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Seizure After Ischemic Stroke; A Diagnostic and Management Challenge in a Resource Limited Setting: A Case Report

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ABSTRACT

Background: Poststroke seizures occur in 6-8% of the adult population that suffer an ischaemic stroke. This pathological process increases metabolic stress and cell death, the extent of vascular obstruction in the brain, the mortality rate and long term morbidity. Poststroke seizures represent one of the most important complications of stroke that must be recognised and treated in a timely fashion. These are classified as either early or late depending on the time of onset after stroke.

Case Report: A 51 year old woman presented to the Emergency Department of RSUD Dr Murjani following a generalised tonic-clonic seizure 3 hours prior that had lasted for two minutes. On arrival the patient subsequently had two further generalised tonic-clonic seizures with a one hour interval between. Whole body stiffness and a fixed upward gaze were observed. A non-contrast CT Head displayed a diffuse infarct of the left frontotemporoparietooccipital lobes. The patient had a history of stroke one year previously and a second stroke one month ago with resultant persistent weakness of the right upper and lower limbs. This patient was diagnosed with poststroke seizure of late onset and treated in hospital with diazepam 10mg and phenytoin 100mg three times per day.

Discussion: Poststroke seizure is described as either early-onset (occurring in the first week after a stroke) or late-onset (occurring after the first week). Based on the International League Against Epilepsy (ILAE) definition, a single unprovoked late-onset poststroke seizure occurring more than seven days after a stroke is considered as epilepsy with a high risk (>60%) of recurrent seizures that may occur for up to ten years thereafter. Hence this risk factor must be identified and treated correctly to prevent significantly increased morbidity for the patient.

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BACKGROUND

Stroke represents one of the main causes of acquired epilepsy in adults [(1)]. Poststroke seizures are generally classified as early-onset or late-onset[(2)]. There is no consensus on the classification of poststroke seizures, however the majority of authoritative research defines early-onset seizures as occurring within 7-14 days of stroke[(3)]. Poststroke seizures occurring beyond this period are considered late-onset[(2)]. The incidence of early-onset poststroke seizures is reported as between 2-33%[(4)].

CASE REPORT

A 51 year old woman presented to the Emergency Department of General Regional Hospital (RSUD) Dr Murjani, Kalimantan Indonesia following a generalised seizure three hours prior that lasted approximately two minutes. On arrival to the hospital, they suffered another generalised tonic-clonic seizure, with a third episode one hour later. During the seizures in hospital, whole body stiffness with rhythmic jerking and superiorly displaced gaze were observed. Their past medical history was significant for recurrent stroke, with their first stroke one year prior and the second stroke one month ago. They subsequently suffered persistent right sided weakness. They had no history of seizures or epilepsy. Their National Institute of Health Stroke Scale (NIHSS) score was 14[(5)].

On physical examination, the patient was awake and alert, blood pressure 122/75mmHg, heart rate 102 beats/min,

respiratory rate 20/min, temperature 36.6°C and oxygen saturations (SpO2) 99% on room air. Neurological examination revealed pupils equal and reactive to light with preservation of consensual and direct light reflexes, nil neck stiffness, normal bicep/tricep/brachioradialis/patellar/ankle jerk reflexes and grossly normal tone. Babinsky sign (plantar reflex) positive on the Right side and negative on the Left. Coordination and sensation were not formally assessed. Gross motor examination revealed a right sided hemiparesis, with 3/5 power in the right upper limb, 4/5 power in the right lower limb and 5/5 power to the left upper and lower limbs. Laboratory test abnormalities included a raised leucocyte count of $16x10^3$ and hyponatremia of 130mmol/L. Systems review did not reveal any significant cardiovascular, respiratory or nephrological abnormality. Their blood sugar level was within normal limits at the time. Their past medical history included hypertension and type 2 diabetes mellitus with poor adherence to medication.

Radiological imaging included an Antero-Posterior Chest X-ray which displayed cardiomegaly and opacification indicating a potential pneumonia. Previous non-contrast head CT (computed tomography) displayed a 17 Hounsfield Unit hypodense lesion representing a diffuse infarct of the left frontotemporoparietooccipital lobes.

The patient was diagnosed with poststroke seizure of late onset and treated in hospital with diazepam 10mg and Phenytoin 100mg three times/day. After five days of inpatient treatment they were discharged from hospital.

DISCUSSION

Poststroke seizures have an incidence of 6-8% in adults who have sufferred an ischaemic stroke[6]. These seizures increase metabolic stress leading to cell death and can increase the extent of infarcted tissue in the brain leading to higher mortality and reduced quality of life[2]. Poststroke seizures represent an important complication that needs to be identified and treated[6]. Treatment depends on whether these are early or late-onset seizures[7].

A recent meta-analysis has found the incidence of early-onset poststroke seizures to be 3.3%, whereas the incidence of late-onset poststroke seizures is 18 per 1000 person-years [8]. Another study found that the incidence of seizure within the first 24hrs poststroke is 3.1%, from a cohort of 6000 patients[9]. Not all individuals suffering a poststroke seizure develop epilepsy. Recorded rates vary widely but between 2-4% are diagnosed with poststroke epilepsy[10].

In a number of studies, various factors were found to be predictive of the risk of early poststroke seizures. Risk factors included cardioembolic stroke, cortical infarction, haemorrhagic transformation, the severity/extent of stroke and past medical history of coronary artery disease or atrial fibrillation[6]. Early poststroke seizures are associated with increased mortality and morbidity. Furthermore, this may reduce the functional independence of an individual and can lead to reduced quality of life with increased need for support services due to disability[4].

This case refers to a patient who suffered a late-onset poststroke seizure who it is suspected will develop poststroke epilepsy. With the limited facilities available in a rural Indonesian hospital the only investigations available are physical examination, limited biochemical blood tests and non-contrast CT. In this situation there is high utility for a risk stratification scoring system to predict the risk of poststroke. The SeLECT score fulfils this role by integrating clinical and radiological features to stratify risk. Predictive factors include severity of stroke, large-artery atherosclerotic aetiology, early seizures, cortical involvement and middle cerebral artery territory involvement. The highest score (9) predicts >80% risk of epilepsy in the five years poststroke[7].

The underlying pathophysiological mechanisms for early and late-onset poststroke seizures are very different[11]. And it is important to have a clear definition to discriminate between these, since it can assist in predicting the risk of poststroke epilepsy[10]. In the acute phase, ion shifting, neurotransmitter excitotoxicity, metabolic dysfunction and coagulation cascade derangement all contribute to early-onset poststroke seizures. Whereas late-onset poststroke seizures arise from persistent structural abnormalities and gliosis which occur in the final phase of a stroke and lead to structural neuron damage and circuit dysfunction which are epileptogenic[8].

The risk of recurrent unprovoked seizures after early onset poststroke seizure is approximately 30%, such that these patients are not considered as having epilepsy due to the relatively low risk of recurrence[6]. However, late-onset seizures carry a >60% risk of further unprovoked seizures hence this was considered sufficient to give a diagnosis of poststroke epilepsy in this case and context[1].

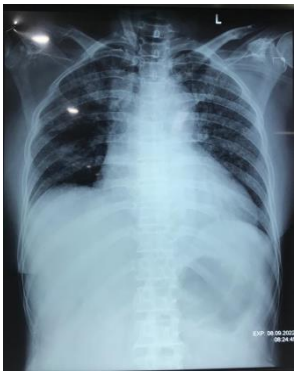

Figure 1. Thorax PA X-ray

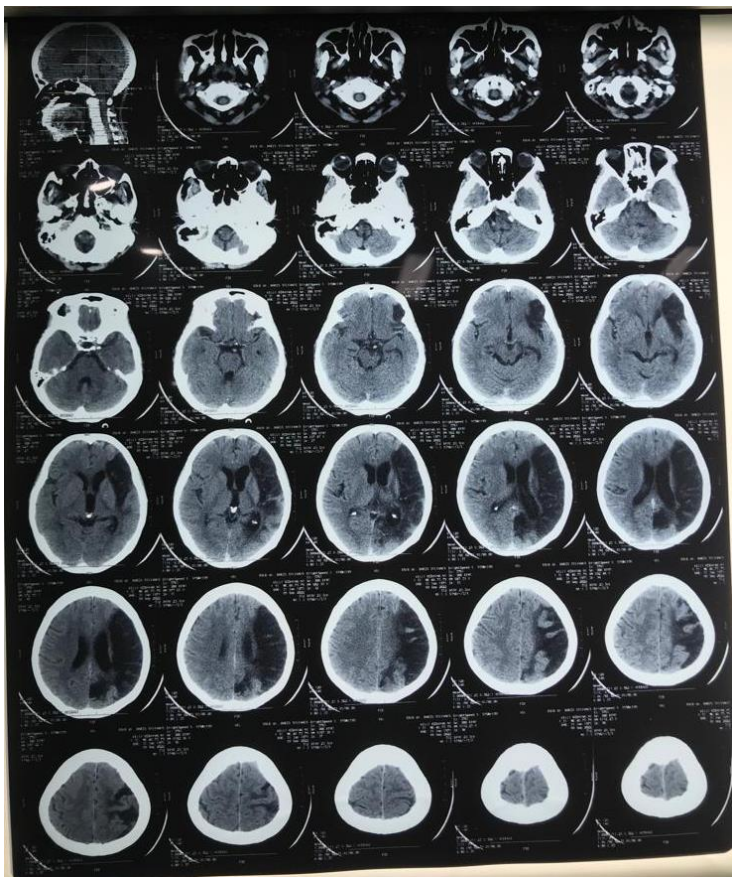

Figure 2. Non-contrast Head CT

a Calculation of SeLECT score

	SeLECT score (points)
(Se) Severity of stroke	
NIHSS ≤3	0
NIHSS 4–10	1
NIHSS ≥11	2
(L) Large-artery atherosclerosis	
No	0
Yes	1
(E) Early seizure (≤7 days)	
No	0
Yes	3
(C) Cortical involvement	
No	0
Yes	2
(T) Territory of MCA	
No	0
Yes	1

Table 1. SeLECT score[12]

DISCLOSURE STATEMENT

The authors received permission and agreement from the patient and all doctors responsible for or involved in their care to utilise their clinical information in this journal article and for publication. The patient understood that their name and initials will not be published and efforts made to hide their identity, however complete anonymity cannot be guaranteed. We do not have any undisclosed financial or personal association, consultation or other significant relationship with products, production, organisations or service provision that could be considered a conflict of interest in the context of this case report and presentation.

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