Sudden unexpected death

Sudden unexpected death in epilepsy (SUDEP) is typically unwitnessed but can be preceded by seizures in the period prior to death. Peri-ictal respiratory dysfunction is a likely mechanism for some SUDEP, and central apnea has been shown following amygdala stimulation. The amygdala is enriched in neuropeptides that modulate neuronal activity and can be transiently depleted following seizures. In a postmortem SUDEP series, Somani et al. sought to investigate alterations of neuropeptidergic networks in the amygdala, including cases with recent poor seizure control.

In 15 SUDEP cases, 12 epilepsy controls, and 10 nonepilepsy controls, they quantified the labeling index (LI) for galanin, neuropeptide Y (NPY), and somatostatin (SST) in the lateral, basal, and accessory basal nuclei and periamygdala cortex with whole slide scanning image analysis. Within the SUDEP group, seven had recent generalized seizures with recovery 24 hours prior to death (SUDEP-R).

Galanin, NPY, and SST LIs were significantly lower in all amygdala regions in SUDEP cases compared to epilepsy controls ($P < .05$ to $P < .0005$), and galanin LI was lower in the lateral nucleus compared to nonepilepsy controls ($P < .05$). There was no difference in the LI in the SUDEP-R group compared to other SUDEP. Higher LI was noted in epilepsy controls than nonepilepsy controls; this was significant for NPY in lateral and basal nuclei ($P < .005$ and $P < .05$).

A reduction in galanin in the lateral nucleus in SUDEP could represent acute depletion, relevant to postictal amygdala dysfunction. In addition, increased amygdala neuropeptides in epilepsy controls support their seizure-induced modulation, which is relatively deficient in SUDEP; this could represent a vulnerability factor for amygdala dysfunction in the postictal period [1)]

1)
Somani A, Perry C, Patodia S, Michalak Z, Ellis M, Sisodiya SM, Thom M. Neuropeptide depletion in the amygdala in sudden unexpected death in epilepsy: A postmortem study. Epilepsia. 2020 Jan 20. doi: 10.1111/epi.16425. [Epub ahead of print] PubMed PMID: 31958887.