

Working to relieve the pressure!

Intracranial Pressure Monitoring

Also known as an ICP bolt - ICP monitoring gathers more information than a lumbar puncture. The procedure can take place under GA or with local anaesthetic. It's usually left overnight or for two consecutive nights. Usually only a small amount of hair is shaved off and you may have a few stitches.

It is not a 100% true ICP reading due to limited movement of the patient i.e. it cannot measure ICP sitting in the bed, playing computer games, etc. There are small but significant risks from the procedure.

A recent poll taken by IIH UK showed that 14 out of 16 patients said they suffered less discomfort through ICP Monitoring than a lumbar puncture and would prefer ICP monitoring to a lumbar puncture for intracranial pressure readings.

How is intracranial pressure monitored?

- ICP monitoring involves a doctor placing an intracranial pressure catheter inside the skull few a millimetres under the brain tissue surface.
- This catheter is 1.2 mm wide with a sensor device on the tip. When placed inside the head it senses the ICP and sends its measurements to a recording device, which then displays the pressure reading on the monitor at the bedside.
- The reading from the intracranial pressure monitor enables doctors to guide treatment for patients.

There are different types of monitor. Some have an actual 'bolt' type structure with a wing nut to hold them in place. Others are thin wires.

How is intracranial pressure monitoring established?

For insertion of the intracranial pressure catheter, the doctor ensures the patient is sedated (or under GA) the scalp is made numb by applying local anaesthetic and then a fine hole is made in the skull just behind the hairline through which the catheter is placed.

- The catheter is then kept in place with a locking mechanism or the wire coiled and stitched to the scalp to stop it being pulled out.
- You will be connected up to the bedside ICP pressure monitor first.
- The ICP bolt may not be connected to the computer immediately, as it may take some time for the pressure inside the head to settle after the procedure.
- The catheter is attached to a monitor which has a plug at the end to connect to the computer.



Back on the ward

Once you are back on the ward and the ICP monitor is connected to the computer (if this is what your Doctor requires), there is no need for regular readings taken to measure the pressure by a nurse.

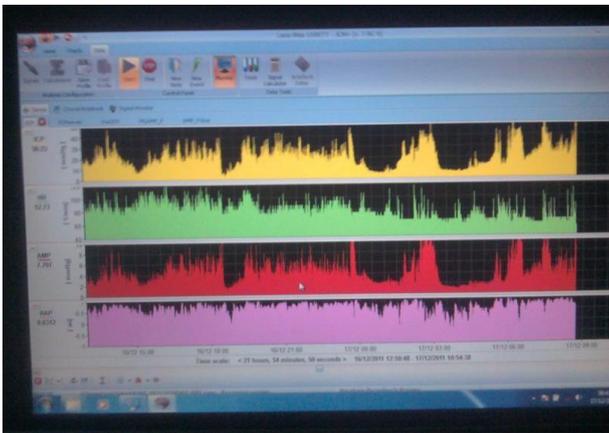
- You may notice a change in the pressure reading if you do anything that alters the pressure inside your head. Things like moving about, changing position in bed, coughing or sneezing, vomiting or crying.

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- You will also notice that the pressure reading changes depending on whether you are awake or asleep. Pressure tends to climb when sleeping as we stay still for longer lying down and produce more CSF when dreaming.
- Normal pressure can be anything between 15 and -5 mmHg. Abnormal readings will be above or below this but must be maintained for some time to be recorded as such. ICP is measured in mmHg (mercury) and not cmH₂O (water) as an LP is. The conversion is approximately 1.34 e.g. an LP of 20 cmH₂O would convert to 14.8 mmHg
- It is important that you try to move around when you are having monitoring to give true readings of what is happening with your pressure. You may have to be 'unplugged' to go to the toilet. Do not leave the ward! You need to be sure that you can plug yourself back and start monitor functioning properly- some types do not start automatically after re-connection the plug!

Information from the monitor (software ICM+; www.neurosurg.cam.ac.uk/icmplus)

This photo was taken from an ICP laptop when the patients LP shunt spinal catheter had snapped – it therefore shows high pressure readings taken over 21 hours.



- Yellow shows ICP
- Green shows heart rate
- Red shows pulse amplitude of the ICP
- Purple shows index of compensatory reserve.

You may find if your pressure is very high, that an alarm goes off on your monitor. Try not to be worried as your medical team will be doing their best to reduce the pressure as soon as they can.

Keeping busy whilst 'wired up'

For children and adults alike – being stuck in a hospital bed can be very boring!



Take your MP3, Kindle, books, magazines, games as much as you can to keep you occupied with you to hospital.

Lay in your bed completely flat if possible for a few minutes and record what happens to your pressure readings.

Write down what you are doing at a certain times so the Doctors can see how your pressure behaves.

Make sure that you keep well hydrated and eat little and often – low blood sugar and dehydration can make headaches worse.

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Complications with intracranial pressure monitoring

- The insertion of the catheter is done with great care to avoid complications. Intracranial pressure monitoring does have some risks attached.
- The main risks are minor bleeding on insertion.

Other possible but rare risks are:

- Infection, requiring antibiotics and further treatment.
- Bleeding can occur and may require a return to the operating room. Bleeding is more common if you have been taking blood thinning drugs such as Warfarin, Aspirin, Clopidogrel (Plavix or Iscover) or Dipyridamole (Persantin or Asasantin). These drugs should be withdrawn some-time before ICP monitoring - ask your doctor when.
- Stroke or stroke like complications may occur causing neurological deficits such as weakness in the face, arms and legs. This could be temporary or permanent.
- Fluid leakage from around the brain may occur through the wound after the operation. This may require further surgery.
- Inadequate placement or malfunction of the probe and/or device. This may require further surgery.