Radionuclide cisternography

A radionuclide cisternography or cisternogram is a medical imaging study that involves injecting a radionuclide by lumbar puncture (spinal tap) into a patient's cerebral spinal fluid (CSF) to determine if there is abnormal CSF flow within the brain and spinal canal termed hydrocephalus.

Indications

Diagnosis of spontaneous cerebrospinal fluid hypovolemia.

See Radionuclide cisternography for spontaneous intracranial hypotension diagnosis.

While radionuclide cisternography has been the historical standard, recent imaging techniques have emerged considering the low sensitivity. Computed tomography cisternography (CTC) with contrast also has low sensitivity, even in active leaks. While high-resolution CT is commonly the initial study of choice, MRI methods, particularly 3D imaging, may prove to be a more sensitive study of choice. CT/MRI combination methods may show promise in localizing CSF leaks. Stratifying by status and etiology may be an important determinant. Further studies investigating various imaging techniques for localizing CSF leaks are needed [1)].

It may also evaluate a suspected leak (also known as a CSF fistula) from the CSF cavity into the nasal cavity. A leak can also be confirmed by the presence of beta-2 transferrin in fluid collected from the nose before this more invasive procedure is performed.

The patient may be instructed to not eat or drink, or take medications such as aspirin or other blood thinners before the procedure. Pledgets can be inserted into the nasal cavity before the procedure when a CSF leak is suspected.

The patient's spinal fluid is injected with a radiopharmaceutical tracer, such as DTPA tagged with indium 111, through a lumbar puncture (spinal tap). The tracer will diffuse up the spinal column and into the brain. The progress of the tracer's diffusion through the CSF will be recorded by a nuclear medicine gamma camera. Images are usually taken immediately, at 6 hours, and at 24 hours. The patient may be asked to return for 48 and 72 hour follow-up scans.

The pledgets will be removed and either imaged with a gamma camera or counted using a gamma counter. If the tracer has leaked onto the pledget through the skull, it will appear on the gamma camera image or register abnormal counts allowing the diagnostician to determine the location of the leak within the sinus cavity. The site of the CSF leak can be plugged with fat or muscle by endoscopic surgery.

Headaches following the procedure are common, but should fade in 3–5 days. Drinking caffeinated liquids, as well as bed rest, is often recommended, though at least one scientific paper disputes the practice.

1)

Eljazzar R, Loewenstern J, Dai JB, Shrivastava RK, Iloreta AM Jr. Detection of CSF Leaks: Is There a Radiologic Standard of Care? A Systematic Review Detection of CSF Leaks: A Systematic Review.

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