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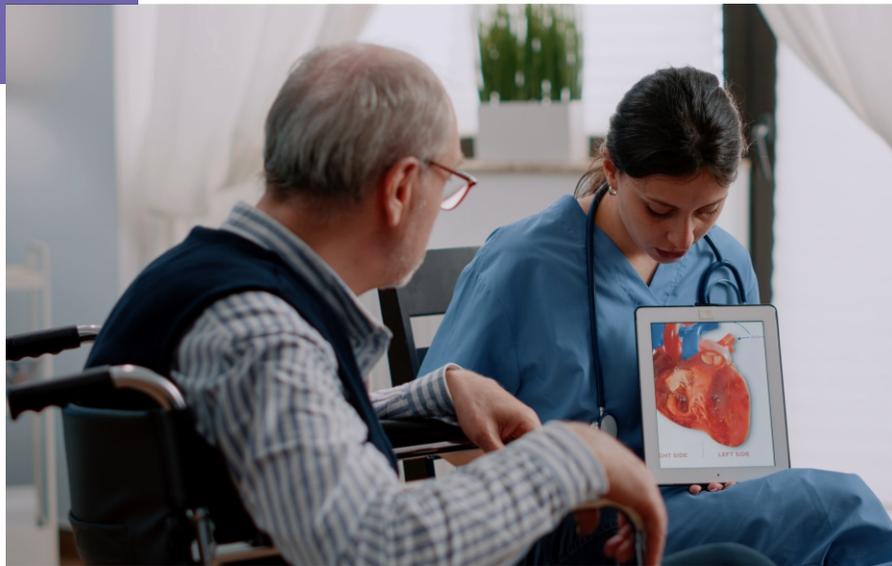
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Transcatheter Aortic Valve Implantation (TAVI)



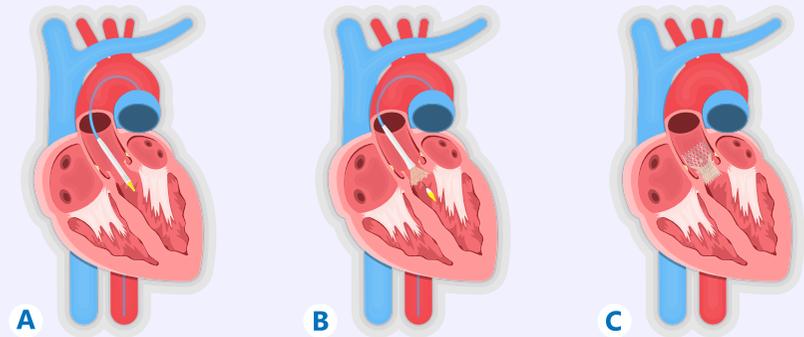
What is Aortic Stenosis?

The aortic valve is the heart valve which directs the flow of blood through the heart and on to the rest of the body. Aortic stenosis is when the valve becomes thickened, hardened or inflamed. This may start as a result of infection, rheumatic fever or a congenital abnormality. In older people the valve can become calcified with time. This causes restricted movement of the valve leaflets and ineffective blood flow to the body and the coronary arteries (the arteries which supply the heart with blood) may occur.

Because of this restricted blood flow, people may experience symptoms such as chest pain, fatigue, shortness of breath, light-headedness and fainting, fluid retention or reduced exercise capacity. It is important to acknowledge some people with aortic stenosis have no symptoms.

As the leaflets stiffen it becomes more difficult for blood to travel through the valve. To compensate, the heart muscle stretches and thickens eventually leading to heart failure. Once aortic stenosis is severe and symptoms develop, it is life threatening.

Treatment options depend on each individual but can include balloon valvuloplasty, TAVI or open-heart surgery. No medical therapy exists to fix aortic stenosis, but there are medications which can reduce the symptoms.



A Balloon catheter is inserted through aorta and into heart valve

B Transcatheter valve placed into position over the diseased aortic valve

C Transcatheter valve in place, procedure completed

What does TAVI mean?

TAVI stands for Transcatheter Aortic Valve Implantation. Instead of open-heart surgery, where the valve is removed and replaced, TAVI means replacing the native valve without removing it using a catheter threaded up the artery loaded with a stented valve that sits on top of the diseased valve.

What is the difference between TAVI and open-heart surgery?

With conventional surgery the chest is cut through skin, tissue and the breast bone, the heart is stopped. The aorta is opened and the native valve is removed, a new valve is inserted and all the while the bypass machine oxygenates the body while the heart is being operated on.

TAVI is a less invasive way of replacing the valve for people deemed high risk for open heart surgery. Instead of cutting through the breast bone as in open heart surgery, the valve is advanced via a transcatheter approach. This means the valve is delivered in a catheter (hollow tube) while compressed and then taken through a small incision or cut into the blood vessel, usually the femoral artery, and guided up to the heart.

With fluoroscopy and echocardiogram (ECHO) guidance the new valve is placed on top of the native valve. The aim of the procedure is to replace the valve without lengthy deep anaesthesia and the subsequent long recovery time.



Assessments prior to TAVI

A complete evaluation will be necessary which will include but not limited to an ECHO, a coronary angiogram and Cardiac TAVI CT. These tests can run over a few days because it is safer to have a break between the coronary angiogram and the CT.

Echocardiogram or ECHO: It is an ultrasound of the heart. It illustrates the severity of the aortic stenosis and also the nature of stenosis.

Coronary angiography: It is where a catheter is inserted into the radial or femoral artery and x-rays are used to visualise the coronary arteries. This is done to ensure there is no significant artery disease which will need correcting before the TAVI procedure.

CT or Computerised Tomography: It is where iodine-rich contrast medium is injected and then images are taken while lying on a flat bed with a machine above. This scan is important to analyse the aortic valve and the structures surrounding it. Good imaging gives a clear understanding of any obstacles to a safe TAVI procedure. It also helps with sizing to ensure the correct valve are used. This contrast medium is the same as that used for a coronary angiogram. It can be damaging to kidneys if there is already impaired kidney function.

Lung Function Tests: These are sometimes done if there is a suspicious respiratory disease which is contributing to the symptoms.

TAVI procedure

The procedure takes place in the Hybrid theatre or Coronary Catheter Lab, which is a state-of-the-art facility designed in a manner that any eventuality during the procedure can be catered for. Consumption of aspirin or clopidogrel need not to be stopped prior to a TAVI unless otherwise directed by a doctor. Stronger anti-coagulants may need to be stopped. Some diabetes medication including insulin requires stopping prior to the procedure. The anaesthetist or interventionist will discuss these prior to the procedure being performed.

A catheter will be inserted in the neck and an arterial line in the wrist, before going into the cardiac catheter lab. These are used to give fluids and drugs quickly and measure output of fluids. They will be removed afterwards, usually the next day.

A small hole in the femoral artery is made when a transfemoral approach is used. This is at the top of the leg. A catheter is inserted into the artery. The new valve is carefully compressed and taken up by the catheter and inserted on top of the native valve using a special delivery device. A temporary pacing wire is used to reduce the motion and blood pressure of the heart, making insertion of valve easier. The access point is most often in the right groin artery. There will be waterproof dressings on these incision sites and the nurses will monitor the sites to ensure the small incision sites are healing well. The possible complications here can be an external or internal bleed; presenting as a haematoma. To encourage proper wound healing, laying supine for at least 4 hours after the procedure is essential. Ideal placement of the new valve is determined by angiography and echocardiography. Once the valve is functioning appropriately the catheter is removed. The groin puncture site is then closed. The entire procedure takes about one hour.

After the procedure, the patient will be shifted to the Intensive Care Unit for close monitoring, for one night and then to the cardiac ward the following day. While on the cardiac ward a portable telemetry cardiac monitor will be used to check the heart's rhythm. After the procedure more blood tests, a chest x-ray, ECG and an echocardiogram will be performed to assess recovery.

Post discharge from the hospital, a list of medications will be given and required appointments will be outlined for subsequent visits.

