Determination of the subjective visual vertical as a topographic diagnostic tool

Deviations of the subjective visual vertical (SVV) in the fronto-parallel roll plane are the most sensitive sign of acute unilateral brainstem infarctions [1]. They occur in more than 90% of thus afflicted patients in the acute stage and may be helpful when determining not only the level but also the side of the brainstem lesion. If the level of damage is known from the clinical syndrome, the SVV tilt indicates the more-severely affected side. Conversely, if the side of damage is clear from the clinical syndrome, the direction of SVV tilt indicates the level in the brainstem. All SVV tilts are ipsiversive in unilateral peripheral vestibular or ponto-medullary lesions (vestibular nuclei) below the crossing of the "graviceptive pathways". All SVV tilts in unilateral ponto-mesencephalic brainstem lesions are contraversive and indicate involvement of the medial longitudinal fasciculus or the interstitial nucleus of Cajal [1]. There are two loci, a lesion of which may induce either ipsiversive or contraversive SVV tilts. One locus is the posterolateral thalamus with involvement of the vestibular thalamic sub-nuclei [1]; the other is the dentate nucleus, which when spared in acute cerebellar strokes induces ipsiversive tilts and when damaged induces contraversive tilts [2].

Recently, an ipsilateral vestibulothalamic tract adjacent to the medial lemniscus was described [3]. Patients with acute anteromedial pontomesencephalic infarctions showed ipsiversive SVV tilts when the ipsilateral graviceptive pathway running from the vestibular nuclei, within the medial lemniscus, to the posterolateral thalamus was affected.

It makes sense to investigate the SVV not only in the upright position as was done earlier in large studies, but also using a small-angle body tilt in the roll plane (E-effect) or large-roll angles (A-effect). In this issue of the Schweizer Archiv für Neurologie und Psychiatrie, Tarnutzer and coworkers report on six patients with sub-acute lesions along graviceptive pathways. When roll-tilted, the patients exhibited increased SVV tilt, which could be explained by combining an SVV offset in an upright position with body-position dependent errors when tilted in the roll plane (4). These effects were larger on the ipsilesional side and smaller on the contralesional side. At follow-up 4 months later, tilt angles had improved. This was obviously due to central compensation of the vestibular tone imbalance. The authors concluded that assessing SVV tilts in body-tilt position may disclose subtle deficiencies. In view of the small number of patients in the study, however, these data may require further investigations with regards to their clinical relevance for diagnostics and balance physiotherapy.

Few neurologists have a device for measuring SVV tilts quantitatively. Recently, however, a simple, self-made bucket method, based on an idea by Frisén [5], was devised [6]. With it the subject estimates true verticality by attempting to properly align a straight line visible on the bottom of the bucket that is rotated at random by the examiner. This method is an easily performed and reliable bedside test for determining monocular and binocular SVV (6). Another test has been described that requires the patient to put a self-illuminated rod in an apparently upright position in a three-dimensional plane in total darkness [7]. With this method, patients with ocular tilt reaction could be shown to have combined pitch and roll deviations. Correlation analysis, geometric modelling and experimental self-observations indicated that deviations in pitch were attributable to cyclotorsional asymmetries between the eyes [7].

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