

## Possible Sudden Unexpected Death in Epilepsy (SUDEP) – A Case Report

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### Abstract

SUDEP i.e sudden unexpected death of someone with epilepsy, who was apparently healthy, is an area of medical concern. The mortality due to epilepsy is approximately two to three times more than the expected in similar population without epilepsy. Every year, more than 1 out of 1,000 people die from SUDEP. It is a leading cause of death in young adults, i.e risk increases to more than 1 out of 150 with uncontrolled seizures.

Hereby, we present a case of 21 years old male, known case of seizure disorder on treatment (sodium valproate), was brought to Kasturba Hospital, Manipal, with history of altered sensorium, skin rash, vomiting and episode of seizure. The deceased died within 2 hours of admission. The causes of SUDEP and diagnostic criteria will be discussed.

**Key words:** Epilepsy, Seizure, Sodium valproate.

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### Introduction:

The meaning of the term Epilepsy and Seizure should be clearly understood as they are distinguished. Epilepsy is a condition where a person has a recurrent seizures due to chronic underlying process. It is a clinical phenomenon rather than a single disease entity. Seizure, derived from latin word, means —to take possession of is characterized by paroxysmal event of abnormal, excessive or synchronous neuronal activity in brain.<sup>1</sup> Sudden Unexpected Death in Epilepsy (SUDEP) is defined as sudden, unexpected, non-traumatic, non-drowning death in an individual with epilepsy, witnessed or unwitnessed, in which post-mortem examination does not reveal an anatomic or toxicological cause for the death.<sup>2</sup>

Mortality associated with epilepsy is an area of concern, as around 50 million of world population are affected, and 80 % of such

population are low and lower middle class.<sup>3</sup>

### Case Report:

This case had a relatively short and vague history as provided by the family members to the treating clinician. The period of survival was only 2 hours at Kasturba Hospital, Manipal. The deceased was 21 year old male, a known case of seizure disorder and was on treatment with sodium valproate since 2 years. (Doses and other relevant history was not available). He was admitted with altered sensorium, with vomiting and skin rashes since last 2 days. On examination, his Glasgow Coma Scale was 5/15, and vitals were within normal limit. Systemic examination did not reveal any abnormality, and complete nervous system examination and reflexes were not elicitable. As routine investigation was advised, he suddenly developed cardiac arrest. Code blue was activated, patient was immediately intubated and Cardio Pulmonary Resuscitation was initiated as per the Basic Life Support and Advanced Cardiac Life Support Protocol. But in spite

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of all the effort patient succumbed. The routine blood investigations and toxicological analysis did not reveal any abnormal results and poison respectively. The cause of death was given as SUDEP.

### Discussion:

Epilepsy as a whole is a complex clinical condition with various forms of seizures. The hall mark for epilepsy as a whole is its classification, proper diagnosis, seizure control. As per The International League against Epilepsy (ILAE) Commission on Classification and Terminology, they have come up with an updated approach to classification of seizure, which is based on the clinical features and associated electroencephalographic findings.<sup>1</sup> However other distinctive features such as etiology, cellular substrate, genetic factors, etc. are expected to be added up subsequently as more is learned about the pathophysiologic mechanism.

Epilepsy-related causes of death account for 40% of mortality in persons with epilepsy and include the following :

- Death due to stroke, tumour, space occupying lesions.
- Sudden unexpected death in epilepsy (SUDEP).
- Accidents during epileptic attack
- Status epilepticus.
- Complication due to medication.

To make the matter worse, it is fear, misunderstanding, discrimination and social stigma that have surrounded epilepsy for centuries. This persists even today in our society and has a wider impact on the quality of life for people with the disorder and their families.

**Approach to the case of Epilepsy:** Other area of concern is the determining the type of seizure as it will enable clinician in diagnostic and therapeutic approach. Often the cases of SUDEP, and various other forms of seizure are unwitnessed or go unnoticed.

There are various overlapping pathophysiological events which may

contribute to SUDEP and the mechanisms are multifactorial.

**Respiratory:** These events include:

1. Asphyxiation: secondary to airway obstruction due to prone position at the time of death.
2. Central apnoea: Direct propagation of electric discharge to respiratory centre.
3. Neurogenic pulmonary oedema: Due to alpha-adrenergic response, generalized vasoconstriction, and pulmonary hypertension.

**Cardiovascular:** The events include fatal arrhythmias which can occur during the ictal attack and inter-ictally.

**Medication:** It includes:

- Sub therapeutic dose leading to poor seizure control.
- Withdrawal from medications leading to arrhythmias, e.g. Carbamazepine.
- Study on Lamotrigine showing its effect on sodium channel modulating effect.

**Genetics:** It includes:

The following genes have been studied in SUDEP autopsy cases: KCN SCN1A, LQTS, KCNH2, and SCN5A<sup>4</sup>.

The US Food and Drug Administration (FDA) and Burroughs-Wellcome had formulated certain criteria for diagnosing SUDEP in 1993 which are as follows:<sup>5</sup>

- The patient has epilepsy (recurrent, unprovoked seizures).
- The patient died unexpectedly while in a reasonable state of health.
- The death occurred suddenly (i.e., within minutes).
- The death occurred during normal and benign circumstances.
- An obvious medical cause of death could not be determined at autopsy.
- The death was not the direct result of a seizure or Status epilepticus.

The FDA/Burroughs-Wellcome also formulated the following categories<sup>2</sup>:

- Definite SUDEP - Cases meet all criteria and have sufficient descriptions of the circumstances of the death and a post-mortem report

- Probable SUDEP - Cases meet all criteria but lack post-mortem data
- Possible SUDEP - SUDEP cannot be ruled out but evidence is insufficient regarding the circumstances of death and no post-mortem report is available.
- Not SUDEP - Other causes of death are established clearly or the circumstances make the diagnosis of SUDEP highly improbable.

Our case falls under the “Possible SUDEP” category as there are insufficient evidences in a known case of epilepsy. The symptoms with which the patient was suffering for the past two days were not sufficient to give cause of death and the post-mortem report was not available.

**Management:** It should be based on detailed history, general physical and systemic examination and identification of underlying cause and precipitating factors. Some baseline investigations are mandatory prior to initiation of drugs, e.g., complete blood count and liver function tests in case of Valproic Acid.

Treatment should be multimodal, treat the underlying conditions, avoid precipitating factor and also address the psychological and social issues. The selection of drugs should be based on the therapeutic effect, convenience of dosing, cost, and potential side effect. Drugs like Carbamazepine, Sodium Valproate and Lamotrigine are used in focal seizure whereas Valproic Acid and Lamotrigine is generally used in generalized seizure.<sup>6</sup> However the selection of drugs varies in each case, and are advised as per the clinician’s assessment. Patients are advised to consult their physician whenever required. People with leukocyte antigen allele, HLA-B\*15:02, are at particular high risk of developing serious skin reactions from carbamazepine and phenytoin, so racial background and genotype are to be considered.<sup>1</sup>

As far as SUDEP is concerned recent study by Hessdorfer et al<sup>7</sup> has suggested that risk

of SUDEP is higher in untreated patients, with poor compliance and with sub therapeutic drug levels. The study also showed that monotherapy with antiepileptic drugs (AEDs) was protective.

### Conclusion:

So Patient education, family and society awareness and planning for future by extensive research programs will be an added advantage. Also the newer study suggesting that Genetics also play an important role in the etiology, so it should also encourage researchers.

**Conflict of interest:** NIL

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