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EPILEPSY SYNDROME AFTER HEMORRHAGIC STROKE, CLASSIFICATION, EPIDEMIOLOGY

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Abstract: Stroke is the second leading cause of death worldwide after cardiovascular diseases and the leading cause of disability. To date, despite the fact that the development of early stroke treatment principles has led to an increase in the life expectancy of patients, the incidence of stroke-related epilepsy is increasing. Epilepsy after stroke accounts for 10% of all seizures and 55% of primary diagnosed seizures in the elderly. In 1 in 10 adult patients with epilepsy, the cause of the disease is a previous stroke.

Keywords: brain, stroke, hemorrhagic, epidemiology, seizure

A stroke is an acute disorder of blood circulation in the brain, which is caused by a violation of blood circulation in the cerebral vessels, causing damage to brain cells and neurological problems. The disease can cause irreversible changes and is a condition that requires urgent medical attention.

Currently, PSE has different clinical definitions. In 2014, the definition of epilepsy was revised by the International League Against Epilepsy (ILAE). According to that definition, epilepsy is a disease of the brain defined by at least two unprovoked (or reflex) seizures occurring more than 24 h apart, one unprovoked (or reflex) seizure with an at least 60% probability of future seizures, which is similar to the probability after two unprovoked seizures. Seizures after stroke can be divided into early seizures and late seizures according to the time interval between the onset and cerebrovascular events.

Epilepsy that shows up after a hemorrhagic stroke can be grouped in a few different ways, depending on when the seizures start, the kind of stroke, what the seizures look like, why they happen, and what it means for the patient long-term. Here's a simpler breakdown:

1. **When the seizures happen**

1. **Early seizures** happen in the first week after the bleed. They're often triggered by the immediate mess the blood causes—like swelling, irritated brain cells, or toxic stuff from broken-down blood.
2. **Late seizures** come after that first week (usually between one week and six months). These are caused by longer-term changes, like scar tissue forming, brain wires growing back in weird ways, or a permanent "seizure hotspot" developing. If someone keeps having unprovoked seizures after this point, it's called **post-stroke epilepsy (PSE)**—basically a chronic epilepsy caused by the stroke damage.

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2. **Type of stroke** Hemorrhagic strokes (bleeds in the brain or around it) are more likely to cause epilepsy than ischemic strokes (blockages). About 10–15% of people who have a brain bleed end up with epilepsy, mainly because blood sitting on the brain's surface is super irritating.
3. **What the seizures look like** Using the latest ILAE (2017) rules:

1. Most are **focal** (starting in the part of the brain where the bleed happened).
2. Sometimes they spread and become **focal-to-bilateral tonic-clonic** (the classic shaking seizure).
3. Purely **generalized** seizures (like big tonic-clonic or drop attacks) are less common and usually show up later or when a huge area of the brain is affected.

4. **What's actually going on inside the brain** A bunch of things team up to make the brain more "twitchy":

1. The blood clot squashes and kills neurons right away.
2. As blood breaks down, it releases iron and other junk that causes inflammation and oxidative stress.
3. Support cells (glia) overgrow, the brain's chemical balance gets thrown off (too much glutamate), and the blood-brain barrier gets leaky. All of this can turn a patch of brain tissue into an epilepsy trigger zone.

5. **How worried should we be? (risk groups)**

1. **Low risk**: small, deep bleeds with no seizures in the first week.
2. **Medium risk**: moderate-sized bleeds or a couple of mild seizures early on.
3. **High risk**: big bleeds that hit the cortex, especially if seizures started right away. The bigger the bleed and the more cortex involved, the higher the chance of lifelong epilepsy.

Occur in patients of different ages, including newborns and the elderly. When acute seizures and late seizures were studied in patients with hemorrhagic stroke by E. Haapaniemi, acute seizures were observed more often in the first 3 days. K. Alme et al. observed seizures in 66 of 2598 ischemic stroke patients, which was 2.5%. A study by P. Redfors et al. in 2019 showed that acute seizures accounted for 2.4%, and nocturnal seizures accounted for 27%. In total, 50% of acute seizures occurred within 24-48 hours after stroke. The prevalence of nocturnal seizures varies among different authors, depending on the nature of patient selection, study inclusion criteria, sample size, duration of observation period, criteria for diagnosing ICD, and many other factors. The prevalence of ICD has been shown to range from 5% to 30% in various studies. Due to the updated terminology and changes in the diagnostic criteria for ischemic stroke, this indicator is 3-6% in the first year after stroke, and 12% in the first 10 years. Studies over the past 10 years have shown that the risk of developing ischemic stroke is higher in people over 65 years of age. According to W. Hauser and co-authors, the risk of developing seizures after II is low in people under 50 years of age and high in people over 70 years of age. Seizures after GI are more common in younger patients. According to V.M. Gabashvili and co-authors, ischemic stroke in people over 60 years of age is associated with atherosclerosis of the cerebral arteries, or

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atherosclerosis with arterial hypertension. According to M. Lossius, S. Adelow and co-authors, ischemic stroke is not associated with age. Other studies have confirmed that age 60-65 is a risk factor for ischemic stroke. T.V. According to Danilova, the percentage of nocturnal seizures in the age group 31-49 is higher than in the elderly. The authors attribute the high percentage of ICD development among young people to the fact that most of these patients survive, the methods of examining those who are able to work are more careful, and the clinical manifestations of ICD seizures in the elderly are not as pronounced.

Conclusion: The impact of post-stroke seizure syndrome on the recovery of patients' bodily functions, mortality, and quality of life has been studied by many authors. Studies have shown that repeated TS leads to an increase in the amount of brain tissue damage and a slowdown in the recovery of functions. Clinical studies have shown that TS, in particular, has a negative impact on patient recovery. TX leads to a prolongation of inpatient treatment, a decrease in the patient's quality of life, an increase in the injury index, and a deterioration in the patient's condition due to prolonged administration of antiepileptic drugs. In the treatment of post-stroke seizure syndrome, ignoring the pathogenesis of the disease, clinical and neurological characteristics, and the use of incorrect tactics during the attack require consideration of effective treatment methods. Therefore, a modern approach to the diagnosis and treatment of post-stroke epilepsy, the correct improvement of the correct diagnostic and therapeutic approach are the requirements of the present time.

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