Superior sagittal sinus occlusion

Cerebral sinus thrombosis, which constitutes a small percentage of all strokes, usually affects young individuals and can lead to venous stroke. Ischemic and hemorrhagic Stroke are associated with Spreading Depolarization (SD) waves in brain tissue, propagating through the affected areas and causing a transient disruption of ionic homeostasis and neuronal function. This interaction highlights the complexity of the neurological consequences associated with SD.

Sanchez-Porras et al. investigated the occurrence of SDs following the occlusion of the superior sagittal sinus (SSS) in a gyrencephalic model, specifically swine. To instigate an occlusion, they surgically clipped the middle third of the SSS. The animals were grouped and monitored using one of three methods: electrocorticography (ECoG) alone, ECoG with intrinsic optical signal (IOS) imaging, or ECoG in conjunction with laser speckle contrast and oxygen imaging (LSCI). Post-mortem, the brains were analyzed using 2,3,5-triphenyl tetrazolium chloride (TTC) staining to check for venous infarction. Our results confirmed the spontaneous occurrence of SDs in the gyrencephalic swine brain after SSS occlusion, which was detectable via all monitoring methodologies. SD activity was most frequent in the first-hour post-occlusion, subsequently diminishing. IOS imaging identified four unique hemodynamic responses, while TTC staining indicated no infarction. This research is the first to document SDs in the gyrencephalic swine brain following SSS occlusion, laying the groundwork for future investigations in both animal models and human clinical studies [1)].

1)
Sanchez-Porras R, Ramírez-Cuapio FL, Gutiérrez-Herrera MA, Puig-Lagunes ÁA, Albiña-Palmarola P, López-Navarro JM, Suárez-Gutiérrez MA, Díaz-Peregrino R, Sandoval-Lopez DA, Fischer G, Vazifehdan F, Woitzik J, Santos E. Characterization of spreading depolarizations in swine following superior sagittal sinus occlusion: a novel gyrencephalic model study. Thromb J. 2025 Feb 12;23(1):15. doi: 10.1186/s12959-025-00689-w. PMID: 39940023.

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