



Equipment, devices and procedures in the Intensive Care Unit

Information for relatives, friends and carers

Welcome

The intensive care unit is one of the most unnerving areas in a hospital, and it is quite normal to be anxious and worried about your visit to the ICU. Most of the patients are extremely sick and need constant, close monitoring and support from the staff, equipment and medication to keep normal body functions going. This booklet will help provide you with information regarding the need for monitoring devices, the common procedures and the treatments that we offer. If it does not cover everything you need to know, our staff will be glad to answer any questions you may have. Patient information and advice can also be found on our website at www.bsuh.nhs.uk and www.ics.ac.uk (patients and relatives section).

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Staff in Intensive care

Intensive care units in the United Kingdom are run and staffed by specialists trained in intensive care. Once a patient is admitted to the unit the intensive care team will manage the care of the patient in consultation with the original team that admitted the patient to the hospital and any other specialists that they think can help to aid the patient's recovery. The intensive care doctors and nurses will give the best overview and general update on the patient, but they may refer relatives to the specialist teams for discussion of certain aspects of care.

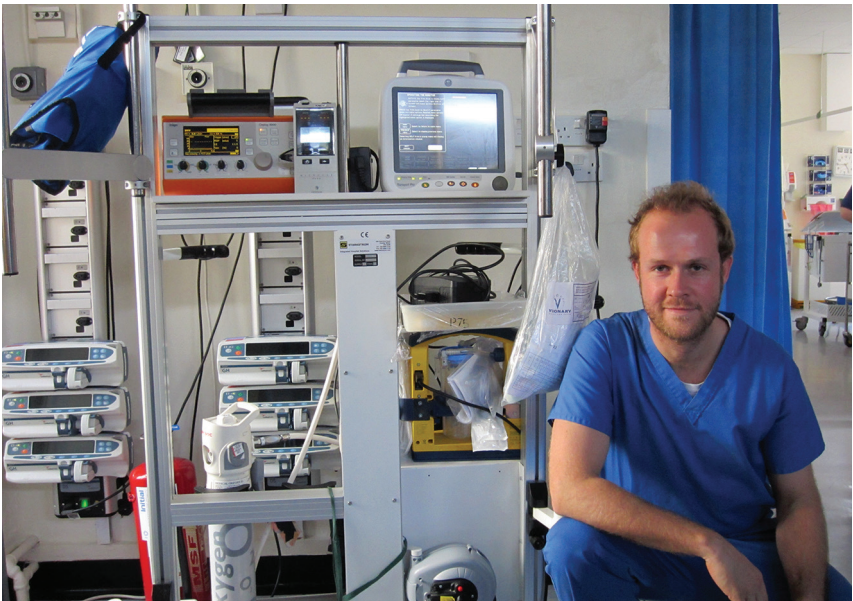
Patient comfort

Patients need to be sedated to tolerate the help they need with their breathing. This level of sedation is much less than is needed for an operation and patients are often partially awake. The nurses and doctors will keep reassuring the patient and make sure that they have plenty of pain relief to minimise any uncomfortable procedures that need to be done.

Relatives often want to know if they can talk to the patient or touch them and this is usually encouraged. Reassuring voices and contact can really help patients.

Noises and alarms

Noise levels are likely to be higher than on a general hospital ward largely because of the operation of the equipment, often beeping or sounding an alarm. If you do hear an alarm it doesn't necessarily mean something's wrong, just that there's something the staff need to be aware of. Staff will be able to explain the equipment and noises to you should you have concerns about the alarms.



Equipment

It is common for patients to be connected to a number of different machines or devices whilst in the ICU.

Breathing machines or ventilators

Many patients need help with breathing and to do this they usually need to be sedated and have a breathing tube put into their windpipe or through the neck. Such tubes are attached to a breathing machine known as ventilator. Modern ventilators use complex computers to enable patients to breath as much as possible for themselves with variable amounts of help from the machine. Sometimes, patients' breathing might be supported with tight fitting masks which look uncomfortable at first, but many patients get used to them very quickly and this means they don't need to be deeply sedated and don't need a tube putting into their windpipe.

Kidney machines

Some patients' kidneys stop working due to their illness. The kidneys work to filter the blood and remove waste products (and in doing so produce urine) so if they fail, it is important that the machines take over this job. To do this a special large tube is put into one of the big veins in the leg or neck.

Monitors

Patients in intensive care are constantly monitored to track their condition and alert staff to changes. This monitoring routinely includes measurement of:

- Heart rate and heart electrical tracing (ECG)
- Oxygen levels in the blood
- Blood pressure
- Pressure in the veins (CVP)
- Urine output
- Temperature
- All the fluids, food and drugs.



Lines

These are plastic catheters or tubes sometimes referred to as 'drips' or 'lines' and are inserted by the doctors and nurses into the patient's blood vessels. These lines help to give fluids and medications, are used in monitoring blood pressure, and for taking blood samples for regular investigations. Common lines inserted in ICU are:

Arterial line

A very thin tube is inserted into one of the patient's arteries (usually in the arm) to allow direct measurement of the blood pressure and to measure the concentration of oxygen and carbon dioxide in the blood.

Central line

A thin tube is inserted into a big vein usually in the neck, shoulder or groin to measure the pressure, take blood samples and to give concentrated medications and fluids.

Dialysis line or Vascath

These lines are similar to central lines and are inserted into a big vein. However they are bigger in diameter enabling them to attach to a kidney machine in order to perform the job of the kidneys.

PICC lines

These lines are inserted into one of the veins in the upper arm and are long enough to reach the big veins close to the heart. They have the advantage of having a less chance of infection, thereby they could be used for a long duration of time.

How are lines inserted?

All lines inserted are done by doctors or nurses experienced in doing the procedure. Local anaesthetic will be injected into the site to numb the area before performing the procedure to ensure patient comfort. Sometimes a strong painkiller might be given through a venous line. All lines are inserted in the safest manner. Complications do occur although these are rare. The common one are bleeding, bruising and infection.



Breathing tubes

Some of the patients in the intensive care will need support with their breathing. This is achieved by passing a plastic breathing tube into the windpipe. There are two types of breathing tubes:

Endotracheal (ET) tube

This is a plastic tube placed through the patient's mouth or rarely through the nose into the windpipe (trachea). Most patients will need sedation to keep them comfortable while this breathing tube is in place.

Tracheostomy

This is a plastic tube placed into the patient's windpipe through a small incision in the front of the patient's neck. Tracheostomy is usually performed where there is a need for breathing support for a prolonged period of time.

Breathing tubes are placed by doctors skilled in anaesthesia or critical care and are always done using a general anaesthetic. Rarely, the patient may need a surgical tracheostomy, which is done in the operating theatre – more information will be given if this operation is needed.

Benefits of tracheostomy

Tracheostomy is far more comfortable than a breathing tube passing through the mouth/nose. Patients need less or no sedation after a tracheostomy which means that they are more awake and this will help in the process of reducing the breathing support needed by the patient. Most of the tracheostomies performed in the intensive care are safe. Complications include bleeding, bruising, infection and rarely a collapsed lung (pneumothroax).



Feeding in the intensive care

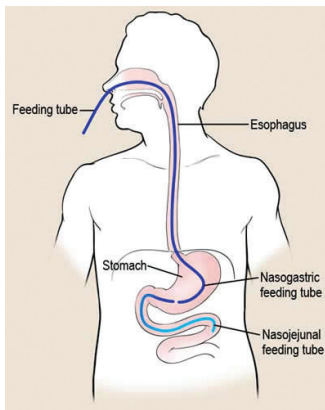
Patients in the intensive care unit are at risk of malnutrition because of their illness. It is essential to maintain an adequate nutrition and calorie intake in order to fight the infection and aid recovery after prolonged illness.

Nasogastric tube

A nasogastric tube is the most common type of feeding tube used in the critical care. These are long thin tubes which are inserted by the nurse or the doctor, which goes into the nose, down the oesophagus (food pipe) until it reaches the stomach. Nasogastric tubes are used to feed the patients in the intensive care who are unable to eat or drink. In addition to this, these tube could be used to drain the stomach contents. Complications with nasogastric tube are rare. Common ones include bleeding from the nose, inflammation of the sinuses and occasionally these tube might go into the lungs instead of the stomach. The position of the tube is checked either by x-ray or by pH test in order to ensure that it is in the right position.

Intravenous feeding

If there are problems with absorption of the feed through the stomach, nutrition is provided through a central line into the veins. This route is usually not the first choice for feeding as it poses the risk of infection and feeding through the stomach is more physiological.



Other types of tube used for feeding include:

Nasojejunal tube

If there are problems with the nasogastric tube due to absorption of the feed, a nasojejunal tube might be inserted. These are similar to nasogastric tube but tip of the tube is positioned in the small intestine (jejunum) instead of being in the stomach. Special x-rays or other imaging may be needed to ensure the adequate positioning of the tube.

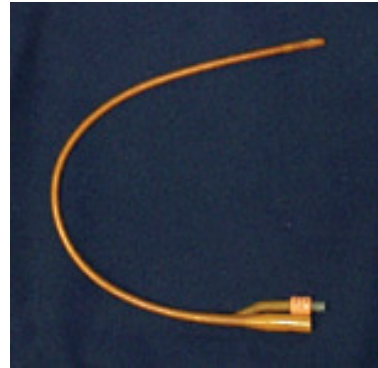
PEG tube

A PEG (Percutaneous Endoscopic Gastrostomy) tube is inserted through the skin on the abdomen leading into the stomach. These tubes are inserted if the patient needs long standing feeding, or they are at a high risk of aspirated food contents into the lung. The procedure is technically challenging and the surgeon performing the procedure will update you with further information.

Urinary catheter

A urinary catheter is a flexible tube that is inserted into the bladder to drain urine. This is essential to drain the bladder of urine while the patient is unable to use the toilet normally. In addition to this, it is essential to check the amount of urine produced by the patient to ensure that the kidneys are functioning alright.

The tube is inserted by a doctor or a nurse via the urethra until it reaches the bladder and a balloon is inflated to keep the tube within the bladder. Urinary catheter carry a risk of urinary tract infection (UTI) in the urethra, bladder or the kidneys. Care will be taken to prevent such infections, however this might need treating with antibiotics.



Scans: CT and MRI

Patients in the intensive care unit may need further investigation in terms of a computerised tomography scan (CT or CAT scan) or an MRI (Magnetic Resonance Imaging) of their head, chest or abdomen. These investigations give detailed radiological pictures which are not possible with a plain x-ray film. The patient needs to be taken to the x-ray department in order to get these investigations. This will be done by a doctor and a nurse who are trained to manage the patient during the process of the transfer.

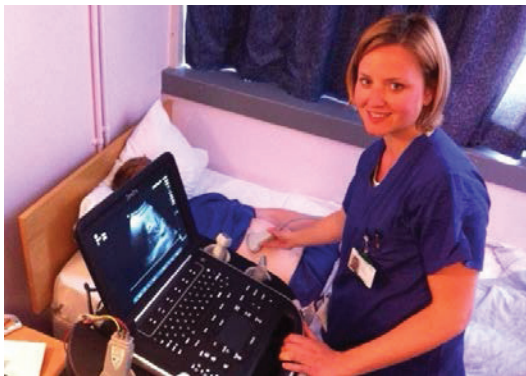
A doctor and a nurse will escort the patient to ensure continuous monitoring, and to give essential treatment during the entire process. Occasionally, tubes may become disconnected or a medical problem may occur during the process of the transfer. The doctor and the nurse are trained to handle such situations and will deal the patient based on the necessity.



Ultrasound

Ultrasound is a commonly used device in ICU. It is used to assist the doctor in inserting lines, and also forms an easy and safe investigative tool. Most of the ultrasound machines used in the intensive care are portable and could be used at the bedside. The ultrasound machine has a probe attached to a monitor screen, and high frequency sounds are emitted from the probe. The probe is placed on the part of the body to be examined and images are obtained based on the density of the organ such as bone, muscle or a blood vessel. It is totally safe and does not cause any pain to the patient. However, it has limitations with regards to the type and quality of images that can be obtained.

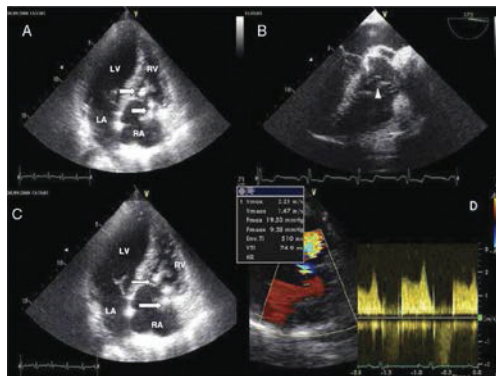
Ultrasound is commonly used to scan the lung for any fluid, examine the abdomen and the organs within, such as the liver and kidneys, and also to aid insertion of lines into central vein.



Echocardiography

This is a scan of the heart to look how it is functioning, identify leaky valves, looks for any clots in the heart, and to guide treatment plans for the patient.

Echocardiography uses the same principle as any other ultrasound device. A probe is placed on the patient's chest to obtain images of the heart. Most of the echocardiograms done in the intensive care unit are painless with no risk to the patient. Sometimes, more detailed images need to be acquired which can't be done by a probe placed on the patient's chest. In such circumstances, the probe has to be introduced into the patient's oesophagus (food pipe). This procedure is called as Transoesophageal Echocardiogram and will be done under sedation or under general anaesthesia. The procedure is usually safe. Occasionally there is a risk of an injury or tear in the oesophagus and an operation might be needed to fix this.



Facilities for relatives and friends

The intensive care team aim to regularly update relatives, friends and carers on the patient's condition. These updates might be done at the patient's bedside or in a quiet place outside the unit where we can sit down and talk (sometimes referred to as the quiet room). Occasionally while procedures are being performed and in between visiting times, the staff might ask you to wait outside the intensive care. Please be patient if this is the situation. To make your wait a bit easier there is a visitors waiting area outside the intensive care.



Final comments

We hope you find this information leaflet helpful in explaining some of the equipment, people and procedures you might come across during your visit to the intensive care unit.

We appreciate your feedback and will from time to time collect feedback with a questionnaire. If you have any further questions, please contact the intensive care team on the numbers provided on the front of this leaflet.

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