty connective tissue can weaken the aorta, the large artery that arises from the heart and supplies blood to the body. Marfan syndrome can lead to aortic aneurysms, aortic dissection, and valve deformations.

The pressure of blood leaving your heart can cause an aortic aneurysm where the wall of your aorta to bulge out, like a weak spot in a tire. In people who have Marfan syndrome, this is most likely to happen at the aortic root where the artery leaves your heart.

The wall of the aorta is made up of layers. Aortic dissection occurs when a small tear in the innermost layer of the aorta's wall allows blood to squeeze between the inner and outer layers of the wall. This can cause severe pain in the chest or back. An aortic dissection weakens the vessel's structure and can result in a rupture, which may be fatal.

People who have Marfan syndrome can have weak tissue in their heart valves. This can produce stretching of the valve tissue and abnormal valve function. When heart valves don't work properly, your heart often has to work harder to compensate. This can eventually lead to heart failure.

Aneurysm

An aneurysm is a bulge in a blood vessel caused by a weakness in the blood vessel wall, usually where it branches. As blood passes through the weakened blood vessel, the blood pressure causes a small area to bulge outwards like a balloon. Most aneurysms do not show symptoms and are not dangerous. However, at their most severe stage, some can rupture, leading to life-threatening internal bleeding.

Clinical Data

General Patient Data

Age (yrs)	18
Sex	Male

Specific Patient Data

Weight (kg)	58.4
Height (m)	183.5
Heart Rate (beats/min)	75
P sys SP cuff	100
P sys DP cuff	64

Notes

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

Image Modality: CT

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.

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