Epidural Blood Patch for IntraCranial Hypotension.

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What Is Intracranial Hypotension?

This is an abnormal syndrome where the normal volume of cerebral spinal fluid(CSF) surrounding the brain is reduced. This fluid protects and supports the brain and spinal cord. Depletion of this normal volume often manifests with headache. Other symptoms may include nausea, vomiting , double vision, poor visual focus, light sensitivity, reduced hearing , ringing in the ears , vertigo, pressure at the base of the skull and neck pain. They are all exacerbated by standing up and relieved by lying down. Other names for this problem include; Aliquorrhea , CSF Hypovolaemia, CSF volume depletion, low CSF Pressure ,Spontaneous CSF leak and any of these combinations mentioned in association with a headache ie Spontaneous Low Pressure Headache.

What are the Causes of this Condition?

A hole or tear in the outer protective lining of the Central Nervous System(CNS) known as the dura. This may be due to a needle, surgery, trauma or minor trigger events such as sporting activities, exercise, sneezing, lifting objects, sexual intercourse, falling over and bending over .There may be no trigger event in which case it is called a spontaneous occurrence where there is no correlation with age ,gender ,race socioeconomic status or lifestyle. People with connective tissue disorders such as Marfans , Ehlers -Danlos and Behcets Syndromes are also prone to this condition and importantly fail to respond to any treatment. The hole in the dura in minor trigger events and spontaneous cases occurs in the spinal dura.

How do we Diagnose this Problem?

MRI of the brain may show brain sag with thickening of the dural layers known as enhancement of the leptomeninges and in advanced cases collections of fluid and blood called subdural hygromas. MRI of the brain is mandatory to exclude other diagnosis such as bleeding, infection or tumours in the brain. MRI of the spine may show fluid in the epidural space known as pseudocyst. CT myelogram may show dye leaking out of the spinal dura. Lumbar puncture may show low spinal fluid pressure on manometric measurement. Radionucleotide labelling of CSF may reveal a leak on scintigraphy. Most of these tests are negative and are invasive, time consuming, expensive and may involve significant radiation exposure. Even if all of these tests are performed and find no abnormality with the relevant symptoms the diagnosis can still be made on the patient's history alone.

What are the Treatment Options?

Lying flat (supine) and resting. The CSF pressure is at its lowest when supine and this reduces the rate of CSF leak. Exercise and physical activities will also raise CSF pressure and aggravate the leak. Our bodies make CSF and reabsorb it at the same rate of about 25mls per hour to maintain 150mls of CSF in the average 70 kg adult. Caffeine, increased oral fluids and analgesics relieve symptoms but will not cure the condition. Many of these leaks may invariably be mistaken for a viral illness and most people recover in a few days with bedrest and analgesic support as this allows the body to repair the dural tear. Those people who do not improve (1 in 20000) have a large hole or tear or a jagged tear that cannot be healed naturally by the body. In these situations, the person often cannot drive, work, look after themselves or their family members. Their symptoms may change with time and they often become depressed and suffer psychomoter retardation. Lack of positive findings on medical testing and multiple medical referrals compound this as does frustration shown by employers and family members. In these situations patients are referred for an epidural blood patch.

What is an Epidural Blood Patch?

This procedure involves placing a needle through the skin in between the bones of the back known as the verterbral bodies and advancing the needle to find the space that lies just outside the dural lining. A similar technique is used for labour when a woman is giving birth. The patient sits up and leans forward whilst the area is cleaned with sterile solution and a numbing medicine injected into the skin over the target area. Blood is taken from a vein in the arm and injected slowly whilst the patient reports back on any problems including lower back pressure or pain down the legs. For this reason no sedation is used. Previously it was mentioned that the leak is from the spinal area but we cannot find the exact site so the blood is injected as near to the middle of the back as is safe to do around L1 the highest lumbar vertebra. 20 to 30mls of blood are injected if possible and then the patient lies flat for 4 hours to optimize the spread of the blood before it coagulates. The patient is discharged home with pain relief and asked to rest for 5 days to enable the dura to heal with the CSF pressure as low as possible.

Side Effects and Complications?

Common issues are back pain and constant non-postural headache. They will resolve over 1 to 2 weeks. Bleeding, infection, nerve damage involving sensation ,movement and bladder and bowel function are rare complications minimized by careful technique and cessation of all blood thinning agents such as aspirin, plavix ,non-steroidal anti inflammatories, pradaxa, xarelto, eliquist, fish oil, glucosamine and krill oil prior to the injection.

How does it work?

Platalets, clotting factors, volume of fluid injected and stem cells all play a role. The symptoms may resolve straightaway or over several weeks or partial recovery may occur implying a reduced but persistent leak. Repeat blood patches may be undertaken safely however the back pain is often of increased intensity often . No improvement at all implies that intracranial hypotension is not the diagnosis and the test becomes a diagnostic test of exclusion rather than a curative procedure.