

CASE REPORT: CHRONIC EMBOLIC STROKE WITH BRONCHOPNEUMONIA IN GERIATRIC PATIENTS

Johanes Andrew¹, Dana Profit Sampurno², Rayhan Al-ghifari Iridansyah Siregar³, Eric⁴

Universitas Tarumanagara, Jakarta, Indonesia
Email: johanes.andrew1170@gmail.com

Abstract

Stroke is a neurological deficit of the central nervous system caused by vascular issues, affecting around 800,000 individuals annually. According to Riskesdas 2018, the prevalence of stroke is approximately 10.9%, with the highest rates in East Kalimantan and the lowest in Papua. In this study, we present a case of a 79-year-old male diagnosed with embolic stroke at Royal Taruma Hospital. The patient was admitted with a fever that persisted for four days prior to hospitalization. Comprehensive anamnesis, physical examination, and diagnostic tests confirmed a diagnosis of febris e.c. bronchopneumonia and hemiparesis duplex e.c. chronic CVDNH. Embolic strokes occur when a cerebral artery is occluded by a clot originating from the heart, aortic arch, or a major cerebral artery, often leading to maximal neurological deficits at the onset. This case underscores several risk factors for embolic stroke, including hypertension, dyslipidemia, and advanced age. The patient was treated with rivaroxaban (10 mg once daily) for anticoagulation and meropenem (1 g three times daily) to manage the infection. Post-treatment, a comprehensive geriatric assessment revealed no signs of urinary or fecal incontinence, and the patient did not exhibit polypharmacy. Following intervention, there was a notable improvement in neurological function and resolution of infectious symptoms. This case highlights effective management strategies for a 79-year-old male with complex medical conditions and emphasizes the necessity of timely interventions in elderly patients for better prognostic outcomes.

Keywords: Stroke, Embolic Stroke, Bronchopneumonia, Geriatric patients

*Correspondence Author: Johanes Andrew
Email: johanes.andrew1170@gmail.com



INTRODUCTION

Stroke is classically characterized as a neurological deficit attributed to an acute focal injury of the central nervous system (CNS) by a vascular cause, including cerebral infarction, intracerebral hemorrhage (ICH), and subarachnoid hemorrhage (SAH), and is a major cause of disability and death worldwide (Balbinot et al., 2018; Nugroho Danu et al., 2022; Turkar et al., 2021).

Stroke is divided into two categories, namely ischemic stroke and hemorrhagic stroke (Alexandrov, 2019; Aulia, SKM, MBA-HM, MEc, PhD et al., 2017; Baoum et al., 2022). Ischemic stroke is caused by occlusion of a blood vessel which usually occurs due to one of the following three factors: Atherosclerosis with thrombosis of cerebral or extracerebral vessels, cerebral embolism, and occlusion of small cerebral vessels within the brain parenchyma (Feske, 2021; Laurent et al., 2022; Mosconi & Paciaroni, 2022; Zhu et al., 2022). While hemorrhagic stroke is one type of stroke pathology due to rupture of intracerebral blood vessels caused by various etiologies such as chronic hypertension, coagulopathy, malformations of cerebral blood vessels and others (Hägg-Holmberg et al., 2019; Hairani et al., 2023; Khan et al., 2020; Lekoubou et al., 2021).

The incidence of stroke is about 800,000 people per year. The incidence of stroke has decreased, but the morbidity has increased. The risk of stroke is higher in women because of the longer life expectancy. Globally, at least 5 million people die from stroke and millions more remain disabled. Stroke is a very serious problem in Asia, which has more than 60% of the world's population, and many of its countries are developing economies. In these countries there are differences in health care and this will continue to be a challenge for disease control. Deaths from stroke are higher in Asia than in Europe and America (Dong et al., 2022; Rashid & Hossain, 2022; Turana et al., 2021). In Indonesia based on Riskesdas 2018, the prevalence of stroke is about 10.9% where the highest prevalence is in East Kalimantan and the lowest is in Papua.

Stroke risk factors are divided into non-modifiable factors and modifiable factors (Bakraa et al., 2021; Boehme et al., 2017; Chen et al., 2022; Mehndiratta et al., 2015). Non-modifiable risk factors include age, gender and race, while modifiable risk factors include hypertension, smoking, obesity, dyslipidemia, lack of physical activity and alcohol consumption habits. General management includes maintaining airway and ventilation, controlling blood pressure, temperature and other general medical conditions (Sweet et al., 2017). While the specific management of stroke is adjusted to the cause of the stroke itself. In ischemic stroke, specific treatments that can be given include intravenous thrombolysis therapy, neurointervention, administration of anticoagulants and antiplatelet agents.

Despite advances in stroke management, significant gaps remain in understanding the long-term outcomes of different treatment strategies, particularly in diverse populations with varying healthcare access (Albart et al., 2022; Kuriakose & Xiao, 2020; Ramadhoni, 2021). Additionally, there is a lack of comprehensive studies examining the interplay between modifiable and non-modifiable risk factors in specific demographic groups. These gaps underscore the need for further research to optimize treatment protocols and improve patient outcomes across different populations.

The purpose of this study was to analyze and document cases of ischemic stroke in elderly patients, as well as to evaluate the effectiveness of the management implemented in our institution. This study aims to provide deeper insights into optimal therapeutic approaches and to understand the influence of risk factors in local contexts.

The benefits of this study are expected to provide valuable information for clinical practice in hospitals as well as enrich the literature on stroke management, especially in the older population. In addition, the results of this study are expected to be a reference for future research and help in the development of better clinical guidelines for stroke management in Indonesia.

In this study, we report on diagnosis and management of ischemic stroke case of one patient from our institution.

RESEARCH METHODS

A 79-years-old male was admitted to the Royal Taruma Hospital with a complaint of fever since 4 days before his admission to the hospital. The fever is felt continuously, the temperature is measured at 38oC at home. The patient also has a cough since the onset of fever with purulent phlegm. The patient also complained of weakness both of the extremity since 4 days ago, it felt so heavy that the patient could not move.

The patient had a history of high blood pressure for more than 10 years and CVD for more than 2 years, a history of high cholesterol and diabetes was denied.

On physical examination, we found GCS score was 11 (E4M5V2), blood pressure 131/61 mmHg, heart rate 77x/min, respiratory rate 22x/min, temperature 37,50C and oxygen saturation 97%. In the patient's lungs, ronchi and wheezing were found in both lung fields. Neurology examination shows absents in meningeal sign. On cranial nerve examination, On examination of the cranial nerves, defects in nerves IX and X were found. On examination of motor tone and trophy shows hypertonic, atrophy and hemiparesis duplex. Physiologic reflex was found absent in the patella and achilles of both extremities, no pathologic reflexes were found, sensoric and autonomic function.

The laboratory examination (26/09/22) shows increase in leukocytes, liver enzyme and hs-CRP, decrease in albumin. The laboratory examination (27/09/22) shows increase in D-Dimer and decrease in HDL-Cholesterol. On MRI brain (26/09/22) shows no sign of acute infark, multiple chronic infarct in basal ganglia bilateral, capsula interna genu-crus posterior bilateral, and lacunar infarct on the left subcortical frontal, corona radiata and cerebral penduncle bilateral. Multiple hemosiderin deposit (chronic microbleed) in the white matter left temporal lobe and thalamus bilateral (Figure 1, Figure 2). Senilis diffuse brain atrophy with prominen leukoaraiosis in the lateral paraventricular, sentrum semiovale and subcortical frontoparietal bilateral (Figure 3). On thorax radiography show heart is not enlarged with aorta elongation, consolidation and infiltrate on the both of the lung suggestive bronchopneumonia (Figure 4).

Based on history, physical examination, laboratory and MRI brain result, the patient was diagnosed with febris e.c bronchopneumonia and hemiparesis duplex e.c chronic CVDNH. The patient treated with meropenem 3x1 g, paracetamol 3x1 g, pantoprazole 1x40 mg, aspirin 1x80 mg, hepamax 3x1 tab, vip albumin 3x1. On the next day (27/09/22), when the d-dimer result is high and there are no sign of acute infarct, aspirin drug is stopped and replaced with rivaroxaban 1x10 mg.

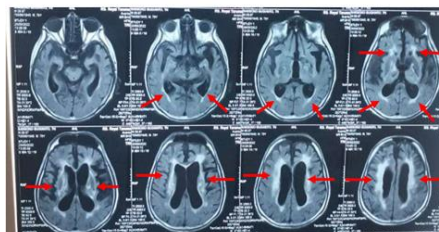


Figure 1. MRI Brain Axial. There is Multiple Chronic Infarct in basal ganglia bilateral, capsula interna genu-crus posterior bilateral, and lacunar infarct on the left

subcortical frontal, corona radiata and cerebral penduncle bilateral. Multiple hemosiderin deposit in the white matter left temporal lobe and thalamus bilateral.

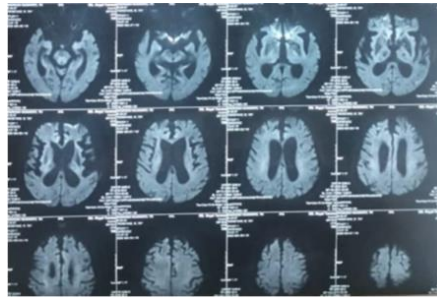


Figure 2. MRI Brain Axial DWI. There is No Sign of Water Restricted Area (There is No New Infarct)



Figure 3. MRI Brain Axial T2 Diffuse Brain Atrophy Senilis. There is a Fissure Widening (Left Picture Both Circle) and Sulcus Widening (Right Picture Both Circle)



Figure 4. Thorax AP Supine There is Consolidation and Infiltrate on The Both Lung Suggestive Bronchopneumonia (Red Circle)

RESULTS AND DISCUSSION

Stroke is classically characterized as a neurological deficit attributed to an acute focal injury of the central nervous system (CNS) by a vascular cause, including cerebral infarction, intracerebral hemorrhage (ICH), and subarachnoid hemorrhage (SAH), and is a major cause of disability and death worldwide.¹ Ischemic stroke is caused by occlusion of a blood vessel which usually occurs due to one of the following three factors: Atherosclerosis with thrombosis of cerebral or extracerebral vessels, cerebral embolism, and occlusion of small cerebral vessels within the brain parenchyma. Two pathogenetic mechanisms can produce ischemic stroke — thrombosis and embolism. However, the distinction is often difficult or impossible on clinical grounds. One of the most common ischemic stroke classification schemes defines common stroke subtypes as follows: cardioembolic, large artery atherosclerosis, lacunar, and cryptogenic. An embolism causes a stroke when a cerebral artery is occluded by the clot distal to the heart, the aortic arch, or a large cerebral artery. Embolic strokes often produce maximal neurologic deficits at the time of attack. When a TIA precedes an embolic stroke, particularly one from a cardiac source, the symptoms usually vary between attacks because the vascular area affected is different. In this case, the patient was diagnosed with chronic embolic stroke based on history, physical examination and supporting examinations (radiologic and laboratory examinations).

Stroke risk factors are divided into two, namely modifiable and non-modifiable risk factors. Modifiable risk factors are hypertension, diabetes mellitus, smoking habits, gout and dyslipidemia.

Modifiable risk factors:

1. Hypertension is the most common risk factor and as many as 60% of hypertensive patients will have a stroke. Hypertension can cause ischemic or hemorrhagic stroke. The risk of thrombotic stroke in hypertensive patients is 4.5 times higher than normotensive and at age >65 years, hypertensive patients have 1.5 times higher risk than normotensive.
2. 10-30% of diabetic patients can have a stroke. A study of 472 stroke patients over a 10 year period showed a history of DM in 10.6% of men and 7.9% of women.
3. Smoking can worsen stroke attacks by 3.5 times which is caused by several mechanisms, one of which is caused by cigarette derivatives, namely nicotine. Nicotine is thought to have an effect on the sympathetic nervous system and the thrombotic process.
4. Hyperuricemia is an important risk factor for stroke. One study in Japan found that hyperuricemia is also thought to be a risk factor for platelet aggregation. Based on meta-analysis, the lowest risk of stroke is on uric acid serum range of 3–5 mg/dL.
5. The components of dyslipidemia that are thought to play a role in stroke are low HDL levels and high LDL levels. Both of these things accelerate atherosclerosis of coronary and cerebral blood vessels. The target for reducing LDL cholesterol to prevent stroke is <70 mg/dL.

Non-modifiable risk factors include age, gender and race. The incidence of stroke increases with age. This is due to the increase in atherosclerosis with increasing age and other risk factors, namely atrial fibrillation and hypertension, which are also common in the

elderly. Men have a risk of stroke 1.25-2.5 times greater than women, but in the elderly, the prevalence of stroke in women is higher than men. Black people in America have a higher risk of stroke than whites. Typically, new symptoms in ischemic stroke develop over seconds to minutes, or they may be present on waking from sleep. Based on clinical presentation alone, it is difficult to consistently differentiate between hemorrhagic or ischemic stroke, and can only be distinguished with certainty through neuroimaging. In this case, the patient has several risk factors where the modifiable risk factors include high blood pressure and dyslipidemia, while the non-modifiable risk factor is old age.

Currently, no laboratory findings are diagnostic of cerebral infarction. All patients, however, should be evaluated with a complete blood count, prothrombin time and partial thromboplastin time, basic metabolic panel, finger-stick blood glucose level, and cardiac enzymes. Unless there is a clinical suspicion for coagulopathy or the patient is anticoagulated, the results of the laboratory tests should not delay the decision to administer thrombolysis.¹² All patients with stroke symptoms should undergo immediate neuroimaging with non-contrast computed tomography (CT). The main goals of neuroimaging in patients with suspected ischemic stroke are to rule out the presence of nonischemic central nervous system lesions and to differentiate between ischemic and hemorrhagic stroke. Non-contrast CT is considered sensitive enough to detect mass lesions, such as brain masses or abscesses, as well as to detect acute bleeding. However, less than two thirds of strokes were detected by non-contrast CT at three hours post-infarction.

Magnetic resonance imaging (MRI) has better resolution than non-contrast CT, and therefore has greater sensitivity for detecting acute ischemic stroke. However, non-contrast CT is faster, available, inexpensive, and can be performed in people with implanted devices (eg, pacemakers) and in people with claustrophobia. If a patient is within the timeframe of intravenous thrombolytic therapy, guidelines recommend that non-contrast CT or MRI be performed to exclude intracerebral hemorrhage and evaluate ischemic changes. MRI examination in this case did not reveal an acute infarction in this patient. This patient had bilateral multiple chronic infarcts in basal ganglia, bilateral posterior genu-crura internal capsule, and lacunar infarct on the left subcortical frontal, bilateral corona radiata and cerebral peduncle. And found senile diffuse brain atrophy with prominent leukoariosis in the lateral paraventricular, centrum semiovale and subcortical frontoparietal bilateral.

Electrocardiogram should be performed on all ischemic stroke patients admitted to evaluate the presence of atrial fibrillation and myocardial ischemia. Cardiac ultrasound can be considered after an ischemic stroke to evaluate for a source of cardioembolism, although the yield is overall low in patients without a history of heart disease.¹² Assessment of stroke grade can be done using the National Institutes of Health Stroke Scale (NIHSS), which focuses on level of consciousness, visual and motor function, sensation, cerebellar function, and language skills. If the score is 0 then there is no stroke, a score of 1-4 indicates a minor stroke, 5-15 moderate stroke, 15-20 moderate to severe stroke and 21-42 severe stroke where in this patient the NIHSS score is 12.¹⁷

Stroke management can be divided into two, namely acute phase management/general management to stabilize circulation and stop the pathological process and specific management for ischemic stroke. General management includes maintaining airway and ventilation, controlling blood pressure, temperature and other general medical conditions. While the specific management of stroke is adjusted to the cause of the stroke itself. In ischemic stroke, specific treatments that can be given include intravenous thrombolysis

therapy, neurointervention, administration of anticoagulants and antiplatelet agents. In this case, the patient was given prophylactic treatment to prevent recurrent stroke using rivaroxaban 1x10 mg. This patient was given anticoagulants which are the first-line therapy to prevent recurrent embolic strokes.

Infection after stroke is common, associated with poor outcomes and potentially deadly. Stroke appears to induce endogenous immunosuppression through suppression of cytokine induction, making patients more vulnerable to infection. It has been proposed that this might be an adaptive mechanism aimed at minimizing post-ischemic immune activation against brain antigens. In this case, patient was diagnosed with bronchopneumonia. Patients with stroke with low mobility and impaired swallowing function are more susceptible to aspiration pneumonia, thus indicating that there is a correlation between the stroke and the lung infection he is currently experiencing.

After a thorough examination, it was found that the patient had hemiparesis and difficulty swallowing, which contributed to a high risk of aspiration. Antibiotic therapy with meropenem (1 g three times a day) is started to treat the infection, and patients are also given respiratory support to mitigate further complications. During treatment, close monitoring of the patient's vital signs and neurological function is carried out. The results of the evaluation showed an improvement in the patient's respiratory condition, with a decrease in infection symptoms within one week. In addition, patients show improved mobility with appropriate physical therapy. Multidisciplinary treatment involving neurology, pulmonology, and rehabilitation is key in optimizing patient care outcomes.

Geriatric syndrome is a non-disease clinical condition of older persons characterized by multiple causes determining a unified manifestation. By definition, it implies a group of signs and symptoms variably occurring together and characterizing a particular abnormality. This implies that geriatric syndromes present a multifactorial and extremely heterogeneous background, grounding its roots in clinical, psychological, social, and environmental vulnerabilities.²⁰⁻²² Many of the most common conditions cared for by geriatricians, including delirium, falls, frailty, dizziness, syncope and urinary incontinence, are classified as geriatric syndromes. While heterogeneous, geriatric syndromes share many common features. They are highly prevalent in older adults, especially the frail elderly. Their impact on quality of life and disability is substantial. Multiple underlying factors, involving multiple organ systems, tend to contribute to, and define, geriatric syndromes.¹⁹⁻²¹ The results of a comprehensive geriatric assessment in this case were that there were no signs of urinary incontinence or faecal incontinence. The drugs used in this patient are therapeutic drugs so that in this patient there are no inappropriate prescriptions. In this patient, cognitive and mood examinations could not be performed.

CONCLUSION

The case described a 79-year-old male who was diagnosed with febris e.c bronchopneumonia and hemiparesis duplex e.c CVDNH based on anamnesis, physical examination, laboratory tests, and MRI brain results. The patient was treated with antibiotics and anticoagulants to address the underlying issues contributing to his condition. The management of this patient highlights the importance of a multidisciplinary approach in the treatment of stroke and its complications. Early intervention and appropriate antibiotic therapy were crucial in addressing the bronchopneumonia, which is a common complication in stroke patients, particularly those with impaired mobility and swallowing function. The prognosis for our patient is generally good, considering the timely administration of treatment and the patient's responsiveness to therapy. Continuous monitoring and rehabilitation efforts will be essential in enhancing his recovery, particularly in regaining mobility and independence. This case underscores the need for healthcare providers to remain vigilant for potential infections in stroke patients, as well as to implement preventive measures to reduce the risk of aspiration pneumonia. Further research is warranted to explore the long-term outcomes of stroke patients with similar complications, aiming to optimize management strategies and improve patient quality of life.

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