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Letter to the Editor re: Ultrasound Guided Lumbar Puncture Is Not Necessarily Useful for VIIP/SANS

Dear Editor:

With high interest we have read the article by D.J. Lerner and coworkers⁵ describing a novel promising method of ultrasound guided lumbar puncture for in-flight evaluation of VIIP/SANS. From a practical point of view, this method may be useful especially in hospital patients with abnormal anatomical conditions (scoliosis, degenerative spine disease, previous surgery, etc.) or in obese patients. However, since an excellent state of health and a sporty stature is a precondition for becoming an astronaut, the need for a visual aid when puncturing appears usually ignorable. Even more, visual guidance will not replace previous practice, periodical training, or experience.

In general, one may raise the question regarding the indication for lumbar puncture during spaceflights: As intracranial pressure is substantially influenced by venous drain which is in turn regulated by a person's position under normal gravity, an elevated intracranial pressure in the absence of gravity is a consequence of reduced venous backflow.⁴ This is pronounced by the fact that cerebral veins do not contain any valves.

The reason for lumbar puncture in the present context may, therefore, be purely scientific. However, as the authors have pointed out,⁵ lumbar puncture bears the risk of several complications. In an environment restricting any external medical support to basic measures,⁴ no relevant complication of a lumbar puncture, therefore, appears to be justifiable. Even a mild sequel of lumbar puncture such as postpunctural headaches may be difficult to treat in microgravity and seriously impairs both the astronaut's physical and psychologic ability to fulfill mission tasks.⁴ Hence, an alternative approach for measuring intracranial pressure such as in-ear measurements—already validated and safer—appears much more useful.²

From a therapeutic point of view, lumbar puncture with active reduction of intracranial pressure by draining substantial amounts of cerebrospinal fluid (CSF) may be justified in the light of a potentially permanent visual disturbance due to optic nerve compression and an increased optic nerve sheath

diameter. In this condition, the risk for procedure-associated complications may be considered. However, recent evidence suggests that even noninvasive techniques can be used effectively to reduce ICP during flight.⁶ Furthermore, VIIP/SANS seems to be caused by a prolonged increase in orbital CSF spaces^{1,7} and morphologic alterations in the brain structure³ even without a noteworthy increase in ICP.⁵ In the light of these findings, therapeutic drainage of CSF to treat VIIP/SANS could be critically questioned.

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