Information for Patients & Families

Aortic Valve Repair Surgery

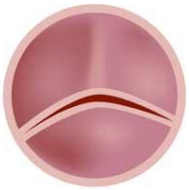
This information leaflet has been written to help you understand more about surgery to repair the aortic valve. It will give you general information about the operation, its benefits and how it compares to alternatives procedures. We hope this answers some of the questions or concerns you may have. It is not intended to replace talking with medical or nursing staff. Further details, including the risks and benefits involved in the surgery will be discussed in full during the consent process.

What is the aortic valve?

The heart is divided into a left and a right side with two heart valves on each side. Their purpose is to prevent the backflow of blood through the heart as it pumps the blood forward through the circulation. The aortic valve sits on the left side of the heart and guards the outlet of the main pumping chamber of the heart, which is the left ventricle. When the heart pumps, blood flows out through the aortic valve into the main blood vessel in the body, the aorta, which supplies blood to all the organs.

The aortic valve is made up of three leaflets that meet in the centre of the valve when the valve closes. Although the majority of the population will have an aortic valve with three leaflets (a trileaflet valve), approximately 2% of people will have two leaflets that close together otherwise known as a bicuspid aortic valve (see diagram below). This is a congenital variation which means people with this sort of valve will have been born with it. People with a bicuspid aortic valve may develop problems with their aortic valve at a younger age than people with a trileaflet valve however, this is highly variable.

Normal tricuspid valve



Bicuspid aortic valve

The aortic valve sits within the first part of the aorta called the aortic root. This provides structural support to the valve leaflets as they open and close. The two coronary arteries (the blood supply to the heart) arise from bulging areas in the aortic root called the aortic sinuses very close to the valve.

Problems related to the function of the aortic valve may arise from irregularities involving the leaflet tissue, enlargement of aortic root that supports the valve leaflets or a combination of both. These problems can result in either valve narrowing (stenosis) or a valve leak (regurgitation).

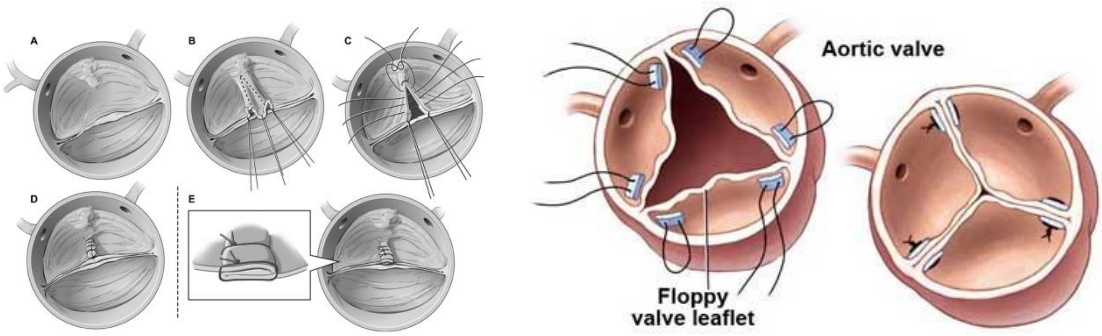
Why might the aortic valve need intervention/surgery?

If the valve narrowing or leak becomes severe enough to cause symptoms or have an impact on the strength or the size of the heart muscle, then intervention/surgery on the aortic valve may be necessary. The commonest procedure currently is valve replacement with an artificial prosthesis. Valves that are suitable for valve repair are more often leaking rather than narrowed valves. People may be monitored for many years with leaking valves before they reach the verge at which corrective surgery becomes beneficial. People can develop leaky aortic valves for many reasons but it can be associated with an enlargement of the aortic root, otherwise known as an aneurysm. In these cases the aortic valve can be repaired in together with a replacement of the aneurysmal area of the aorta in a slightly more extensive procedure called a valve sparing aortic root replacement. If this is the case, your surgeon will discuss this with you in more detail.

What is an aortic valve repair?

An aortic valve repair is a surgical technique to correct diseased areas of the aortic valve and restore normal function, maintaining a patient's own native tissues. In general this involves reinforcing the leaflets of the aortic valve with sutures and occasionally supporting the aortic root from the outside using sutures, artificial patches or rings.

An aortic valve repair means that a patient will retain their own aortic valve and this is where it differs from a valve replacement.



Examples of valve repair

Can all aortic valves be repaired?

Not all diseased aortic valves are suitable for repair as this depends on the condition of the valve leaflet. Valves that are very narrowed and thickened with heavy calcium deposits, such as those that we see in aortic stenosis are not possible to repair because the leaflets are irretrievably damaged. Equally leaky valves that have very thin fragile leaflets which may tear despite support with sutures or patches may also be unsuitable for repair.

It is for this reason that it is sometimes difficult to completely predict whether a valve will be repairable until the surgeon is able to review by the naked eye in the operating theatre. If the valve is unsuitable for a repair or if the repair fails then the surgeon will proceed directly with a valve replacement. This is why it is important for us to discuss with you before your operation, what your preferred valve replacement would be in the event that we are unable to perform a successful repair.

Is an aortic valve repair better than having a valve replacement?

Aortic valve replacements are an excellent solution in many patients with aortic valve disease. There are two main sorts of replacement heart valve; mechanical and tissue but there is a degree of compromise associated with each. These include the requirement for a lifetime of blood thinning medication (warfarin) for *mechanical valves* versus the life-span or

amount of time the valve lasts for with *tissue valves* and as a result of this the potential for further operations down the line. Aortic valve repair provides a third option that can offer the best of both worlds.

Tissue valve and mechanical valve

Tissue aortic valve replacements are made of animal tissue (usually cow or pig tissue) and are also known as bioprosthetic valves. If a patient has a tissue valve replacement they will need to be on aspirin (or alternative) for life as this will help prevent small clots forming in and around the valve. Mechanical valves are made of metal and carbon and because blood clots can form more easily on these valves that could potentially block the metal mechanism or cause a stroke, these valve replacements require lifelong warfarin.

However, mechanical valves do not wear out and tissue valves do. The older the patient at the time of valve replacement, the longer a tissue valve will last for example, a tissue valve in a 70 year old may last twenty years but the same valve in a 40 year old may last a maximum of ten years. To avoid repeated operations in younger patients mechanical valves have traditionally been the preferred option in this age group. However, the warfarin requirement in this instance may conflict with plans for pregnancy in women and cause lifestyle or occupational adjustments in all patients. There is also an increased risk of bleeding episodes with Warfarin.

The main benefit of aortic valve repair is in the patient population aged less than 60 in whom the decision between committing to lifelong warfarin versus almost guaranteed reoperation is most pressing.

In patients who are suitable for aortic valve repair there is no need for blood thinning medication (anticoagulation). Patients do need to take aspirin for a minimum of three months postoperatively. There is no requirement for long term anticoagulation unless it is for a co-existing condition. In this younger age group we know that the likelihood of needing a repeat aortic valve operation following aortic valve repair within the following 10 years is 10% (1 in 10 people) in comparison to 70% (7 in 10 people) if they selected a tissue valve.

Despite their robust construction mechanical valves are not entirely without a risk of reoperation either. This can be due to infection of the valve (which can happen to any artificial medical device), tissue growth around the valve or clot formation. The likelihood of this within a 10 year period equals that of valve repair at 10%.

Of all the aortic valve operations listed above aortic repair is the newest technique. Valve replacements have a long history of success and we know are very good solutions in people who would otherwise have life-limiting aortic valve disease. However, in those suitable for valve repair longevity over at least a ten year period matches that of mechanical replacements without the need for warfarin therapy.

Is aortic valve repair safe?

Aortic valve repair procedures are safe. In all the widely published series as well as in this hospital, they have similar risks of death or major ill-health/complications.

This type of operation is, however, longer and more technical to perform than the standard valve replacement and do carry the risk of needing to convert to a valve replacement at the end of the operation, if the repair is not deemed successful. For this reason and as mentioned earlier this type of procedure may not be suitable for everyone.

With good case selection, and anticipation of which valves repair is likely to be successful in, this risk of conversion is reduced. With careful consideration and discussion with your surgeon of which valve repair is likely to be successful for you, the risk of requiring a replacement is reduced. The length of the procedure does not seem to impact on the results of surgery either short or long-term. Following these procedures, you will be followed up on a long term basis to ensure the valve repair is durable and holding over time.

If you have any further questions, please do not hesitate in asking your doctor or nurse specialist.

V1 – May 2019

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