Section 2 Your heart operation

Main types of heart surgery

Coronary artery bypass grafting (CABG) is the most common type of heart surgery. There are various types of heart valve surgery and also other heart surgery including surgery to correct congenital heart diseases (heart conditions you are born with) and surgery for conditions of the aorta (within the chest).

Most heart operations are done using the traditional heart surgery technique which involves cutting your breastbone (median sternotomy).

Sometimes, alternative approaches may be considered by your surgeon. Your surgeon will advise and recommend what is in your best interests. Partial breastbone (mini-sternotomy) or other minimal access techniques may or may not be appropriate.

The lifestyle advice in this booklet is mainly aimed at patients having CABG surgery as a treatment for CHD. However the general activity advice applies to all patients having heart surgery.

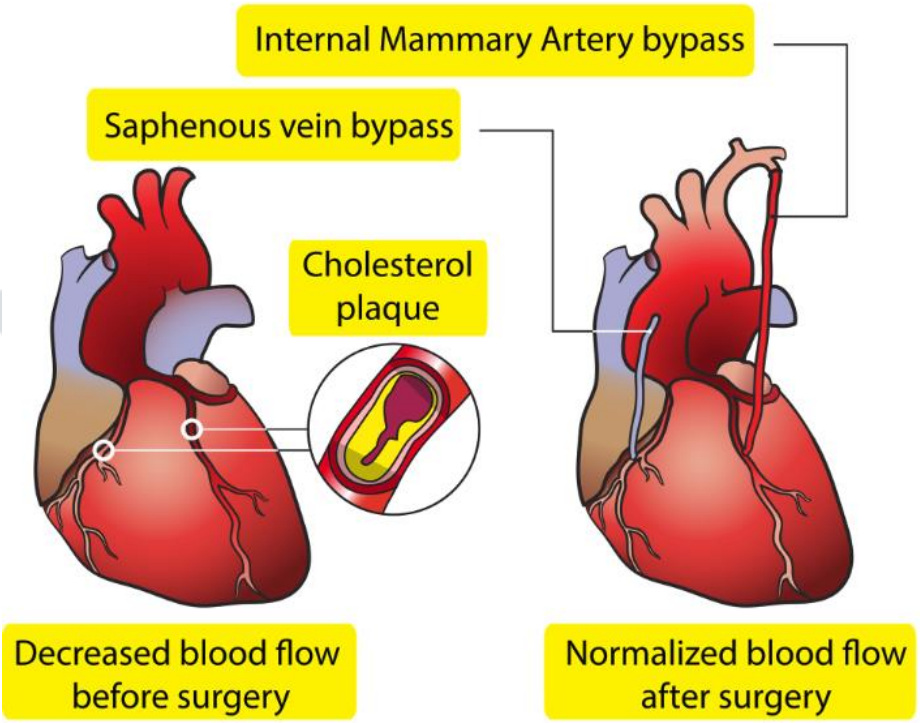
Coronary Artery Bypass grafting

The purpose of coronary artery bypass grafting is to improve the blood flow to the heart muscle by bypassing the narrowed, damaged sections of the coronary arteries. The surgeon does this by attaching a piece of healthy artery or vein from another part of the body (usually from the chest, leg or arm) and attaching it to the coronary artery above and below the narrowed area or blockage. This new blood vessel is called a bypass graft. This operation can take between three and six hours depending on the number of grafts you need. This depends on how severe your CHD is and how many coronary blood vessels need to be bypassed.

The coronary angiogram is a ‘roadmap’ that gives the surgeon the initial information regarding the severity of CHD. However, it is not the full picture - the final number of grafts performed is based on the findings at the actual time of the operation.

The internal mammary artery, an artery inside the chest wall, is used as a bypass graft for the main branch of the left coronary artery whenever possible, as its life span is proven to be longer than that of a vein graft. Your doctor, physiotherapist, or nurse will tell you if the internal mammary artery (IMA) was used for your operation. In some instances, however, it is preferable to only use vein grafts, for example, in emergency surgery when time is important (removal of the internal mammary artery is a longer procedure). In very rare cases, the internal mammary artery may have disease from where it originates and may then not be used as a bypass graft.

Coronary Artery Bypass Grafting



Part of a vein (the long saphenous vein) taken from the leg is used for your bypass graft which means you will have a leg wound. The position and length of the wound depends upon where a suitable vein is located. Please refer to the 'Vein Harvesting' patient information leaflet that you would have been given at your pre-op clinic appointment.

Occasionally your surgeon will choose to use the radial artery in the arm as a graft. In this case, the incision is in the forearm, from elbow to wrist.

There are two ways CABG surgery may be performed.

Most commonly, surgery is performed after placing the patient on a heart-lung bypass machine and stopping the heart.

Alternatively, 'beating heart' surgery may be considered in specific circumstances. In this case, the heart-lung machine is not used and the heart is not stopped to undertake the grafts.

Your surgeon will decide on the most appropriate technique.

Before you come into hospital

Out-patient clinic appointment

At your out-patient clinic appointment you will meet your surgical team. The surgeon will discuss:

- The results of any investigations/tests you have had including the angiogram showing any blockages or narrowing that may be responsible for your symptoms.
- Your operation, risks and expected benefits as well as alternatives for you as an individual.

In some cases at your out-patient appointment, a member of your surgical team will ask you to sign a written consent form for the operation to be carried out. If you have any questions, please talk to the doctor before you sign the consent form. Otherwise consent will be signed later at your pre-admission visit or on admission for your operation.

What are the benefits, risks and complications of CABG surgery?

The benefits of CABG surgery vary for each person. They may include:

- Reduction in angina and/or breathlessness
- Reduction in the amount of medication you need to take
- Improvement in your quality of life
- Reduction of the risk of future heart attacks
- Increased chance of you living longer

Patients should be aware that shortness of breath is not always due to heart disease. Lung conditions or obesity may contribute to this symptom. After surgery, it is usual to be breathless on exertion in the first few months due to the stiffness of the lungs and chest wall, but this can improve with regular walking and exercise. If there are other underlying conditions responsible for breathlessness, it is important to appreciate that shortness of breath may not improve following your operation. However, your operation may be justified for other reasons.

You will have a chance to discuss your individual risk and the possibility of complications with your surgeon. CABG surgery, like any other surgery, carries a risk of complications. The risk of complications varies for each person. Your surgeon will take the following factors into account when assessing your individual risk.

- The extent or severity of your heart disease and the condition of your heart pump (function).
- Your age and gender.
- Whether you are having additional surgery at the time of your CABG.
- Whether you have diabetes, lung problems, kidney damage or any significant problems with the circulation to your brain or legs.
- The urgency of the operation.
- Your weight.
- Whether you are a smoker and/or a heavy drinker.

Possible complications:

- **Bleeding**. You may need to be taken back to theatre to treat excessive bleeding.

- **Infection**. Infection of your wounds (chest, leg or arm), or the lungs, will be treated with appropriate antibiotics. Recent smokers, obese patients, patients with chronic lung conditions, patients who are on steroids or are immunosuppressed, and critically ill patients are at increased risk of infections. Reduction in the risk of infection is achieved by early mobilisation and breathing exercises. Motivation to recover quickly is a key factor.

- **Heart rhythm changes**.

  Atrial fibrillation. It is common to develop irregular heart rhythms after heart surgery during the early recovery phase. The most common irregular heart beat is called atrial fibrillation. All patients are monitored for this rhythm change during their hospital stay. It affects approximately 1 in 5 patients and is usually temporary. This can be treated effectively with medication. Sometimes this medication is continued for six weeks and reviewed at the out-patient visit.
  On rare occasions during surgery the heart can suffer further damage especially in urgent or emergency surgical procedures when the heart muscle is vulnerable to further injury.

  Ventricular fibrillation. Life threatening heart rhythms are rare after surgery and may necessitate resuscitation and electrical shock treatment. These rhythm problems are more likely in patients with severely scarred hearts and following heart attacks.

Heart block. Some patients will require a permanent pacemaker if heart block is persistent after surgery. Heart block is more common after valve operations.

- **Prolonged critical care and hospital stay.** This may sometimes be due to single organ or multi-organ failure.

- **Impaired kidney function**. The stress of surgery can affect your kidney function particularly if your kidneys were compromised before surgery. Some patients will require kidney support in the form of a renal filtration or dialysis machine and in the majority of cases, this need for support is temporary.

- **Prolonged ventilation or re-ventilation and possible tracheostomy.** This may be necessary especially in obese patients, patients with poor lung function, or critically-ill patients requiring surgery.

- **Stroke.** Stroke can complicate any heart operation in spite of uneventful surgery, even when every precaution has been taken. Patients with CHD may also have narrowing of the arteries supplying the brain (carotid arteries). Plaques in the arteries can result in an embolic stroke where particles dislodge from the wall of the artery and travel into the bloodstream to block smaller vessels in the brain. Clots in the heart may also send particles in the bloodstream that block the arteries in the brain.

  The effects of a stroke may be temporary or permanent and the severity of the stroke may be mild or severe. The screening tests for stroke that we undertake including carotid Doppler ultrasound of the neck arteries and echocardiogram of the heart may sometimes identify issues that can be addressed to minimise the risk of stroke. Carotid Doppler studies are undertaken before surgery in selected patients.

- **Death**. The risk of dying after surgery is called the mortality risk. The surgeon will discuss your specific risks and the balance of risks and benefits that are factors for you as an individual when considering the recommendation for surgical or medical treatment.

What is heart valve disease?

Your heart has four valves. They ensure that blood is pumped in one direction only within the heart and towards the lungs and body. These valves can be damaged in many ways; for example be abnormal from birth, after rheumatic fever, from wear and tear or following a heart attack.

There are two main types of valve problem:

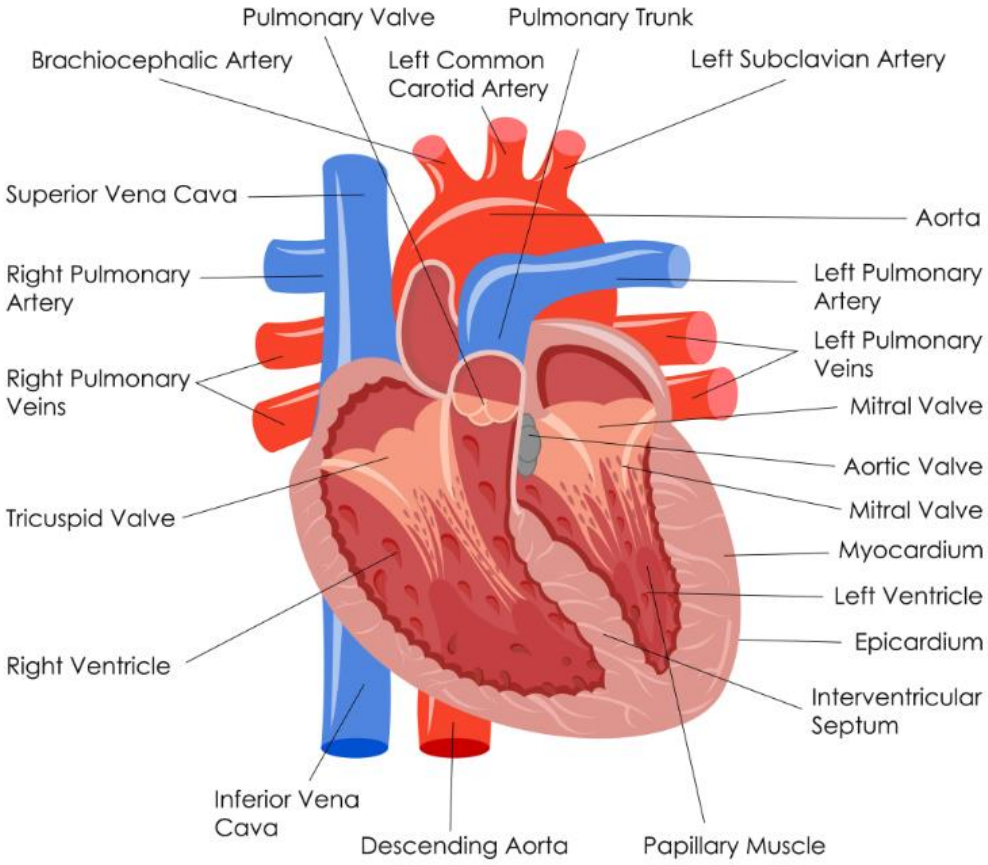
- The valve may become narrowed (called stenosis), which causes a block to normal blood flow within the heart.
- The valve may become leaky and allow blood to flow in the wrong direction (called regurgitation).

In both cases the heart has to work harder to maintain the forward flow of blood and eventually surgery may be necessary.

The drainage of blood from the lungs to the heart may be affected. This will result in a build-up of fluid on the lungs and cause breathlessness. The drainage of blood from the rest of the body to the heart may also be affected causing swollen ankles. Chest pain, palpitations and dizziness may also be experienced.

The most common valves, which require surgery, are the mitral and aortic valves (see picture). They are found in the left side of the heart.

Heart showing valves and chambers



Surgical treatment has a very good success rate for severe valve disease and is the treatment of choice. The evidence supporting surgery for heart valve disease has resulted from long follow up and many years of experience.

Alternatives to valve surgery, including other interventional and medical treatments, may have already been discussed with you by your cardiologist and surgeon.

Newer interventional techniques, such as Transcatheter Aortic Valve Implantation (TAVI) in aortic valve disease, may be appropriate if you are a very high risk or unsuitable for surgery; your surgeon will advise you appropriately.

Heart valve surgery

There are two types of valve surgery. The damaged valve can either be repaired or replaced. A replacement valve can either be mechanical (metal) or tissue (obtained from an animal, usually a pig or cow).

- Mechanical valves are longer lasting, but you will need to take anti-coagulant drugs (those which thin the blood) for the rest of your life (see page 36).
- Tissue valves do not last indefinitely, but you are less likely to require anticoagulant drugs.

Your surgeon will discuss with you the most suitable valve in your case. All valve operations are performed using the heart-lung bypass machine, as the valves are inside the heart and it is necessary to stop the heart while stitching the new valve.

What are the benefits and risks of valve surgery?

The benefits and risks of valve surgery vary for each person. Your surgeon will discuss your individual risk when listing you for surgery. The benefits for you will depend on your particular symptoms before the operation. You can expect to see an improvement in your symptoms. The surgery will also help to prevent your heart valves and function from deteriorating further. Valve surgery, like any other surgery carries a risk of complications.

Possible risks and complications depend on:

- Which valve is being operated on, and the extent of valve and heart muscle disease
- Whether you are having a coronary artery bypass graft at the same time as your valve surgery.

Complications include:

- Wound or chest infection
- Risk of bleeding after the surgery
- Ongoing risk of infection to the artificial valve (endocarditis). To reduce this risk all patients should have regular dental checks
- Irregular heart beat (atrial fibrillation of ventricular arrhythmias)
- Complete heart block, necessitating the insertion of a permanent pace maker in the postoperative period (as a separate procedure)

- Blood clots can form mostly on mechanical valves
- Wear or damage to valves, more common with tissue valves.
- There is always a very small risk of stroke with valve surgery
- Loss of life.

Cardiac surgery waiting list

Once your surgeon has recommended that you have heart surgery, and you have decided to go ahead with it, you will be put on a waiting list.

The NHS defines the maximum time that patients should wait for treatment including routine planned cardiac surgery. Current NHS policy and guidelines state that 92% of patients on the elective waiting list should be operated within 18 weeks. The clock starts with GP referral to the cardiologist and continues while investigations are undertaken leading to treatment decisions, referral for consideration for surgery, completion of investigations necessary to make judgements, and finally the waiting time on the cardiac surgery waiting list.

There are differences in the way the NHS counts the time for patients who are referred from outside Wythenshawe Hospital (for example from clinics at Tameside, Salford, Oldham, Bury, Macclesfield, and Stepping Hill). These referrals are arbitrarily assigned an eight week lead in time regardless of how long the patient has been in the system before they are listed for surgery. The Cardiac Surgery Waiting List office will be able to inform you what time you have been assigned and when you breach the 18 week waiting time.

We acknowledge that it is frequently the case that many patients are already breaching 18 weeks when they are referred to the cardiac surgeon and we do everything in our power to expedite the date of your operation once the decision has been made to proceed.

Patients on the planned (elective) waiting list are categorized by the surgeon into two categories: urgent and routine based upon their cardiac condition and on clinical judgement. Urgent patients should not wait 18 weeks.

Patients on the planned elective waiting list compete for limited NHS resources and may find their surgery delayed, postponed, or cancelled due to other clinical priorities such as transplant operations, emergencies, or in-house urgent hospitalized cases (who are unsafe to be discharged from hospital without surgery such as after a heart

attack). Further delays or cancellations may occur due to the pressure on resources including availability of theatre sessions or beds on critical care or a ward, and /or staffing shortages. All of these pressures are worse during the winter months when there may not be enough critical care beds available and there may also be an increased need for beds for Extracorporeal membrane oxygenation (ECMO) patients who need emergency artificial lung devices.

The Waiting List nurses and the Waiting List Office will inform you of your status on the waiting list and admission plans and inform you of changes in these plans. When cancellation rates are high, you may be given a provisional admission date that will be reviewed closer to the operation date.

At your outpatient visit, you will be informed of the average waiting times for operations based on available information at that time. Usually, there is an average waiting time of three months for planned elective routine surgery from the time of placement on the waiting list.

Earlier admission may be possible and you may be asked if you are willing to be available at short notice when there are late changes in schedules and unexpected operation slots. It may be that the type of medication you are taking rules you out for being called at short notice as some medication must be stopped for several days before surgery. You may be asked if you are happy to have your operation by a different surgeon than the Consultant who saw you in the out-patient clinic.

Your surgeon will do his utmost to get your surgery done as soon as possible. The waiting time for each surgeon will differ and will vary over time. It is reasonable to ask the Waiting List Office if your operation can be undertaken sooner by another surgeon in the department. If you ask, the Waiting List office will review the waiting times and discuss this with your surgeon. Regardless of you asking this question, the Cardiac Surgery Waiting List Office will be monitoring your waiting time and trying to expedite your operation.

What can I do to prepare for planned surgery?

Prior to your cardiac surgery it is very important that you get as fit as possible. The surgical team will have reviewed your current lifestyle risk factors with you. You will receive advice and support, as needed to make the below changes to your lifestyle.

- If you smoke - it is very important to stop smoking prior to surgery. Even stopping smoking just a few weeks prior to your surgery has been shown to reduce complications after cardiac surgery (reduced chest infections and better wound healing). There is help if you need it. Your GP can help you as well as put you in touch with the local Stop Smoking Service. There are some contact telephone numbers on pages 63 - 64.
- If you are overweight – losing some weight will help you to recover quicker. You will find it easier to move around as well as being less tired. There is advice about healthy eating and alcohol intake on pages 66 – 80.
- If you have diabetes – monitoring and working to keep your blood sugar level steady will also help you recover better after surgery.
- Keep as physically active and exercise as your symptoms allow. Regular walking, even for short distances, will help you to recover your fitness quicker after surgery.
- Take good care of your teeth and have regular dental check-ups. Tell your dentist that you are having heart surgery if you need dental treatment.

Pre-admission

Prior to your operation you are required to attend a preoperative assessment with one of the cardiac surgery specialist nurses; this gives an up-to-date assessment of your health prior to your surgery. The ‘pre-op’ process can take up to two to three hours and will involve you having an ECG, bloods, urine specimen and chest X-ray.

You may be required to attend appointments on future dates for further investigations; including an echocardiogram, vascular studies and lung function tests.

Please bring a current prescription list and details of any non-prescribed medication you may also be taking.

Although you may or may not have a date for your surgery when you attend your preoperative assessment, please bear in mind that any dates given can change due to service demands, such as emergency and transplant operations.

Before coming into hospital, please make any arrangements for help that you will need when you first return home after your surgery. The Society for Cardiothoracic Surgery in Great Britain and Ireland (SCTS) have a suggested checklist of practical tips to help you prepare for having surgery. (http://scts.org/patients/having-heart-surgery/)

To help inform you of what to expect when you come in to hospital you can view Wythenshawe Hospital's 'Hearts and Minds' video at http://www.thetickerclub.co.uk

Patient information day

Approximately one or two weeks prior to your surgery you will be invited to attend a Patient Information Day on the Cardiothoracic Critical Care Unit (CTCCU). This takes place on a Friday afternoon between 14.00 and 16.00 hours.

The purpose of the afternoon is to meet members of the team. The team will include someone who has had cardiac surgery who will discuss the patient and carer's perspectives.

They will provide you with information about your hospital stay from admission to discharge with the opportunity for you and your relatives to ask questions. If you do not receive an invitation to this event at least two weeks before your due surgery date, please contact the CTCCU office on (0161) 291 4527 to book your place.

Information about coming in to hospital

If you have a cough or flu, or are taking antibiotics, it is very important that you contact your Cardiac Surgery Specialist Nurse on 0161 291 5067 to ask for advice.

Prior to your admission, every effort is made to ensure that your operation goes ahead on the day as planned. However sometimes due to the pressure of emergencies a bed may not be available on CTCCU; unfortunately in this situation your operation will be postponed.

On the day of admission you will be asked to report to the desk in the Admissions Lounge on the First Floor of F Block within the Green Zone. Once all your details have been checked you will be directed to a Cardiothoracic Ward, normally F6. When you arrive on the ward you may have to wait in the dayroom until your bed is ready, sometimes this can be up to a few hours.

What belongings should I bring in?

As there is a limited amount of storage space, we would appreciate it if you would only bring into hospital a small overnight bag with the following essential items:

- Your own medication.
- Wash bag (denture pot if needed); you do not need to bring a towel.
- Clean nightwear that buttons down the front, dressing gown, comfortable full foot slippers.
- Two sets of underwear - one or two well-fitting non-wired bras for women.
- Small amount of money if required for newspapers.
- Magazine, book or audiobook with headphones and if required glasses and case.
- Comfortable clothes such as tracksuit bottoms and a shirt or blouse which button down the front.

If you have brought in any valuables such as jewellery and / or mobile electronic devices, please ask relatives or friends to take them home before your surgery.

When you are settled on the ward, the nursing staff will ask you some questions about your history and will take your temperature, pulse and blood pressure. This monitoring will continue regularly through the day and night, before and after your surgery.

As part of your introduction to the ward, the nursing staff will discuss any support that you may require at home after your operation. A member of the surgical team will discuss your procedure and ask you to sign a written consent form for the operation to be carried out. If you have any questions, please talk to the doctor before you sign the consent form so that you fully understand the risks of the surgery. The anaesthetist will also visit and talk to you, which will give you an opportunity to ask any remaining questions that you, may have before your operation.

A healthcare support worker will help prepare you for surgery. This may involve the removal of any body hair from your chest, legs and forearms before you have your bath or shower. The hospital policy is to use clippers. We strongly advise you not to attempt to shave yourself beforehand as there may be a risk of cuts or abrasions with shaving. This could cause your surgery to be postponed due to the risk of infection.

How long will I be in hospital?

You can usually expect to stay in hospital for five to ten days however, everyone progresses at a different rate and therefore your length of stay may be longer.

It is dependent upon:

- Your diagnosis;
- The cardiac treatment you have had;
- Your general health and any other medical conditions you may have; and
- Your home circumstances.

What will happen on the day of my operation?

On the day of your operation the anaesthetist may prescribe a 'pre-medication' a few hours before your operation. This will help you relax; if it makes you drowsy you will be taken to theatre on your bed, otherwise you will be able to walk, accompanied by a nurse.

In the anaesthetic room the anaesthetist will insert a tube in the back of your hand to administer the general anaesthetic to put you to sleep. A tube will also be placed down your throat, into your windpipe and connect you to a ventilator (breathing machine) which stays in place throughout your operation. Whilst the thought of having this tube in your windpipe is not pleasant, please remember that you will be asleep and therefore not aware of its presence.

Once you are asleep, an ultrasound probe known as the transesophageal echocardiogram (TOE) will be placed in your gullet so that the anaesthetist can monitor the function of your heart. This gives clear pictures of how well your heart is beating and how the valves are working throughout your operation. There are specific risks associated with TOE; some patients will not have a TOE during surgery because of their medical history.

During the operation your body temperature needs to be lowered to rest your heart and lungs and their function will be taken over by the heart-lung bypass machine.

You will have a catheter inserted into your bladder. This will drain your urine whilst you are asleep and for a short time afterwards. It may be removed during your stay on the Cardiothoracic Critical Care Unit (CTCCU) or on the ward.

After your operation you will be transferred into the CTCCU whilst still under the anaesthetic. It is important for us to monitor your heart rate, breathing and blood pressure. Your sedation will be reduced once you are stable. The tube in your windpipe will be removed when you have woken up and your breathing effort is adequate to wean you off the ventilator.

Cardiothoracic Critical Care Unit

In CTCCU, your nurse will monitor your condition and assess when you are ready to begin breathing unassisted again. As you start to wake up your nurse will tell you that you are back on the CTCCU and that your operation is over. To check that you have woken up properly, your nurse will ask you to move your toes and squeeze their hand. This helps them to assess how awake you are. You will still be very sleepy at this stage and you may become aware of the tube in your throat and windpipe. If, at this stage, your condition is considered stable the nurse will remove the tube in your throat. If not, the sedation will be topped up until you are ready for the tube to be removed. It is important to remember that whilst the tube remains in your throat you will be unable to talk. Do not be alarmed – your voice will return once the tube is removed.

Some patients who have existing lung disease, for example asthma or chronic bronchitis, may need more assistance with their breathing. The consultant anaesthetist who speaks to you before the operation will tell you if they consider that this will be the case.

Once you are off the ventilator and the tube is removed you will need extra oxygen via a facemask or nasal cannula (prongs) for approximately the next two days. The mask or nose prongs should remain in place for most of the time, but you can remove them in order to eat or drink.

Throughout your stay on CTCCU you will be looked after by a dedicated team of Consultant Intensivists alongside your Cardiac Surgeon.

The morning following your operation, the Surgeon and the Intensivist will assess you. They will review your clinical status and progress and decide whether you need to stay on CTCCU or are well enough to be transferred to the ward (this can vary from one individual to another). In general most patients are transferred from the CTCCU to the ward between one to three days after their operation. The nurse who is looking after you will keep you fully informed about your transfer.

Infection control

Infection control is a priority. All visitors to the unit will be requested to adhere to our hand hygiene standards. Applying alcohol hand gel on admission to and upon leaving the clinical area is essential.

Chaperones

All patients are entitled to have a chaperone present when examinations are being performed and personal care being delivered. Please inform the nursing staff of your requirements.

Pain

Your comfort is very important to us. When you are pain-free it will improve your breathing and help with your physiotherapy (see pages 24-27). We will give you pain relief medication through one of your drips and gradually replace this with tablets as you recover sufficiently to be able to eat and drink again. It is important that you let us know if you are experiencing any discomfort so that we can adjust your pain relief to suit your needs.

Intravenous infusions (drips)

Whilst you are sedated you will have several drips inserted. Some of these will be in your hand, others in your neck or shoulder. Most of these will be removed on the CTCCU before your transfer to the ward. You will be left with one drip in your hand and possibly one in a neck vein.

Eating and drinking

Soon after the tube in your throat has been removed you will be able to drink again.

Most people are ready to eat again on the evening of the first day after the operation. You will be offered light meals to start with.

Telephone enquiries and visiting arrangements

When you have been transferred from the theatre and arrived on CTCCU, a member of staff will telephone your next of kin within the hour.

Telephone enquiries thereafter, are welcome at any time of the day or night. In order to help the nursing staff who are caring for you, we ask that only one or two family members ring the CTCCU. They can then pass on the information to other family members. We understand that relatives are anxious to enquire how you are after your operation; however, each time your nurse has to answer the phone, they are taken away from caring for you.

Visiting on the CTCCU is restricted to immediate family only. On the day of your operation we do not encourage relatives to visit. Nevertheless we realise that this day will be an anxious time for your family and in some instances visiting may be possible. Please ask members of your family to contact the CTCCU and speak to the nurse who is looking after you. He/she will make the necessary arrangements.

However many previous patients have told The Ticker Club volunteers that ‘’they do not recommend day-of-surgery visiting as they felt very tired due to the anaesthetic, and the nurses and doctors are still at their bedside frequently. Their advice to future patients is for family members to *‘wait until the day after the operation, it works better for all.’*”

Normal visiting arrangements can be resumed on the first day after your surgery. Before visiting however, your family should contact the CTCCU by telephone to check whether you have been transferred to another ward.

Visiting times on CTCCU are between 14.00 and 16.00 and 18.00 to 20.00 hours. This is to allow protected meal times and provide rest time for patients. Unfortunately, flowers are not allowed on the CTCCU or wards due to health and safety and infection control reasons.

Mobile phones and camera attachments are not to be used on the CTCCU.

Cardiothoracic ward

When you are transferred from the CTCCU, it is likely you will move to Ward F6 (or to Jim Quick Ward). It is recommended that the number of visitors to the ward is restricted to a maximum of two visitors per patient. Children under the age of five years old are discouraged from visiting the ward. Permission for children to visit should be obtained beforehand from the nurse in charge. Visiting times on Ward F6 are between 14.00 and 20.00 hours. Out of hours visiting will need prior arrangement with the ward sister.