

## **Transcatheter Aortic Valve Implementation**

### **Aortic Stenosis**

Aortic stenosis is the most prevalent heart valve disease in the western world.

About 120 patients a year present at Waikato Hospital with Aortic Stenosis. This is a condition where the main outflow valve from the heart thickens and does not open fully. As all the blood leaving the heart has to go through this valve, severe narrowing of the valve causes restricted blood flow to the rest of the body.

Restricted blood flow puts a strain on the heart and eventually causes breathlessness, chest pain, blackouts, and heart failure.

A normal valve opens to around 2.5 centimetres in diameter (about the size of a two-dollar coin). A valve affected by aortic stenosis opens less than half that size: one centimetre in diameter.

Once they notice symptoms, about 50 per cent of patients with aortic stenosis will die within two years. In comparison, 50 per cent of cancer patients will die within five years.

### **Cause**

Aortic stenosis can occur if someone is born with mildly abnormal aortic valve and over 40 to 50 years the body tries to heal the abnormality. This healing causes scar tissue and calcium deposits to build up and distort the valve, causing it to narrow.

Aortic stenosis can also occur with age and from general wear and tear on the valve.

### **Treatment**

#### **Conventional – Open-heart surgery**

If a patient has aortic stenosis, but no symptoms, treatment is not necessary because the risk of undergoing surgery is higher than the risk of a patient dying without surgery.

Once a patient has symptoms of aortic stenosis, open-heart surgery is the traditional option. Open-heart surgery requires a general anaesthetic, major surgery, and months of recovery.

Only about 50% of patients with symptoms from their aortic stenosis are suitable for open-heart surgery. The other 50% of patients have medical conditions that make it too dangerous to perform this type of surgery on them.

For this 50 per cent, there has been no treatment option available and they face disabling symptoms and frequent hospital admissions.

### **Cutting edge – Transcatheter Aortic Valve Replacement**

The latest development in the treatment of aortic stenosis is the transcatheter aortic valve implementation; open-heart surgery is not necessary.

Replacement of the valve is via the leg, and involves inserting a new valve inside the old aortic valve. The patient only requires a local anaesthetic, and the recovery time is much shorter than for open-heart surgery.

Firstly, the surgeon puts a thin tube (catheter) into an artery in the patient's thigh then threads a fine wire through the tube and across the aortic valve. A balloon passes over the wire and positioned across the narrowed valve. Inflation of the balloon occurs under very high pressure in order to open up the narrowed valve. This is a balloon valvuloplasty

Secondly, the surgeon places the made-to-measure, self-expanding CoreValve into position.

Thirdly, the surgeon carefully releases the CoreValve into position inside the old aortic valve. The self-expanding nature of the Core Valve holds the new valve in position against the inside of the aorta and the old aortic valve. The body covers the metal struts of the valve with tissue over the next few weeks.

### **Waikato Hospital**

Only about 2000 transcatheter aortic valve implantations have occurred worldwide. All of these operations have been in the northern hemisphere.

The technology is now available in Australia and New Zealand and Waikato Hospital is the first public hospital in New Zealand to perform the procedure.

Dr. Sanjeevan Pasupati and Dr Gerry Devlin, cardiologists, will be performing the procedures under the supervision of Dr. Jean-Claude Laborde, one of the inventors of the CoreValve.

Undertaking this pilot programme ensures that this technology is available for public hospitals in New Zealand. An application for government funding for the programme to continue in the 2009/10 year is in the planning stages.

Conventional aortic valve replacement by open-heart surgery has stood the test of time and remains the procedure of choice. Routine open-heart aortic valve replacement has a mortality of less than 3%. The mortality for transcatheter aortic valve replacement is 4-6%, so only patients considered very high risk for conventional surgery will have this new procedure. As we gain experience and technology improves, we hope that the Transcatheter procedure will become more widely available in the future.

## **Team involved**

### *Dr Sanjeevan Pasupati*

Dr Pasupati is a New Zealand graduate who undertook post-fellowship work in Canada where he learnt the new technique of percutaneous aortic valve replacement. He is one of only of a few cardiologists in the world with experience in this procedure.

### *Dr Gerry Devlin*

Dr Devlin has been a cardiologist at Waikato Hospital for 13 years. He is now the Clinical Director of Cardiology / Heart and Lung services.

### *Dr Jean-Claude Laborde*

Dr Laborde, from Toulouse, France, is one of the inventors of the CoreValve. He provided clinical and technical support for the first few transcatheter aortic valve implantations at Waikato Hospital.

Performance of these procedures would not have been possible without the support of a wide range of Waikato Hospital departments including, anaesthetists, technicians, cardiac surgeons, echocardiographers, and nurses.

## **Waikato Heart Trust**

In 30 years, Waikato Hospital has gone from having one of the least developed cardiac services, to being one of the leading cardiac centres in New Zealand.

In a unique partnership with the Waikato District Health Board, the Waikato Heart Trust has played an important role in this transformation by providing \$2.3 million for the development of state-of-the-art cardiac services at Waikato Hospital.

Waikato Heart Trust funding is about generating future capabilities and tapping into new technologies for the provision of innovative cardiac services at Waikato Hospital – often before securing government funding.

“The Trust sees itself as acting in the best interests of the community and is prepared to take chances that a government funded organisation could not take, and [it is able to] act within restricted time frames,” said George Vickers, Chairman, Waikato Heart Trust.

The transcatheter aortic valve implantation programme is an example of the Waikato Heart Trust’s contribution to cardiac services. The trust is contributing

\$300,000-\$400,000 to cover the cost of the valves for the procedures so we can secure this technology for public hospitals in New Zealand.

The Waikato Heart Trust promised to provide support for the transcatheter aortic valve implantation procedure, making the appointment of Dr Sanjeevan Pasupati possible.

“We face intense international competition for highly skilled health professionals. We cannot compete internationally on salaries, but knowing I have the backing of the Waikato Heart Trust, I can assure prospective employees that we will be able to provide the cutting edge equipment that they need to ply their trade,” said Dr Clyde Wade, Head of Medicine, Waikato Hospital and Chairman of the Scientific Committee, Waikato Heart Trust.

Once we prove the feasibility of this technology in New Zealand, the Waikato DHB will apply for government funding for 2009/10.

The Waikato Heart Trust is a charitable trust established in 1976.

For more information about the trust or the procedure, please visit [www.waikatohearttrust.org.nz](http://www.waikatohearttrust.org.nz)