

Medicine for Managers

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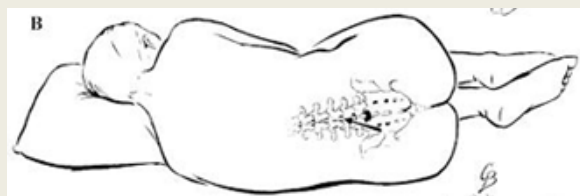
Lumbar Puncture

Lumbar puncture as a technique has been part of medical practice since the 1890s although, with the advent of neuro-imaging techniques it is used less frequently than it used to be. The technique is simply the insertion of a needle into the lower part of the spine as part of the investigative procedure for disorders of the brain and spinal cord.

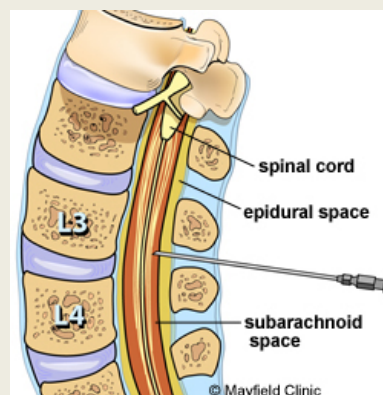
The brain and spinal cord is bathed in cerebro-spinal fluid (CSF). During the procedure a sample of the CSF is withdrawn and can be tested to assist in the diagnosis or exclusion of a variety of conditions including meningitis (infection of the membranes which surround the brain and spinal cord) or a subarachnoid haemorrhage (a bleed occurring in or around the brain).

The same technique can also be used in the treatment of some conditions such as injecting antibiotics or chemotherapeutic agents into the CSF.

The procedure is performed under sterile conditions. The patient is placed lying on the left or right side (called the left (or right) lateral position) with the neck bent downwards and the knees drawn up to the chest.



some operators prefer that the procedure is carried out with the person sitting on a stool or at a table leaning slightly forward. The area of skin is then carefully cleaned using disinfectant and the point of insertion of the needle is palpated using the finger to identify the bony landmarks. The area of insertion is then infiltrated with local anaesthetic and the needle is inserted in the space between two vertebrae, normally the third and fourth lumbar or the fourth and fifth lumbar (see diagram).



The needle passes through the skin and the tissue beneath until it reaches the **ligamentum flavum** which connects adjacent vertebrae.

Once through it, the needle 'gives' and can be progressed until it reaches the meninges which cover the spinal cord. It then passes through the outer layers of meninges to reach the subarachnoid space.

Drops of the cerebro-spinal fluid can then be collected. If required the pressure of the cerebro-spinal fluid can be measured by connecting a simple pressure gauge (manometer) to the needle.

Results of a Lumbar Puncture

Analysis of the cerebro-spinal fluid will include cell count, glucose and protein levels and the fluid is often sent for culture if any sort of infection is suspected.

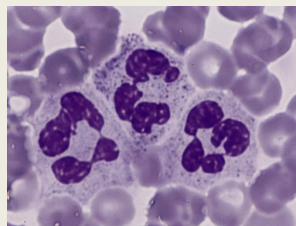
If the **pressure** in the CSF is raised it may indicate a number of possible diagnoses including bruising of the brain (cerebral oedema), a subarachnoid bleed, or some types of bacterial or tuberculous meningitis.

Colour and Viscosity

The CSF itself may appear clear or may be discoloured yellow (with some types of meningitis) or brownish (following a bleed). It appears viscous in the less acute types of meningitis (e.g. tuberculous or fungal).

Cellular content

The presence of white blood cells may suggest pathology. The presence of polymorphs (stained blue in the example above) indicates bacterial meningitis. They also increase in cases of bleeding in the nervous system and they often contain broken down old red blood cells.



The fluid may also be sent for culture to identify any causative bacteria in cases of bacterial meningitis. With modern techniques it is possible to identify viruses such as *herpesvirus* or *enterovirus*. It can also be used to identify more rare causes of symptoms such as *Treponema pallidum*, the causative bacterium of syphilis.

CSF Chemistry

Glucose: usually in concentrations of 60% of the peripheral blood. It is reduced in infections and increased in diabetes.

Protein: total protein content can result from various disturbances in CSF circulation and may indicate infections including meningitis, neurosyphilis or brain abscesses.

Analysis of the CSF is a very important stage in the diagnosis and management of many neurological disorders and certainly controls the choice of antibiotics in many bacterial meningitides.

Lumbar Puncture is a very simple and safe procedure. The most common complications are headache and nausea. The headache may often be relieved by lying down and generally settles quite quickly.

Serious complications are exceedingly unusual and, on the rare occasions that they occur, are due to bleeding into the epidural or subarachnoid space. There have been reports of muscle weakness caused by nerve damage but they are absolutely exceptional.

Lumbar puncture remains an important element in the diagnosis of neurological disorders.

However, these days it is combined with scans and other investigations to achieve more rapid and accurate diagnoses.

As recorded earlier, the procedure is described as being associated with minimal discomfort.

It is therefore with some uncertainty that I conclude with a quote from *Pandora Poikilos* in her book

“Excuse Me, My Brains Have Stepped Out”.

She says:

“I have a needle being stuck into my spine, can anyone please define ‘a little pain’?”

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