

## NEURONAL DAMAGE IN STATE EPILEPTICUS - LITERATURE REVIEW

---

***Alicia Viviana Mendez***

Doctor by: Universidade Técnica Privada  
Cosmos, Guayaramerin, Bolívia

***Pedro Luís Nogueira da Silva***

Student of medicine course- Universidade  
Federal do Rio de Janeiro, Rio de Janeiro, RJ,  
Brazil

***Luiz Gustavo Vieira Gonçalves***

Biodoctor by Centro Universitário UNA,  
Catalão, GO, Brazil

***Samantha Cristina da Silva Chaves***

Student of medicine course- Universidade  
Federal de Catalão, Catalão, GO, Brazil

***Rai Medeiros Veiga***

Student of medicine course- Centro  
Universitário do Pará, Belém, PA, Brazil

***Adrian Emanuel Rosales Mendez***

Neurocientista pela Universidade de  
Roehampton, Londres, Reino Unido

***Maria Vitória Lima Camilo***

Student of medicine course- Centro  
Universitário Maurício de Nassau, Aracajú,  
SE, Brazil

***Larissa Cavalcanti de Andrade Nunes  
Mattos***

Student of medicine course- Centro  
Universitário Maurício de Nassau, Aracajú,  
SE, Brazil

***Marcos Roberto Soares Filho***

Student of medicine course- Universidade  
Potiguar, Natal, RN, Brazil

All content in this magazine is  
licensed under a Creative Com-  
mons Attribution License. Attri-  
bution-Non-Commercial-Non-  
Derivatives 4.0 International (CC  
BY-NC-ND 4.0).



**Renan Dantas Gonçalves da Silva**

Student of medicine course- Universidade Potiguar, Natal, RN, Brazil

**Gabriel Filgueiras Lima**

Student of medicine course- Faculdade de Ciências Médicas, Cabedelo, PB, Brazil

**Cassia Sousa Ferreira**

Student of medicine course- Universidade Brazil, Fernandópolis, SP, Brazil

**Luiz Gustavo de Sant'Anna Santos**

Student of medicine course- Centro Universitário de Brasília, Brasília, DF Brazil

Conflict of interests: nothing to disclose.

**Abstract: Introduction:** Status epilepticus is defined as the presence of a convulsive crisis lasting more than 30 minutes, or the presence of several sub-entering seizures without recovery of consciousness between them (FONSECA, et al., 2022). **Objective:** Gather information about the neuronal damage present in status epilepticus. **Result:** This state has a great capacity for neuronal damage, generating definitive sequelae or not. The period in which neuronal damage begins is not exactly known, but studies in primates reveal that cytoarchitectural changes begin to be identified after 60 minutes of uncontrolled seizures (BLAKA et al., 2022). **Conclusion:** The possible sequelae are diverse, such as dysfunction of higher functions, such as cognition, and lower functions, such as motor control, balance and proprioception (DE CASTRO, 2021).

**Keywords:** Status Epilepticus; Neural degeneration; Chronic brain injury.

## INTRODUCTION

Status epilepticus is defined as the presence of convulsive seizures (generalized, simple partial or complex partial) lasting more than 30 minutes, or the presence of several sub-entering seizures without recovery of consciousness between them (FONSECA, et al., 2022).

We can divide it into three main clinical types according to the cause, being prolonged febrile crisis (most common cause among children under three years of age); idiopathic, which includes children who are already epileptic and who start to trigger more seizures due to problems with adherence to treatment, such as forgetting doses of medication, abrupt suspension of barbiturates or benzodiazepines or due to an intercurrent extracranial infection such as pneumonia, otitis and gastroenteritis; Or symptomatic, that is, caused by an infection or injury to the central nervous system

such as meningitis, encephalitis or trauma; metabolic abnormality such as hypoglycemia or hypocalcemia; exogenous intoxication; and severe epilepsies that are difficult to control due to brain structural abnormalities, such as lissencephaly and schizencephaly; inborn errors of metabolism (ALVARADO QUIMIS et al., 2020).

This state has a great capacity for neuronal damage, generating definitive sequelae or not. The period in which neuronal damage begins is not exactly known, but studies in primates reveal that cytoarchitectural changes begin to be identified after 60 minutes of uncontrolled seizures (BLAKA et al., 2022).

With continuous electrical discharges, a large amount of excitatory neurotransmitters is released, such as glutamate, in addition to neuronal influx of calcium, accumulation of arachidonic acid and prostaglandins, leading to cell death. In addition, there is edema, venous congestion and small cerebral petechial hemorrhages (DE OLIVEIRA COSTA et al., 2020).

The brain regions most vulnerable to status epilepticus are the hippocampus, amygdala, cerebellum, medial cortical areas and thalamus. Status epilepticus also presents systemic repercussions triggered by dysregulation of the autonomic nervous system, such as hypotension, shock and lactic acidosis and by acute tubular necrosis due to myoglobinuria thanks to the damage to skeletal muscle cells by repetitive contractions (DE CASTRO, 2021).

Continuous electroencephalogram at the bedside is indicated if the condition is

refractory to first-line drugs and/or if the patient is on mechanical ventilation or cured (neuromuscular paralysis) (DE SANTI, 2023).

## **MATERIAL AND METHODS**

PubMed database and was limited to articles between 2019 and 2023 that met the criteria of being literature reviews and case reports.

Next, the keywords in the article titles were analyzed and those whose themes best fit our objective were selected.

6 articles were selected for full reading.

## **DISCUSSION**

The major discussion surrounding status epilepticus is the sequelae resulting from neuronal damage caused by neurotransmitters, edema, venous congestion and small petechial hemorrhages. As the brain regions most vulnerable to status epilepticus are the hippocampus, amygdala, cerebellum, median cortical areas and thalamus, the possible sequelae are diverse, such as dysfunction of higher functions, such as cognition, and lower functions, such as motor control, balance and proprioception (DE CASTRO, 2021).

## **CONCLUSION**

This state has a great capacity for neuronal damage, generating definitive sequelae or not. The period in which neuronal damage begins is not exactly known, but studies in primates reveal that cytoarchitectural changes begin to be identified after 60 minutes of uncontrolled seizures (BLAKA et al., 2022).

## REFERENCES

1. BLAKA, Kamila, et al. Estado de mal epiléptico super refratário concomitante à infusão de propofol: relato de caso. 2022.
2. DE SANTI, Renan. Manejo do status epilepticus em unidade de terapia intensiva: estudo retrospectivo. 2023.
3. DE OLIVEIRA COSTA, Lílian Lúcia, et al. Atualização em epilepsia: revisão de literatura. Revista de medicina, v. 99, n. 2, p. 170-181, 2020.
4. FONSECA, André Luís Basso, et al. Crise convulsiva febril em crianças: uma revisão narrativa. Revista eletrônica acervo médico, v. 3, p. E9780-e9780, 2022.
5. DE CASTRO, Jheovanne Anjos, et al. Aspectos da abordagem terapêutica a pacientes com epilepsia-revisão da literatura. Revista científica do Tocantins, v. 1, não. 1 pág. 1-11, 2021.
6. ALVARADO QUIMIS, Carla Daniela, et al. Fatores associados, manifestações clínicas e complicações de crises convulsivas em menores de 15 anos. 2020. Tese de doutorado.