Intraparietal sulcus approach

Capilla-Guasch et al. studied the white matter layers traversed in the lateral transcortical parietal approach through the intraparietal sulcus (IPS), adding a transillumination technique. With this knowledge, they selected the safest highway to improve this particular approach.

An in-depth study of the white matter tracts was done on 24 cerebral hemispheres (12 human whole brains). The Klinger technique and microsurgical dissection techniques were used under a ×6 to ×40 magnification. The transillumination technique (torch illuminating the ventricular cavity) was used to expose the layers surrounding the VA and, thus, guide the dissection.

Taking as a reference the IPS on the cerebral surface, we identified the following white matter layers ordered from the surface to the ependyma: U fibers, superior longitudinal fascicle, arcuate fascicle, vertical occipital fascicle, sagittal stratum with the optic radiations and tapetum fibers. The transillumination technique allowed for the easier identification of the white matter deep periventricular layers.

The knowledge of the main fascicles in the path and neighborhood of the VA allowed to understand how certain neurological functions can be affected by lesions at this level and to select the most appropriate way to avoid damaging relevant fascicles [1)].

IPS demonstrated an interrupted course in 36% of the specimens while its branching pattern was variable. The sulcus anterior half was found to overly the atrium on all occasions. Four discrete, consecutive white matter layers were identified en route to the atrium, ie, the arcuate fibers, the arcuate segment of the superior longitudinal fasciculus, the corona radiata and tapetum, with the arcuate segment being near to the dissection trajectory.

Given the angle of brain transgression during the intraparietal sulcus approach, Koutsarnakis et al. found the optimal dissection area to be the very middle of the sulcus. The IPS-postcentral sulcus meeting point, in contrast to previous thought, proved to risk potential injury to the arcuate segment of the superior longitudinal fasciculus, thus affecting surgical outcome [2)].

References

1)
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2)
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