



TRANSCATHER AORTIC VALVE REPLACEMENT (TAVR)

Just within the last several years, new technology has become available to help people with aortic heart valve disease, referred to as aortic stenosis. Previously, the only option for these patients was open heart surgery. There is renewed interest, now that there are other options for treatment.

The aortic valve opens to let blood flow through three very flexible, tissue paper-like leaflets. When the valve becomes calcified it does not open properly and pressure builds up within the heart. This can cause chest pain or fluid to accumulate in the lungs making it hard to breathe and causing heart failure. When it becomes critically narrowed it can cause dizziness and passing out spells.

A lot of people do not know they have aortic stenosis, as there can be no symptoms for many years. Once symptoms develop, however, symptoms progress rapidly and the chance of dying from the problem increases dramatically.

How can you tell if you have aortic stenosis? With a stethoscope, a cardiologist is able to easily hear a murmur. This is like when you hold your thumb over a garden hose. In the same way, the cardiologist hears blood going through the narrowed opening. He/she can tell how mild or severe the narrowing is just by listening. This alerts the cardiologist to the possibility there might be a problem with the valve.

The next step in diagnosis is an echocardiogram, which is an ultrasound of the heart, where sound waves are bounced off the heart to produce a picture. The picture can show calcium on the valve, which shows up as a bright white color. The echo also measures the speed of blood flow, which helps determine how severely narrowed the valve is.

Another way to diagnose aortic stenosis is by placing a catheter inside the heart and measuring the pressure difference between the heart and the artery that the heart pumps blood into.

How is aortic stenosis treated? Medications can help with symptoms but do not change the progression of the problem. It is a mechanical problem and requires a mechanical solution.

There is a good chance of survival, if the valve is replaced. If it is not treated, the chances of dying increase dramatically.

For years, surgical valve replacement was the only treatment. During surgery, a cardiothoracic surgeon opens the chest through the breast bone, stops the heart and removes the old valve and replaces it with a new valve by sewing it in place. Many older

patients have difficulty getting through the surgery and it is often not even attempted due to the high risk of dying from the procedure.

Now, there is a procedure available. A specially trained cardiologist takes the same replacement valve and puts it on a catheter, passing it from the leg or through a small incision in the chest across the old valve and puts it inside the diseased valve. This is called a TAVI procedure. It stands for Transcatheter Aortic Valve Implantation. A valve, from a cow's heart, is used. The valve is sewn into a wire mesh, like a stent. The new valve crushes the old valve out of the way and the stainless steel mesh holds it in place supported by the calcium of the old valve.

What makes patients good TAVR (Transcatheter Aortic Valve Replacement) candidates? Patients who are high risk for an open surgical procedure, which is usually determined by the STS score. (An STS score above 8%, predicts a very high risk of dying from an open surgery); chest tissue scarred due to radiation to the chest; "porcelain" aorta (calcium in the aorta, so if clamped during surgery, calcium would break off, potentially resulting in a stroke); or frail people who would have trouble getting through the surgery are all potential candidates for TAVI.

Patient screening, for the procedure, includes an echocardiogram, a consultation with a specially trained cardiologist and cardiothoracic surgeon, a CTA scan of the chest, abdomen and pelvis (to make sure the arteries are big enough for the catheter), and a cardiac catheterization. All blocked heart arteries are fixed with balloons and stents prior to undergoing the TAVI procedure.

The procedure was performed for over six years through research trials. The trial results were exciting showing a reduction in death from any cause, less chance of hospital admission, as well as, reduction in symptoms, which was often dramatic. It is approved by the Food and Drug Administration to be done in specially trained centers.

Complications, of the procedure are comparable with open heart surgery such as atrial fibrillation, needing a pacemaker, vascular complications, stroke, bleeding, and death, although the TAVR valve resulted in a 23.7% reduction in the risk of dying from any cause.

This is an exciting time for patients with aortic stenosis. TAVI procedure will continue to improve in the next few years with more valve sizes, smaller catheters for access to the aorta and additional types of valves, improving on current designs, which will allow lower risk and younger patients to be treated for this debilitating and often life threatening condition.

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