International Journal of Research in Medical Sciences
Paramita IGAADP. Int J Res Med Sci. 2024 Aug;12(8):2997-2999
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20242230

Case Report

Middle cerebral artery stroke in chronic heart failure patient: a case report

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Received: 29 May 2024
Revised: 01 July 2024
Accepted: 02 July 2024

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ABSTRACT

Middle cerebral artery (MCA) stroke describes the sudden onset of a focal neurologic deficit resulting from hemorrhagic or ischemic disruption of the MCA's blood supply. Ischemic stroke is frequently divided into several etiological categories, including atherosclerotic, cardio embolic, lacunar, and cryptogenic. Chronic heart failure (CHF) is also common cause of ischemic stroke. A 66-year-old male patient came to the emergency room at Kasih Ibu Gianyar Hospital with complaints of suddenly not being able to talk since 8 hours before entering the hospital. There is weakness on the right side of the upper extremities, and weakness on the right and left lower extremities. The patient has a history of chronic heart failure since 3 years. A thorax X-ray showed atherosclerosis. Computed tomography (CT) scan showed acute thromboembolic ischemic infarction in the left temporoparietal lobe in the left MCA territory. The causal relation between CHF and ischemic stroke represent manifestations of similar underlying risk factors, such as hypertension and diabetes mellitus. The pathophysiological mechanism of chronic heart failure can be at risk of causing a stroke infarction in large blood vessels in the brain such as the MCA, and patient MCA Stroke with CHF has high risk of recurrent stroke.

Keywords: MCA, Stroke, Chronic heart failure

INTRODUCTION

Middle cerebral artery (MCA) stroke describes the sudden onset of a focal neurologic deficit resulting from hemorrhagic or ischemic disruption of the MCA's blood supply. The MCA is by far the largest cerebral artery and is the vessel most commonly affected by cerebrovascular accident (CVA). The MCA is by far the largest cerebral artery and is the vessel most commonly affected by CVA.[1] Ischemic stroke is frequently broken into several etiological categories, including atherosclerotic, cardio embolic, lacunar, and cryptogenic.[2]

Chronic heart failure (CHF) is also common cause of ischemic stroke. The most frequently recognized reasons for cardio embolic stroke in patients with CHF are thrombus formation due to atrial fibrillation or left ventricular (LV) hypokinesia.[3] Moreover, there is evidence of endothelial dysfunction in CHF patients, rheological alterations consistent with increased blood velocity, and malfunctioning of cerebral autoregulation.[4] In addition to the causal relation between CHF and ischemic stroke, both entities represent manifestations of similar underlying risk factors, such as hypertension and diabetes mellitus.[5] Therefore, patients with CHF are at risk for stroke of large-artery atherosclerosis and small-vessel occlusion. CHF is clearly associated with ischemic stroke risk. It seems likely that CHF-related strokes are primarily embolic, but concurrent subtypes of stroke have to be taken into account.[6]

CASE REPORT

A 66-year-old male patient came to the emergency room at Kasih Ibu Gianyar Hospital with complaints of suddenly not being able to talk since 8 hours before entering the hospital. There is weakness on the right side of the upper extremities, and weakness on the right and left lower

extremities. The patient has a history of chronic heart failure since 3 years. Echocardiography in the last 6 months showed an ejection fraction of 40%. The patient was on routine treatment with bisoprolol 1×2.5 mg, clopidrogel 1×75 mg, simvastatin 1×20 mg and nitrocaf 1×2.5 mg. On physical examination vital signs showed blood pressure 138/74 mmHg, pulse 97x/minute regular, respiratory rate 16x/minute, temperature 36 ^{0}C and oxygen saturation 98% room air. In neurological status with GCS E4V×M6 (motor aphasia), paresis nerve VII dextra and motor power of the upper extremities 222/444 and lower extremities 222/222 and decreased sensibility in the four extremities.

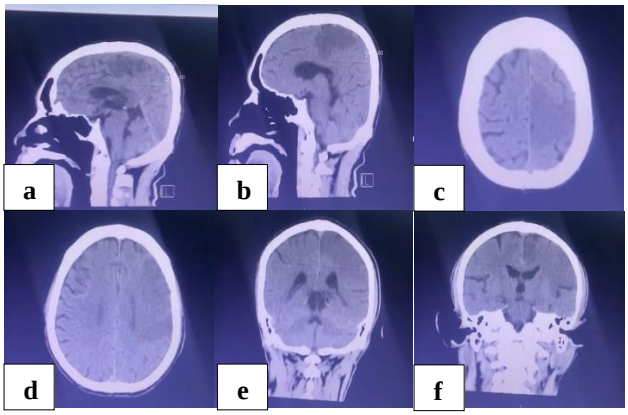

Figure 1 (a-f): Head CT scan with acute thromboembolic ischemic infarction in the left temporoparietal lobe corresponding to the left MCA territory.

Figure 2: X ray thorax with atherosclerosis.

The patient underwent a complete blood count, blood sugar, kidney function and liver function, heart record, thorax x ray and head CT scan. A thorax X ray showed atherosclerosis. CT scan showed acute thromboembolic ischemic infarction in the left temporoparietal lobe in the left MCA territory. The patient was hospitalized with clopidogrel 300 mg on the first day and clopidogrel 1×75 mg the following day for 4 days, citicholin 2×500 mg IV, atorvastatin 1×40 mg and mecobalamin 3×500 mcg. On the 5th day of hospitalized, patient planned to discharge with clinical symptom improved such as GCS E4V5M6, minimum parasis N VII dextra, upper extremity motor power 444/444 and lower extremity power 444/444 and sensibility in normal limit. One week after discharge patient follow up at neurology policlinic with no remark complain and activity daily living was good. Patient planned for control at polyclinic every month for routine evalution related his CHF, infarct stroke and the other comorbidity and complication.

DISCUSSION

The MCA is the most common artery involved in acute stroke. It branches directly from the internal carotid artery and consists of four main branches. These vessels provide blood supply to parts of the frontal, temporal, and parietal lobes of the brain, as well as deeper structures including the caudate, internal capsule, and thalamus. The most important part of the physical exam to perform in an emergent fashion when there is a concern for a stroke is the National Institute of health stroke scale. This scale is a standardized way of assessing stroke patients to remove subjectivity during their examination. This scale is particularly useful for identifying and localizing strokes involving the anterior circulation, such as the middle cerebral artery, based on the functions they assess. The components include sensation, strength, and coordination in all 4 extremities; production and comprehension of speech, including naming and repetition; visual fields; orientation to self and time; and symmetry and sensation of the face. Large MCA strokes are usually the easiest to recognize of all strokes, as they tend to present with the major deficits that one thinks of when thinking of a stroke, such as unilateral flaccidity, forced gaze deviation, visual field cuts, and, if in the dominant hemisphere, speech deficits.[7] As in the case we presented, a patient aged 66 years with symptoms of sudden neurological deficit where there were disturbances in sensation and strength in all four extremities, speech disorders which clinically indicated a stroke in the MCA territory.

Heart failure is a common cause of ischemic stroke. Heart failure is defined as the inability of the heart to supply sufficient blood flow to meet the body's metabolic needs. Clinical symptoms of heart failure include breathlessness at rest or on exercise, fatigue, tiredness, and ankle swelling. Moreover, patients show typical signs of heart failure (tachycardia, tachypnea, pulmonary rales, pleural effusion, raised jugular venous pressure, peripheral edema, and hepatomegaly) and objective evidence of a structural or functional abnormality of the heart (for example, cardiomegaly, cardiac murmurs, abnormal echocardiograms, and raised natriuretic peptides). Whereas ejection fraction (EF) is decreased in heart failure patients with systolic dysfunction, EF is normal in those patients with diastolic dysfunction, characterized by elevated end-diastolic ventricular pressure.[8] In the case above, the patient, aged 66 years, had experienced chronic heart failure for 3 years with a systolic ejection fraction of 40%. The most common heart failure pathophysiologic mechanisms related to stroke is increase thrombus

formation caused by several underlying cause such as increase prevalence of left ventricular hypokinesia, decrease left ventricular ejection fraction, increase prevalence of atrial fibrillation and increase blood viscosity. The other mechanism is increase coagulation, decrease fibrinolysis and thrombocyte aggregation. The most frequently recognized reasons for cardioembolic stroke in patients with CHF are thrombus formation due to AFib or left ventricular (LV) hypokinesia.[9] In addition to the causal relation between CHF and ischemic stroke, both entities represent manifestations of similar underlying risk factors, such as hypertension and diabetes mellitus.[10]

In general, patients with cardiac disease such as CHF and cerebral infarction face a high risk of recurrent stroke. Because it is often difficult to determine the precise mechanism, the choice of a platelet inhibitor or anticoagulant drug may be difficult. In the AHA/ASA guidelines for secondary prevention of stroke, recommendations for medical treatment in patients with cardiogenic embolism include the following: For patients with ischemic stroke or TIA who have dilated cardiomyopathy, either warfarin (INR 2.0-3.0) or antiplatelet therapy may be considered for prevention of recurrent events. Potential antiplatelet therapies used to prevent recurrent stroke include aspirin (50-325 mg/d), the combination of aspirin (25 mg twice daily) and extended release dipyridamole (200 mg twice daily), and clopidogrel (75 mg daily). However, in patients with CHF due to AF, acute MI with LV thrombus, rheumatic mitral valve disease or prosthetic heart valves should be treated with oral anticoagulants.[10]

CONCLUSION

Patients with MCA stroke are closely related to the presence of previous chronic heart failure. The pathophysiological mechanism of chronic heart failure can be at risk of causing a stroke infarction in large blood vessels in the brain such as the MCA. Stroke and chronic heart failure also have several overlapping risk factors, causing the incidence of chronic heart failure in stroke to be very high. Patient MCA Stroke with CHF has high risk of recurrent stroke so that anticoagulant or antiplatelet should administer to that patient beside of the other medication for patient's underlying risk factor.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Paramita IGAADP. Middle cerebral artery stroke in chronic heart failure patient: a case report. Int J Res Med Sci 2024;12:2997-9.