

Intracranial pressure in space

Astronauts that spend long time in microgravity develop a visual problems. The syndrome is called Visual Impairment Intracranial Pressure (VIIP) and is a NASA's top priority human health risk. Identifying its pathophysiologic mechanisms is essential for designing countermeasures or treatments that will be necessary to prevent or mitigate the potential visual compromise of VIIP with long-duration spaceflight. Although elevated ICP has long been suspected of playing a primary role in the pathophysiology of VIIP, there is "limited evidence to support the hypothesis that increased ICP is responsible for the observed optic disc swelling and choroidal folds" seen in VIIP. To date, ICP has never been measured in humans in zero G in any setting, including parabolic flight or spaceflight.

Invasive ICP measurement is the gold standard for diagnostic testing in clinical practice. If NASA/ESA are to make rapid progress in understanding VIIP, then invasive ICP measurements on astronauts should be performed to demonstrate whether VIIP is associated with pathophysiologic ICP changes. The aim of a joint research effort between research groups in Umeå- Dallas-Seattle and Houston is to perform invasive ICP measurement via lumbar puncture (LP) and accurately on the International Space Station (ISS).

The aim of the development work performed in collaboration with CMTS-MT-FoU is to design, develop and evaluate the measurement system that will be used on earth and at the ISS.

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