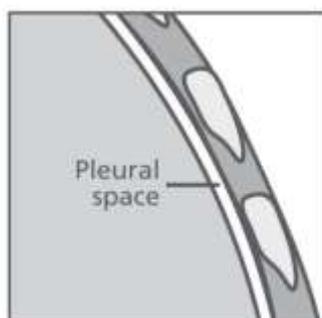
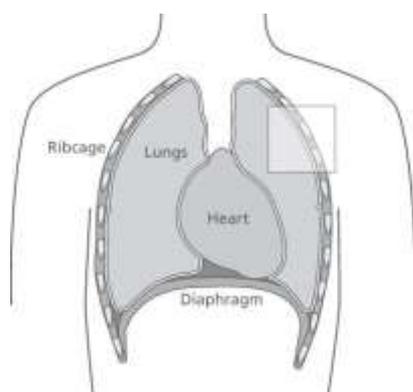


Chest drains: information for families

A chest drain is a plastic tube inserted into the chest to drain off fluid or air that might be collecting there after an operation or accident or as a result of disease. This information sheet from Great Ormond Street Hospital (GOSH) explains about chest drains and what to expect when your child has one.

When we breathe in, the air passes from the nose and mouth into the windpipe. From there, it travels into the airways and into the lungs. The airways (bronchi) split into lots and lots of smaller tubes (bronchioles) each ending in an alveolus (or air sac).

The lungs and inside of the chest cavity each have a smooth covering called the pleura that lets the lungs expand without rubbing on the inside of the chest. The two layers of pleura are usually in close contact with only a small space in between (pleural space).



After an operation or accident or as a result of disease, the pleural space can fill up with air, blood or fluid; this is called pneumothorax if the pleural space is filled with air, haemothorax if it is filled with blood and pleural effusion or chylothorax depending on the type of fluid collecting in the pleural space. The air, blood or fluid in the pleural space stops the lungs inflating completely when a person breathes in, causing breathing difficulties as the amount of air, blood or fluid in the pleural space increases.

The air, blood or fluid inside the pleural space needs to be drained away so that the person finds it easier to breathe; a chest drain inserted into the pleural space can drain this air, blood or fluid away gradually.

A chest drain consists of a plastic tube that is connected to a collecting container, positioned at a lower level than the child's chest. If a chest drain is needed to drain air, suction, provided by a wall unit, will sometimes be needed to move the air from the pleural space into the container. If a chest drain is needed to drain fluid or blood, suction might not be needed, as the force of gravity might be enough.

Why might my child need one?

At GOSH, chest drains are routinely used after operations where the chest wall is opened, for instance, heart and lung surgery, as the operation

can allow air to seep into the pleural space and blood can build up inside the chest.

Children who have had an accident may need a chest drain if the injury was severe enough to create a way for air or blood to collect in the pleural space, for instance, after a stab wound or broken rib. Children who have a disease that causes fluid to build up inside the pleural space may also need a chest drain, but this is less common.

Pneumothorax (the medical name for a collection of air in the pleural space) can also happen if an air sac bursts inside the lung, letting air leak into the pleural space; this kind of pneumothorax can happen for no obvious reason, but may need a chest drain if the amount of air is large enough to cause symptoms.

Some children develop a condition called empyema. In this condition, infected fluid (pus) collects in the pleural space. An operation is often needed to treat this, but occasionally it can be managed by chest drains, which are used to drain the infected fluid.

Are there any alternatives?

It may be possible to suck out air or fluid with a needle (aspiration) but this is rare. The only other option to a chest drain is an operation where the chest is opened up, the air, blood or fluid is drained off and the lung re-inflated. A chest drain is the simplest, safest and quickest way of draining the pleural space, which allows the amount of air, blood or fluid to be carefully monitored as it drains gradually. However, an operation might be needed if the chest drain cannot be inserted or it does not drain off enough air, blood or fluid.

Inserting a chest drain

Most children at GOSH have chest drains inserted at the end of a heart or chest operation while the child is under anaesthetic. If your child needs a

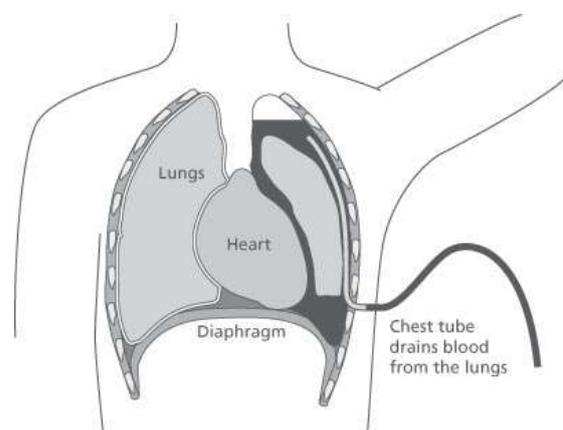
general anaesthetic, then other doctors will come to meet you and assess your child to make sure we are safe to proceed with the procedure with your consent. However, a doctor can also insert chest drains on the ward with local anaesthetic and pain relief. The next section describes what to expect with a ward insertion.

What does it involve?

You are welcome to stay with your child while the chest tube is inserted on the ward, but if you would prefer not to stay, that is fine too. We can discuss this with you.

At least 20 minutes before the chest drain is due to be inserted, your child will be given a pain relief medicine such as morphine to make them more comfortable. A combination of pain relief and sedation medicines will be given to your child in the hours before the procedure; the types of medicine used vary depending on your child's age and condition, but they can include paracetamol, ibuprofen or morphine.

Once your child is pain-free, they need to sit or lie with the insertion site clearly accessible. The chest drain tube is inserted through a small incision (cut) between the ribs, tunnelled under the skin into the pleural cavity and held in place with sutures (stitches) and tape. The tube is connected to the suction unit and collecting container, placed below the level of the bed, and unclamped so the air, blood or fluid can start to drain away.



Are there any risks?

It is extremely important that your child stays completely still while the chest drain is inserted; this can be difficult for some children even though they have had pain relief, so they may need to be held still during the procedure.

Your child will be given strong pain relief to take away the pain of the chest drain tube insertion, but they will still be able to feel pressure around the ribs as the tube is inserted.

There is a risk that air could leak back into the pleural space if there is a gap at the incision site or at the connections of the chest drain equipment. The nurses will monitor your child closely to make sure this does not happen.

The amount of air, blood or fluid draining away will be carefully measured. If your child has had an operation or has blood in the chest for another reason, and the amount of blood draining away is large, they may need a blood transfusion and/or an operation to find and stop the cause of the bleeding.

Although the procedure to insert a chest drain is carried out under sterile conditions, there is a small risk that the insertion site could become infected. Children who have had an operation usually have a short course of antibiotics after the operation but other children may need antibiotics for a few days.

In some children, the chest drain cannot be inserted safely or it does not drain away the air, blood or fluid well enough, so an operation may be needed to drain the air or fluid and re-inflate the lung.

What happens afterwards?

After the chest drain has been inserted, your child will need an x-ray to check the position of the tube and how the air, blood or fluid is draining. Your child will be closely monitored while the

chest drain is in place, and the amount of air, blood or fluid draining will be carefully measured and recorded.

The nurse will also check your child's breathing, pulse and heart rate. Your child will be monitored every hour by your bedside nurse. Chest drain clamps will be placed by your child's bed, as a safety measure.

It is difficult to say for sure how long a chest drain will have to stay in place. After an operation, drains are usually removed within a day or two; it may be longer if the drain is in place for other reasons. The doctors and nurses will tell you how long they expect the drain to be in place, but this is only a rough guide and the timings may change, depending on your child's condition.

Looking after the chest drain

Once your child has recovered from the procedure, they will be able to eat and drink normally.

Your child will carry on being monitored as above while the chest drain is in place and continue to have regular pain relief as needed. It is important that the drainage tube does not develop kinks or get caught up in clothing or bedclothes, so the nurse will monitor the drain hourly to make sure it stays in the correct place. You can also work with the bedside nurses to make sure the tube is treated carefully when your child is being moved or handled.

Coughing and breathing deeply helps the lungs to re-inflate, so your child will be encouraged to do this. Blowing bubbles with a straw in a bottle of liquid is good too. A physiotherapist may visit your child to help. Coughing can be uncomfortable while the drain is in place.

When your child feels able and it is safe to do so, they will be encouraged to get out of bed and start moving around. As long as the collecting container stays below the level of the chest drain

site, your child can sit up in bed, go to the playroom or go for a walk around the hospital. However chest drain clamps must stay with your child at all times. The chest drain tube will need to stay fixed to your child's clothes so it does not get pulled or kinked. Unfortunately, if the chest drain is connected to a suction pump, this will restrict their movement to within the length of the suction tube.

Removing the chest drain

What does it involve?

Your child's chest drain will be removed when it is clear that there is no more air, blood or fluid draining from the chest, they are breathing comfortably again and normal breath sounds are heard through a stethoscope. The team will discuss when this is likely to be with you. As chest drains are usually removed on the ward, you are welcome to stay with your child while the chest tube is removed, but if you would prefer not to stay, that is fine too.

Before the chest drain is due to be removed, your child will be given pain relief medicine. Older children may prefer to breathe in a gas called Entonox[®], which is a mixture of two gases called nitrous oxide and oxygen. As well as taking away the pain, it also has a calming effect. The Entonox[®] is breathed in through a mask, covering the nose and mouth, or through a mouthpiece, held between the teeth.

A combination of pain relief medicines will also be given to your child in the hours before the procedure; the types of medicine used vary depending on your child's age and condition, but they can include paracetamol, ibuprofen or morphine.

Once your child is pain-free, they need to sit or lie with the chest drain clearly accessible. Two nurses will be needed to remove the chest drain, as several tasks need to be done at the same time for the chest drain to be removed safely. The

dressings around the chest drain will be removed, before the drain is removed. When your child is ready, one nurse will pull the chest drain out very quickly and hold the edges of the incision together, while the other nurse ties a knot in the free ends of the stitch to close the incision. An airtight dressing may be put over the incision site. When the chest drain has been removed, the nurse will continue to monitor your child closely. Within an hour or so of the procedure, your child may need an x-ray to check their lungs.

Are there any risks?

It is extremely important that your child stays completely still while the chest drain is removed; this can be difficult for some children even though they have had pain relief, so they may need to be held still during the procedure.

Your child will be given strong pain relief to take away the pain of the chest drain tube being removed, but they will still be able to feel a pulling sensation around the ribs. It can be painful when the chest drain is removed from the tunnel of skin.

There is a risk that air will seep back into the pleural space if the chest drain is not removed and the incision site closed quickly enough. This means that your child may have mild breathing difficulties for a day or so afterwards. Sometimes, if too much air enters the chest, another drain may be needed to clear it.

What happens afterwards?

Once your child has recovered from the sedation, they will be able to eat and drink as normal. An x-ray must be performed a few hours after the drain is removed to check that no air has accumulated in the pleural space.

Your child will be closely monitored for a few days after the chest drain has been removed, checking their breathing, pulse and heart rate regularly.

The incision site will also be checked regularly to make sure it is healing properly and that there are no signs of infection. If a dressing is covering the area, this will be removed over the next few days after the chest drain has been removed to allow healing. The suture at the site will be removed around day 7 either in hospital or by your local services if you are discharged before the suture removal.

What is the outlook for children who have had a chest drain?

If you have any questions about chest drains, please ask your doctor or nurse.

The majority of children who have had a chest drain recover well with no long-term effects. Although the procedure can be quite scary, especially for young children, in our experience, most of them do not remember anything about it due to the pain relief or Entonox®.

The incision site usually heals well, leaving only a small scar, which fades in time so it is less noticeable.