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VeloX was pioneered by Associate Professor Leo Hwa Liang (front row, left) from NUS' Department of Biomedical Engineering and Dr Jimmy Hon (front row, right) from NUS' Yong Loo Lin School of Medicine. PHOTO: DARYL KANG

Prosthetic heart valve helps patients too weak for surgery

Developed by NUS researchers, VeloX can replace faulty mitral valves on heart's left side

SINGAPORE – A group of researchers from the National University of Singapore (NUS) has developed a prosthetic heart valve which can be used to treat a severe heart condition.

Known as VeloX, it can be implanted through a small incision for the treatment of mitral regurgitation, a condition in which the mitral valve on the left side of the heart does not close properly.

The device will benefit patients who are too weak to go through open-heart surgery to repair or replace faulty valves.

Heart valves are thin flaps of tissue in the heart, which ensure a unidirectional flow of blood between the four chambers during the cardiac cycle. The mitral valve is one of the four valves in the human heart.

When the mitral valve malfunctions and does not close all the way, blood flows backward into the upper heart chamber from the lower chamber as it contracts. This cuts down on the amount of blood that flows to the rest of the body.

The heart may then try to pump harder, and this may lead to congestive heart failure or worsen an existing heart failure.

About 12 million people suffer from mitral regurgitation around the world, with nearly 250,000 new patients diagnosed annually. Left untreated, one in three patients with a severe form of the condition will die within six years.

To implant VeloX in a patient, the prosthetic valve is compressed to the thickness of a pencil and loaded into a catheter.

The catheter is inserted into the patient through a small incision, made either at the leg or between the ribs, to deliver the device straight into the left heart.

The catheter will then be used to send the device to the patient's diseased mitral valve.

VeloX was pioneered by Associate Professor Leo Hwa Liang from the Department of Biomedical Engineering at NUS' Faculty of Engineering, and Dr Jimmy Hon from the Department of Surgery at the NUS Yong Loo Lin School of Medicine.

Dr Hon said: "VeloX will restore the unidirectional flow of the blood in the left heart and help alleviate the symptoms associated with mitral regurgitation. This transcatheter valve offers palliative treatment for the patients who were denied surgery, especially those with multiple co-morbidities."

The research project is supported by the Medical Engineering Research & Commercialization Initiative under the Department of Surgery of the NUS Yong Loo Lin School of Medicine.