

Non-invasive Intracranial Pressure Monitor

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Technology description

Technology Summary:Provides a method and apparatus to measure intracranial pressure in a non-invasive way, using images of the eye.

Background:Intracranial pressure (ICP) is exerted by the cranium on the brain tissue, cerebrospinal fluid (CSF) and the brain's circulating blood volume. ICP is a dynamic phenomenon that constantly changes during such activities as exercise, coughing, straining, arterial pulsation and the respiratory cycle.

Brain trauma and other neurological conditions, including brain tumors, can cause elevated ICP. This elevated pressure can be fatal if prolonged, so it must be monitored and treated.

Currently, ICP is usually measured with a spinal tap, which involves puncturing the subarachnoid space of the spinal cord. For many diseases, this must be done repeatedly to monitor treatment results or disease progression. Such invasive monitoring involves risk and discomfort and is not always feasible. This technology measures ICP in a simpler, non-invasive and far less-painful way. It would benefit the 375,000 Americans who are hospitalized annually with non-fatal brain injuries.

Technology Description:Provides a non-invasive method for measuring ICP by imaging the patient's eye with Optical Coherence Tomography (OCT).

Obtains an approximation of ICP by using OCT images to monitor changes of the optic nerve head.

Elevated ICP causes the optic nerve head to swell.

OCT can detect the preclinical signs of this swelling, called papilledema. These signs are dependent on relative ICP and intraocular pressure (IOP).

Thus, ICP can be calculated by measuring the preclinical signs of papilledema, using OCT combined with IOP measurements.

Application area

Brain injuries

Brain tumors

Other neurological conditions

Advantages

Simple

Non-invasive

Less painful

Institution

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