Hippocampal atrophy

Reduced hippocampal volume: hippocampal atrophy.

Syndrome of mesial temporal lobe epilepsy

Basically, there are two major hypothesis regarding a possible impact of intracranial aneurysm treatment type on hippocampus subfield volumes. The first hypothesis is that the open skull surgery itself and the associated trauma to the calvarium, dura mater, and brain parenchyma lead to reactive hippocampal atrophy even if the limbic system itself remains intact. The other hypothesis is that the expectations associated with open aneurysm clipping before and after surgery lead to increased experiences of fear and mood disturbances which might lead to hippocampal atrophy via the neuroendocrine axis and elevated blood cortisol levels.

Hedderich et al., observed a negative correlation for hippocampus subfields and the number of intracranial aneurysms but not for number of interventions. This is interesting because it might suggest that a more extensive or 'traumatic' treatment (such as clipping of several intracranial aneurysms during a single procedure) is related to lower hippocampus subfield volumes. Alternatively, one could hypothesise that the psychological stress associated with knowing about a high number of intracranial aneurysms might lead to dysregulation in the limbic system and consecutive hippocampus subfield volume reductions. The association between hippocampal volume and various psychiatric disorders, particularly depression is known from previously conducted research. Especially 'fear-related' psychiatric disorders like depression or posttraumatic stress disorder are prone to hippocampal atrophy [1)].

1)
Hedderich DM, Reess TJ, Thaler M, Berndt MT, Moench S, Lehm M, Andrisan T, Maegerlein C, Meyer B, Ryang YM, Zimmer C, Wostrack M, Friedrich B. Hippocampus subfield volumetry after microsurgical or endovascular treatment of intracranial aneurysms-an explorative study. Eur Radiol Exp. 2019 Mar 21;3(1):13. doi: 10.1186/s41747-019-0092-7. PubMed PMID: 30900111; PubMed Central PMCID: PMC6428873.