

**Transcatheter Mitral Valve Edge-to-Edge
Repair – TEER
Key-hole approach to repair heart valve
(without open heart surgery)**



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Introduction

What is mitral valve disease?

You have been diagnosed with mitral valve disease by your doctor.

This information will help you to understand your condition and treatment options available, in particular a heart valve repair procedure known as TEER (transcatheter mitral valve edge-to-edge repair).

We also hope that this information is useful for your family and/or carers to understand your condition so that they can support you before and after any procedures that take place. It will also explain some of the aims, benefits, risks and alternatives to this procedure and your choices so that you can be involved in making any decisions.

Mitral valve problems can either involve narrowing of the valve (mitral stenosis) or leaking of the valve (mitral regurgitation).

Mitral stenosis can present in young patients after bacterial infection of the heart or in elderly patients due to deposition of calcium on the mitral valve.

Mitral regurgitation can either be due to age related valve degeneration, secondary to bacterial infection, or a problem with the heart muscles.

Due to these valve conditions, the heart must work harder to pump the same amount of blood, so the work for the ventricle (pumping chamber) increases. As a result, the chambers of the heart enlarge and over time the heart muscle weakens. This affects your overall health and may stop you from taking part in your normal daily activities. Without treatment, mitral valve problems are a very serious, life-threatening condition, leading to heart failure and risk of sudden cardiac death.

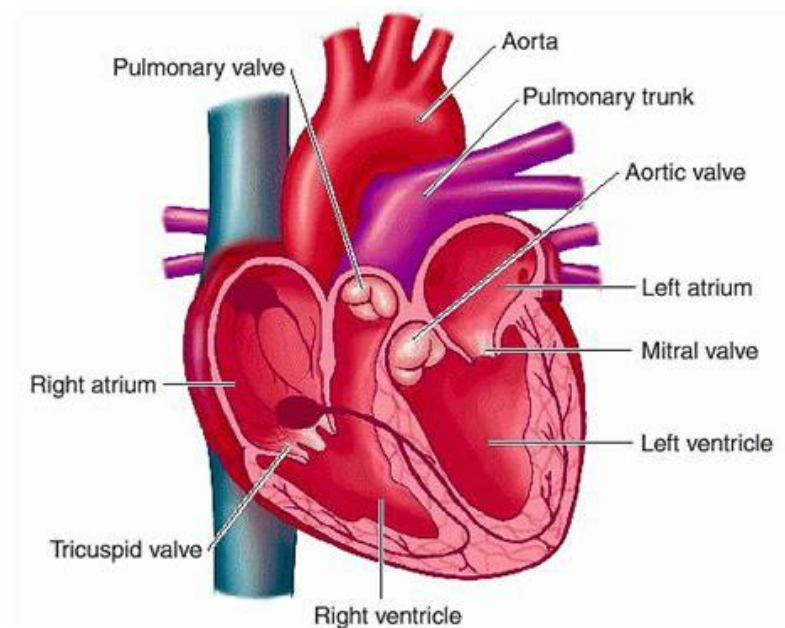
Signs and symptoms of mitral valve problems

These can include:

- Shortness of breath
- Swollen feet
- Irregular heartbeat (palpitations)
- Difficulty in exercising.
- Unusual sound heard during a heartbeat (murmur)

How the heart works

A normal heart has four chambers. The upper two chambers are the right and left atria. The lower two chambers are the right and left ventricles. The heart's job is to supply the body with oxygen-rich blood. Blood is pumped through the four chambers with the help of four heart valves; the tricuspid, pulmonary, **mitral** and aortic valves.



The mitral valve separates the upper left heart chamber (left atrium) from the lower left heart chamber (left ventricle). The mitral valve has two flaps, called leaflets. The leaflets open to let the blood flow into the left ventricle, and close to stop blood flowing backwards to the left atrium.

Mitral regurgitation: when the leaflets do not close properly, with every heartbeat blood may leak in reverse direction towards left atrium.

Mitral stenosis: when the leaflets do not open normally, blood may not flow normally towards left ventricle, increasing back pressure in the arteries of the lungs.

What are the possible treatment options for mitral valve disease?

Having an artificial (biological or mechanical) valve is the traditional treatment for patients with severe mitral valve disease who are fit enough for surgery. This is known as Surgical Mitral Valve Replacement, or SMVR, and involves making a large cut in your chest bone to access your heart.

Up until recently, if you are not fit enough for surgery, your treatment options would have been focused on helping to manage your symptoms only through medications. Example of this would be taking medicine to help you urinate more which can reduce breathlessness, and medicines to prevent the size of your heart getting bigger.

Medicines may help control your symptoms for a period of time. Symptoms may not be apparent immediately because the heart will compensate for the extra volume caused by the leaking valve. But, ultimately, the extra strain on the heart will result in becoming weaker. Without valve treatment, mitral valve disease could worsen to a more serious condition.

It is important to talk to your doctor about the effects of not having the procedure

Depending on your individual health needs, some centres across United Kingdom can now offer patients who are not suitable for traditional surgery keyhole valve procedure called:

- **Transcatheter Mitral Valve Edge-to-Edge Repair (TEER) in case of leaky mitral valve (mitral regurgitation)**

What is transcatheter mitral valve edge-to-edge repair (TEER)?

You may be suitable for another form of valve repair, one which does not require open heart surgery. This is Transcatheter Mitral Valve Edge-to-Edge Repair (TEER) The valve is repaired *percutaneously* (“through the skin”) via the groin using a catheter (*thin flexible tube*). On the top end of this tube, a clip is attached which holds the leaflets together in the abnormal area of the valve and holds it together to abolish the leak or mitral regurgitation. This method does not require the breastbone to be cut or open heart surgery to be performed.

At the moment this type of treatment is only appropriate for certain patients.

Benefits of TEER procedure

This procedure should reduce your mitral regurgitation, so improving the symptoms of heart failure and reducing shortness of breath.

70% (7 out of 10) find their symptoms get better after TEER procedure and they can get back to daily activities.

Risks of TEER procedure

No medical procedure is entirely without risk. It is important to remember, though, that your doctors would not have recommended having this procedure if they did not believe the potential risks were outweighed by the likely benefits to your health.

This procedure is considered if the doctors feel that traditional open-heart surgery would be high risk.

Serious complications are rare but you should be aware that the following complications have been reported:

- Damage to the valve with deterioration in mitral regurgitation 5%
- Collection of blood around the heart requiring drainage using a needle or surgery 3%
- Partial detachment of the device after implantation 5%
- Death 1%
- Stroke 1%
- Bleeding 5%. This is usually at the access site and can be managed by manual compression in most of the cases.
- Damage to the blood vessel requiring surgical repair 1%
- Abnormal heart rhythm: 5 in 100 (5%). This is usually treated with drugs but sometimes may require an electric shock to recover.
- Damage to teeth, throat and oesophagus: During the procedure, the doctor will put another flexible tube (a probe) down your throat into your swallowing tube (oesophagus). This is called transesophageal echocardiogram (TOE), which enables the cardiologist to perform the TEER procedure. Inserting this probe, can damage your teeth, throat, and oesophagus. The risk of this happening is 1 in 1000 (0.1%)

What will happen before the procedure?

Preparing for any mitral valve procedure requires a series of hospital tests that are essential to make sure that your mitral valve problems will benefit from this procedure. The tests also check that it would be a safe procedure for you.

What tests will be needed:

- ECG to check your heart rhythm
- Transthoracic echocardiogram (TTE) - externally looking at your heart with ultrasound
- Transoesophageal echocardiogram (TOE) - a more detailed ultrasound of your heart

- Coronary angiogram to look at the coronary arteries that supply blood to your heart
- Lung function test – to see how well your lungs are working

What can I do to improve my health before TEER procedure?

Stop smoking

If you smoke, you should try to stop completely or at least for several weeks before your treatment. This reduces the risk of breathing problems and makes your anaesthetic safer. The sooner you stop smoking, the more it will reduce your risk. There is plenty of support available to help you give up for good.

Please talk to your GP, pharmacist or call SMOKEFREE on 0800 0224 332

Controlling your weight

If you are overweight, losing weight before your treatment will reduce many of the risks when having an anaesthetic.

Visit your GP

If you have any ongoing medical problems such as diabetes, asthma, bronchitis, thyroid problems, or high blood pressure (hypertension), you should ask your GP if you need a check-up.

Dental care

It is essential to maintain healthy gums and teeth especially if you have heart valve disease. This is to reduce the risk of dangerous infection of the heart valves, known as endocarditis.

It is important that you have dental checks before your heart valve procedure. It may be recommended that dental treatment is necessary, and this may need to be carried out before the TEER is performed.

Please register to a dental practice if you do not see a dentist regularly.

If you are unable to find dental practice accepting NHS patients, you should call NHS England's Customer Contact Centre on **0300 311 2233**.

Valve MDT Meeting

Your case will be discussed in a multi-disciplinary team (MDT) meeting made up of relevant valve specialists, including consultant cardiologists, consultant cardiac surgeons, imaging specialists, Heart valve nurse specialists, and sometimes anaesthetists.

We will analyse all of the data and information to make an informed decision about the best management and treatment option for your condition.

Pre-assessment Visit

Once accepted by the team for mitral valve procedure, you will be invited to attend a pre-admission clinic where the details of your procedure preparation, admission process, care before, during and after your TEER will be discussed.

Usually, you will see the nurse during this visit. Occasionally, they find something about your general health if for example, have a cold, rash or infection that could increase the risks associated with anaesthetic or operation. It might then be better to delay your operation until the problem has been resolved and reviewed.

What will happen during the procedure?

Eating and drinking

It is important that your stomach is as empty as possible before the anaesthetic because if there is any food or liquid in your stomach during your anaesthetic, it could come up into the back of your throat and then go into your lungs. Usually, you must not eat anything at all for six hours before your procedure.

On the ward

An anaesthetist will visit you on the ward before the operation to discuss your anaesthetic. The anaesthetist needs to find out about your general health, previous experiences of anaesthesia, any medicines you are taking and any allergies you might have. If you have caps or crowns on your teeth, please tell the anaesthetist at this time, as these can occasionally be damaged during anaesthesia. This is a good time to talk about any previous experiences you have had with injections or in hospital, or any concerns you have.

In the cardiac catheterisation lab

The anaesthetist may prescribe a sedative, usually a tablet, to help you relax. This will be given by the nurses before you go for your procedure. You will then be taken to the cardiac catheterisation lab ("cath lab"). One of the nurses from the ward will come with you and stay with you until you are transferred into the care of the anaesthetist. When you arrive in the catheterisation lab, the anaesthetic assistant will check your details, and you will be transferred onto the operating table and moved into the anaesthetic room. Here, the anaesthetic assistant will attach you to a heart monitor and place a pulse and oxygen monitor on your finger.

The anaesthetist will then put a drip into a vein in your hand or arm, through which the anaesthetic can be given to send you to sleep and procedure. After this, you will receive some oxygen through a mask and the anaesthetist will start to give you the anaesthetic medication. Once you are anaesthetised, a tube will be placed in your windpipe so that the anaesthetist can support your breathing during the procedure and further drips will be put in place: some into veins in your arms, and some into veins in your neck. A catheter will be put into your bladder to drain urine during the procedure. All of this allows us to monitor you closely during the operation and to give you drugs and fluid.

Once you are asleep, a trans-oesophageal echo (TOE) probe will be passed into your oesophagus (also known as your gullet or “food pipe”). A TOE is a special type of ultrasound that uses sound waves to take very clear pictures of the heart. This allows your cardiologist to use TOE to guide the catheters into place in your heart.

First, a small incision (cut) in your groin is made and then, through the incision, insert a small tube. Through this tube a catheter is inserted. Using x-ray pictures, the catheter is guided into your heart. To access your mitral valve a small puncture is made in the interatrial septum, the thin wall between the 2 collecting chambers in the heart. Once the catheter is in place, the clip device is delivered into position to repair the leak of the mitral valve. Some patients may require more than one clip to adequately repair the valve.

Some patients need a blood transfusion during the procedure. You will need to inform the team if you have any objections to having a transfusion.

Because this is not open-heart surgery the nature of the repair is less detailed than a surgical procedure and does not result in a perfect repair. However, the clip holds the 2 edges of the mitral valve leaflets in position and reduces the extent of the leak. The result of the clip is a mitral valve with two openings instead of one with blood able to flow through both openings.

After your procedure

You will go from the catheter suite to the coronary care unit (CCU) where you will be closely monitored.

Normally you are woken up early after the operation.

Whilst there are tubes in your groin, you will have to be on bed rest.

Over the next 24 hours you will have your drips and sheath's (tubes) removed.

When these tubes are removed you can sit out and start to walk about.

You will be in hospital for 2 to 3 days depending on how quickly you recover.

Recovery at home

You should have someone to care for you for the first week after you leave hospital. Please speak to your nurse or doctor as soon as possible if you think this will be a problem.

The following are general guidelines as everyone's recovery is different.

Activity

You should avoid strenuous activity for 4 weeks. This includes heavy lifting (such as shopping, suitcases) or pushing and pulling (such as cutting grass, vacuum cleaning).

It is important for your recovery that you have a short walk every day. This can be gradually increased. You may feel tired and need to rest in the afternoon.

You do not have to avoid climbing stairs or walking up hill. You may have to start off at a slower pace and you may feel slightly out of breath when walking. This should improve as your fitness level increases.

You may notice that your ankles are swollen after the procedure. This is due to fluid retention. Please contact your GP if this swelling travels further than your ankles.

Wounds

Your wounds should be healed by the time you leave hospital. If they still require a dressing, we will organise a district or practice nurse to continue this.

The stitches are dissolvable so do not have to be removed. Please get your GP or practice nurse to check your wound if it becomes red or inflamed.

You may have bruising to your groin for a few weeks

You may have a hard lump under the skin due to a collection of blood (haematoma). Please talk to your GP if this becomes painful or grows bigger.

Please continue to shower every day. You can use liquid soap. It is safe to get your wound wet but avoid putting soap directly onto your wound or rubbing your wound before it has healed completely. It is important to keep this area dry between showers.

Medication

You will need to continue most of your medications, including anticoagulation. If not anticoagulated, you may need a short course of blood thinning tablets such as Aspirin or Clopidogrel.

You may be discharged with some painkillers and ideally you take regularly until you are no longer getting discomfort from your wound(s).

You can contact your GP or the cardiologist if you are confused regarding your medications.

Driving

The DVLA (Driving and vehicle Licensing Agency) guideline recommends that you do not drive for 4 weeks following your procedure. You will need to inform your insurance company that you have had your mitral valve repaired. If you have a LGV or PCV licence, you will need to have an exercise test before getting your licence back.

Air travel

Please check this with your consultant, nurse, or cardiac rehabilitation nurse. In most cases, you can travel by plane 7 days after your procedure. The clip device will not set off metal detectors at airports.

Work

If you were working before your procedure, you should be able to return to work after about 4 weeks.

Cardiac rehabilitation

Cardiac rehabilitation is a programme of graduated exercise and general health discussions. You will be referred to this service and will depend on whether your local community cardiac team offers this.

Follow-up care

You will have a follow up appointment after your TEER and the valve team will advise you on this before discharge. The team will also decide on future follow ups.