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Use of Antiepileptics in Different Causes of Acute Asymptomatic Seizures: Review Article

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ABSTRACT

Background: Acute symptomatic seizures (ASS), also known as reactive, triggered, or situation-related seizures, used to be described as a seizure that occurred at the time of or in close proximity to the occurrence of a recorded brain damage, seizures that occur within a short period of time after neurological or systemic assaults, and are therefore regarded to be a symptom of an acute disease affecting the brain in some way, shape, or form. After the active phase of central nervous system (CNS) infection or inflammatory disease has ended, based on persistent clinical, laboratory, or imaging finesse, a time window exists during which those acute seizures can be considered symptoms of an acute disease, and the International League Against Epilepsy (ILAE) suggested that it is one week following stroke, head trauma, or anoxic encephalopathy. The therapy of ASS is different from that of unprovoked seizures, therefore antiepileptic treatment may be required in the acute phase, but it is rarely necessary long term because acute symptomatic seizures are unlikely to return unless the underlying acute causative disease develops once again.

Objective: To make an overview of new guidelines for treatment of most common causes of acute symptomatic seizures.

Conclusion: Acute symptomatic seizures are those caused by an acute general medical/surgical or neurological insult and generally tending not to recur with no need for long-term antiepileptic drugs (AEDs) treatment.

Keywords: Acute symptomatic seizures, Antiepileptics, Central nervous system.

INTRODUCTION

Beghi *et al.* [(1)] defined if you have an acute CNS insult caused by a metabolic or toxic or structural or viral process or inflammation, you are more likely to experience acute symptomatic seizures, and the time between the injury and onset of the seizure may vary based on your underlying clinical condition. Instead of terms such as triggered seizure, reactive seizure, or situation-related seizure, they suggested using the phrase acute symptomatic seizure instead.

Seizures that occur within a short period of time after neurological or systemic assaults, are therefore regarded to be a symptom of an acute disease affecting the brain in some way, shape, or form. After the active phase of CNS infection or inflammatory disease has ended, based on persistent clinical, laboratory, or imaging finesse, a time window exists during which those acute seizures can be considered symptoms of an acute disease, and the International League Against Epilepsy (ILAE) suggested that it is one week following stroke, head trauma, or anoxic encephalopathy[(2)].

The aim of this review article is to make an overview of new guidelines for treatment of most common causes of acute symptomatic seizures.

Methods:

A search strategy has been performed to determine the related literature. Initially, the objective of review was identified. Relevant keywords and synonymous key words had been used.

These databases were searched for articles published in English in 3 data bases [PubMed – Google scholar- science direct] and Boolean operators (AND, OR, NOT) had been used such as [Antiepileptics AND acute symptomatic seizures OR central nervous system] and in peer-reviewed articles between April 2008 and June 2021; a 13-year date range was selected, however, the range of time interval for researches was wide as there's scarcity of data on the particular reviewed, accurate and depth in the retrieved literature. Documents in a language apart from English have been excluded as sources for interpretation was not found. Papers apart from main scientific studies had been excluded: documents unavailable as total written text, conversation, conference abstract papers and dissertations.

Epidemiology of ASS:

Nearly 40% of all seizures, 40% of all afebrile seizures, and 50%–70% of all episodes of status epilepticus are caused by acute symptomatic seizures. Acute symptomatic seizures had an overall life-time risk of 3.6 percent, which is close to the likelihood of developing epilepsy. Medical admissions in underdeveloped nations have an acute symptomatic seizure rate of 2% to 5%, while 3.5 percent of intensive care unit patients had acute symptomatic seizures [(3)].

As many as 29–39 seizures per 100,000 people occur each year, according to the National Institutes of Health (NIH). Acute symptomatic seizures are more common in the younger and older populations. There are several typical triggers, including fever, traumatic brain injury (TBI), cerebrovascular illness, drug withdrawal and infection [(4)].

Treatment of ASS:

According to **Halawa**[(5)] epilepsy does not have to be diagnosed in all situations where seizures are

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triggered by metabolic imbalances or structural brain damage. Early identification of the aetiology of provoked seizures is essential for proper management. Since acute symptomatic seizures are unlikely to recur unless the underlying acute causative ailment recurs, antiepileptic medication may be required in the acute phase, but it is not normally required in the long term. Despite this, some people are still at a greater risk of developing epilepsy, particularly those with cerebrovascular problems, head injuries, and infections of the central nervous system.

- **Ischemic Stroke:**

The American Heart Association and the European Stroke Organization have declared that the use of AEDs to prevent a seizure is not encouraged by these organisations [(6)].

The following has been suggested by **Sculier and Gaspard** [(7)] for treatment of seizures after ischemic stroke:

1. Continue or resume the antiepileptic treatment and keep the AED levels at the optimal therapeutic level for the infarct and pre-existing seizures.
2. At least two weeks of observation and consideration of treatment for big, cortical infarctions, with a hemorrhagic component, following an infarction.
3. Monotherapy should begin after an infarct and an early seizure. Continue for two weeks if subcortical or lacune. Continue for 1–2 years if there is anterior circulation cortical infarct (seizure-free interval). Before stopping treatment, get an EEG done.
4. Monotherapy for at least two years for infarct and late first seizure (seizure-free interval). Before discontinuing treatment, have an EEG evaluation performed and establish a personalised treatment plan.
5. In the Neurological Intensive Care Unit (NICU), treat the infarct in accordance with the Status epilepticus (SE) protocol that has been established. Treat for at least four years if SE was the initial epileptic symptom and the patient has not had a seizure in that time period. Before discontinuance, conduct an EEG assessment and tailor treatment to each patient's needs. If SE was followed by early or late seizures, the patient should get ongoing treatment for the likely future.

- **Intracerebral Haemorrhage: (ICH)**

Patients with ICH who have a mental status that is abnormally low for their level of brain damage should have continuous electroencephalogram (EEG) monitoring. Antiepileptic drugs should be used to treat both clinical seizures and electrographic seizures that are accompanied by changes in mental health [(8)].

- **Subarachnoid Haemorrhage (SAH):**

Patients with SAH have been reported to have seizure rates as high as 27% in the literature. Antiepileptic medicines (AEDs) are routinely given after SAH in many centres because of the high likelihood of seizures and the potential repercussions of a seizure in the context of an unsecured aneurysm [(9)].

If a patient experiences a clinical or electrographic seizure, antiepileptic medications should be administered. It's been advised that anti-epileptic drugs (AEDs) prophylaxis should be started promptly and continued until the aneurysm is secured in cases of aneurysmal subarachnoid haemorrhage, due to the potential danger of repeated rupture if the patient is suspected of having a convulsive seizure, by some authors [(10)].

- **Cerebral Venous Thrombosis (CVT):**

The International Study on Cerebral Vein and Dural Sinus Thrombosis (ISCVT) found that AEDs should be used to treat patients with onset or presenting seizures, with levetiracetam, lacosamide, and probably sodium valproate being the best options for injectable forms. For long-term treatment, levetiracetam, lamotrigine, and gabapentin are more appropriate options, but there is no consensus on the duration of treatment. It is usual for people with ASS to develop post-CVT epilepsy within the first six to 12 months following the acute stage. However, if seizures recurred during or after drug tapering, antiepileptic treatment should be continued for additional 1–2 years or more for individuals with ASS [(11-12)].

- **Trauma:**

After a traumatic brain injury, the Brain Trauma Foundation recommends 7 days of preventive anti-seizure medicine [(13)].

Because of the higher metabolic demands, increased intracranial pressure, and neurotransmitter toxicity associated with seizures, the majority of doctors prescribe prophylactic anticonvulsants for 1 week after a head injury. Patients with penetrating injuries, a subdural hematoma that must be evacuated, a continuously epileptiform EEG, early seizures, and repeated contusions may need anti-seizure drugs for longer than one week, according to some authors [(14)].

- **Subdural hematoma (SDH):**

Prophylactic AEDs focusing just on SDHs have not been studied in a controlled trial to date. Prophylactic AED use has been proven retrospectively to significantly reduce epileptic seizures [(15)].

- **CNS infection:**

1. Encephalitis:

Patients with a suspicion of viral encephalitis should be treated with empiric intravenous acyclovir, ideally within six hours of presentation, until a clear diagnosis

can be made, with the goal of addressing the underlying cause [16].

Currently, there is no evidence to support the routine use of AEDs as prophylactics in all patients with encephalitis due to the variable prevalence of ASS. However, preventive AED use may be acceptable if a high-risk population for acute symptomatic seizures can be identified [17].

Acute seizures (focal or generalized), status epilepticus, severe encephalopathy, medically induced coma, and focal neurologic impairments have previously been identified as risk factors for pulmonary embolism (PE) and intractable epilepsy in pediatric cohorts (AEDs). Multiple EEG abnormalities (slowing, multi-focal/focal) and MRI involvement of the cortex/subcortical areas, along with a possible viral etiology, have all been found in this patient (herpes simplex virus [HSV], Mycoplasma pneumoniae) [18].

2. Meningitis:

Treatment for suspected bacterial meningitis should include immediate empiric antibiotics and steroids, as well as antiepileptic medicines for three days. Pneumococcal meningitis is associated with an increased incidence of late spontaneous seizures, which need long-term antiepileptic medication. In individuals who experience late seizures following the acute phase of bacterial meningitis, long-term antiepileptic medication is warranted [19].

- **COVID-19:**

COVID-19-related new-onset seizures should be regarded acute symptomatic seizures, and long-term AEDs medication is frequently not required, unless a late seizure occurs. When a seizure occurs, the treating physician should endeavour to identify the underlying cause and manage it rapidly and effectively. SARS-CoV-2 may have a role in inducing seizures in these individuals if a thorough examination of the general, neurology, and imaging systems, as well as attempts to isolate the virus from CSF, are carried out [20].

- **Eclampsia:**

The immediate aftermath of an acute convulsion episode necessitates supportive treatment, including monitoring and establishing airway patency, verifying oxygenation, and preventing aspiration of the mother's blood [21].

Pregnancy-inducing drugs, such as intravenous magnesium, are used to treat eclampsia. At least 24 hours after the last seizure and/or at least 24 hours following delivery, intravenous magnesium is administered [22].

- **Hypertensive encephalopathy:**

Antihypertensive drugs should be administered intravenously at first. Initially, oral antihypertensive medications should be avoided due to their longer onset of action and inability to titrate to effect. Nicardipine, labetalol, fenoldopam, and clevidipine are all regularly used intravenous antihypertensive medications for this illness. Patients with renal insufficiency may benefit more from the dopamine receptor agonist fenoldopam, according to research showing that it protects the kidneys from damage. When symptoms and neuroimaging findings begin to improve, antiseizure medication may be provided and continued on a long-term basis.

The antiseizure drug can normally be discontinued after one to two weeks, as recurrence of seizures following the cure of encephalopathy is extremely unusual. If a patient is pregnant or has impaired renal function, they may need a different type of seizure medication than someone who is healthy [23].

- **Electrolyte disturbances:**

Monitoring and correcting metabolic and hydro-electrolytic diseases, particularly those related with serum sodium abnormalities, necessitates the measurement of serum osmolality [24].

CONCLUSION

Acute symptomatic seizures are those caused by an acute general medical/surgical or neurological insult and generally tending not to recur with no need for long-term AEDs treatment.

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