The hippocampus is susceptible to damage in patients with epilepsy and in animals with seizures caused by excitotoxic agents. The effect of vitamin D on hippocampal apoptosis related with seizures has not been reported. However, epileptic patients have an increased risk of hypovitaminosis D which is most likely due to the effects of antiepileptic drugs. Therefore, in a study of Şahin et al., from Trabzon, it was aimed to evaluate the effects of vitamin D on hippocampal apoptosis related with seizures by using pentylenetetrazol (PTZ) and kainic acid (KA) in rats.

Male Sprague Dawley rats, aged 5.5 weeks, were randomly divided into six groups: control, vitamin D, PTZ, KA, PTZ + vitamin D and KA + vitamin D groups. The groups that received vitamin D were given 500 IU/kg of vitamin D daily for two weeks in addition to a standard diet. At the end of this period, PTZ and KA were applied to trigger seizures in the rats in the seizure groups. 24 h after the administration of PTZ and KA, the rats were decapitated. In the hippocampal region, apoptosis was assessed by TUNEL and brain-derived neurotrophic factor (BDNF), Bax, caspase-3 and c-fos activation were evaluated by immunohistochemical method.

BDNF level increased while c-fos, Bax and caspase-3 levels decreased ($p < 0.0001$, in all) in the hippocampal neurons of the groups that were pre-treated with vitamin D before the administration of PTZ and KA, in comparison with the PTZ and KA groups. Vitamin D significantly decreased the number of apoptotic cells in these rats in comparison with the PTZ and KA groups ($p < 0.0001$).

This study indicates that vitamin D has neuroprotective effects on hippocampal apoptosis induced by PTZ and KA in rats. With this study it is suggested that keeping vitamin D levels within normal limits may be beneficial for patients with epilepsy, especially children [1)].

1)
Şahin S, Gürgen SG, Yazar U, İnce İ, Kamaşak T, Acar Arslan E, Diler Durgut B, Dilber B, Cansu A. Vitamin D protects against hippocampal apoptosis related with seizures induced by kainic acid and pentylenetetrazol in rats. Epilepsy Res. 2018 Dec 15;149:107-116. doi: 10.1016/j.eplepsyres.2018.12.005. [Epub ahead of print] PubMed PMID: 30584976.