Cerebellum Mapping

Cerebellar damage during posterior fossa surgery in children can lead to ataxia and risk of cerebellar mutism syndrome. Compartmentalisation of sensorimotor and cognitive functions within the cerebellum has been demonstrated in animal electrophysiology and human imaging studies. Electrophysiological monitoring was carried out under general anesthesia to assess the limb sensorimotor representation within the human cerebellum for assessment of neurophysiological integrity to reduce the incidence of surgical morbidities. Thirteen adult and pediatric patients undergoing posterior fossa surgery were recruited. Sensory evoked field potentials were recorded in response to mapping (n = 8) to Electrostimulation of limb nerves or muscles. For motor mapping (n = 5), Electrostimulation was applied to the surface of the cerebellum and evoked EMG responses were sought in facial and limb muscles. Sensory evoked potentials were found in two patients (25%). Responses were located on the surface of the right inferior posterior cerebellum to stimulation of the right leg in one patient, and on the left inferior posterior lobe in another patient to stimulation of the left forearm. No evoked EMG responses were found for the motor mapping. The present study identifies challenges with using neurophysiological methods to map functional organization within the human cerebellum and considers ways to improve success [1)].

1)

Ashida R, Walsh P, Brooks JCW, Cerminara NL, Apps R, Edwards RJ. Sensory and motor electrophysiological mapping of the cerebellum in humans. Sci Rep. 2022 Jan 7;12(1):177. doi: 10.1038/s41598-021-04220-9. PMID: 34997137.