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Case Report

Cardioembolic stroke with hemorrhagic transformation in atrial fibrillation patients on anticoagulant therapy: A case report ☆

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ABSTRACT

Cardioembolic stroke is the second leading cause of mortality and the leading cause of long-term morbidity. Embolisms of cardiac origin, such as atrial fibrillation, represent about one-fifth of all ischemic strokes. Patients with acute atrial fibrillation frequently require anticoagulation, which increases the risk of hemorrhagic transformation. A 67-year-old woman was brought to the Emergency Department with decreased consciousness, weakness on the left side, facial expression, and slurred speech. The patient had a history of atrial fibrillation and was taking regular medications acarbose, warfarin, candesartan and bisoprolol. She has had an ischemic stroke about a year ago. Left hemiparesis, hyperreflexias, pathologic reflexes, and central type of facial nerve palsy were found. The CT-Scan results revealed hyperacute to acute thromboembolic cerebral infraction in the frontotemporoparietal lobe to the right basal ganglia accompanied by hemorrhagic transformation. Massive cerebral infarction, history of previous stroke, and use of anticoagulants are among the greatest risk factors for hemorrhagic transformation in these patients. The use of warfarin should be of particular concern to the clinician, because hemorrhagic transformation is associated with poorer functional outcome and morbidity and mortality.

Introduction

Stroke is the second leading cause of mortality and the top cause of long-term morbidity, just behind coronary heart disease. Two-thirds of stroke are caused by cerebral ischemia, and its frequency is predicted to increase significantly on ageing population and as life expectancy grow [1,2]. Cerebral ischemia can be caused by a wide range of events, including cardioembolism, cerebral vessel occlusion, and atherosclerosis [3]. Cardioembolism accounts for about one-fifth of all ischemic strokes [4].

Hemorrhagic transformation can complicate acute ischemic stroke morbidity and mortality. Prolonged ischemia

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weakens the cerebral vasculature and increases the risk of hemorrhagic transformation. Anticoagulants are known to raise the risk of hemorrhagic transformation and exacerbate bleeding in such situation [5–8].

Case report

A 67-year-old housewife was brought to the hospital with decreased consciousness 10 hours prior to admission. Loss of consciousness occurred suddenly after waking up. The patient experienced weakness on the left-side hemiparesis, and slurry speech. The patient had a history of diabetes and hypertension and is currently taking the medications acarbose, warfarin, candesartan, and bisoprolol. There was a history of hypertensive heart disease since about 5 years prior to the current complaint and a history of ischemic stroke about a year ago featuring right facial palsy which resolve completely. The hypertensive heart disease was routinely controlled by cardiologist. The patient rarely had physical exercise, did not smoke, drink alcohol, or using illegal drugs.

Physical examination revealed 110/70 mmHg blood pressure, 18 times per minute respiratory rate, 80-90 bpm irregular pulse rate, 36.7°C temperature, and SpO2 99% on 3 lpm oxygenation. General conditions were all within normal limits.

Neurologic examination revealed Glasgow Coma Scale of eye, verbal, and movement of 3-3-5 respectively. Eye pupils were equal, round and react to light bilaterally. Corneal reflexes were still found in both eyes. Examination of facial nerve revealed central-type left facial muscle weakness. There were no nystagmus and other cranial nerves were difficult to evaluate due to patient altered mental status. The patient did not present with any meningeal sign. Left-side central-type hemiparesis was present. Hyperreflexias were present on all extremities. Babinski's pathologic reflex was present on the left side. Scoring system showed moderate stroke severity based on the NIH Stroke Scale (NIHSS = 7). Risk for recurrent stroke was moderate-high with indication for anticoagulation, as showed by CHA_2DS_2-VASc score of 7, and HAS-BLED score of 3.

Same-day chest x-ray showed bilateral pneumonia with cardiomegaly and aortosclerosis (Fig. 1). The CT scan results showed a hyperacute to acute thromboembolic cerebral infraction in the frontotemporoparietal lobe to the right basal ganglia (according to the right middle cerebral artery territory) with possible hemorrhagic transformation in the basal ganglia, accompanied by minimal perifocal edema, causing narrowing of the lateral ventricles and midline shift to the left, approximately 0.3 cm (Fig. 2). There was no prior radiologic data for CT-scan result comparison. Echocardiography from a year ago revealed severe mitral stenosis with moderate tricuspid regurgitation. Laboratory testing showed hypoalbuminemia, hyperglycemia, elevated A1c, hyperlipidemia, and increased prothrombin and activated partial thromboplastin time. The patient was diagnosed with cardioembolic stroke due to atrial fibrillation with complication of hemorrhagic transformation.

The patient was treated by 30 degrees head-trunk up position, 3 lpm cannula oxygenation, metronidazole, ceftriaxone, omeprazole, citicoline, rapid-acting insulin, bisoprolol, simvastatin, and high-protein nasogastric diet. Patient was discharged after 14 days of treatment. There was no additional complication and medication during treatment. Anticoagulant for atrial fibrillation was resumed in the outpatient clinic after clinical improvement was apparent and hemorrhage has been resolved.

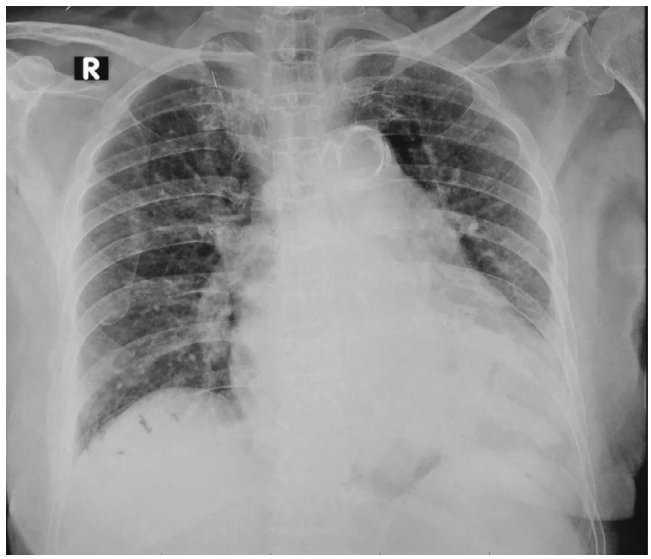

Fig. 1 – Chest x-ray image showing cardiomegaly and pronounced aortosclerosis.

Discussion

Cardioembolic stroke is a subtype of ischemic stroke with a high rate of neurologic disability upon discharge, a high mortality rate, and a tendency for both early and late embolic recurrence [9]. Hemorrhagic transformation is a type of cerebral hemorrhage caused by infarction that is a common spontaneous complication of prolonged, untreated acute ischemic stroke [10]. The clinical presentation (neurologic deterioration or deterioration as measured by the National Institutes of Health Stroke Scale scores) and radiological findings of bleeding on CT-Scan or magnetic resonance imaging within 48 hours of the ischemic stroke can be used to suspect hemorrhagic transformation [11,12].

The mechanism underlying cerebral hemorrhage following ischemic stroke remains unknown. One possibility is that the blood-brain barrier is damaged after an acute stroke, resulting in intracranial blood vessel fragility. This damage increases the risk of intracerebral hemorrhage, particularly in areas of ischemia (hemorrhagic transformation) [8].

Most incidences of hemorrhagic transformation are asymptomatic. However, only parenchymal hematoma is clinically evident and frequently presents with rapid neurologic deterioration. If left untreated, hemorrhagic transformation usually appears within 4 days of the infarction. A rare case of

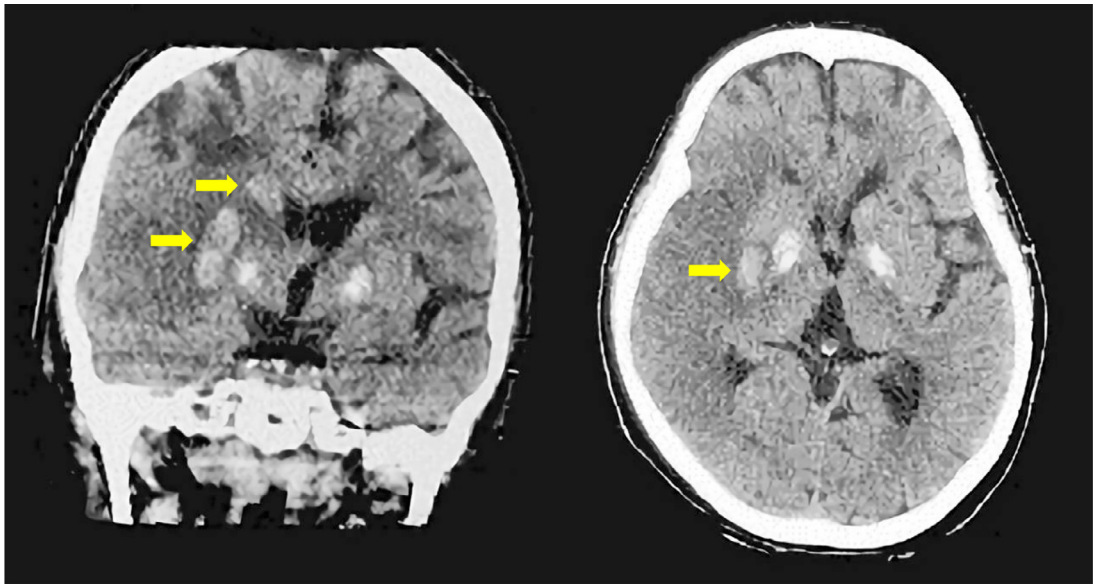

Fig. 2 – Coronal (left) and axial (right) head CT. Yellow arrows designate hemorrhagic transformation in the basal ganglia. The transformation is accompanied by perifocal edema which causes midline shift and narrowing of right lateral ventricle, affecting right internal capsule and corona radiata.

6-hour postonset hemorrhagic transformation also has been reported [6,13,14].

One of the most significant risk factors for hemorrhagic transformation is massive cerebral infarction. Several earlier studies have discovered a link between the amount of infarction and the likelihood of hemorrhagic transformation, with frequent mentions of overlaps between hemorrhage and subacute to chronic infarct in head CT [15–17]. Massive cerebral infarction is frequently accompanied by significant cerebral edema, resulting in peripheral blood vessel compression. Increased vascular wall permeability as a result of prolonged ischemia and hypoxia produced by vascular compression considerably enhances the possibility of hemorrhagic transformation after edema has subsided. Combination of these factors may reduce the integrity of affected cerebral blood vessel, thus inducing hemorrhage. As a result, regardless of whether clinical symptoms are worsening or improving in patients with large cerebral infarction, a cranial CT-scan or magnetic resonance imaging should be conducted on a regular basis. Furthermore, when it comes to thrombolytic therapy, it is critical to choose a treatment strategy carefully [18].

Another risk factor that influences the occurrence of hemorrhagic transformation is the use of anticoagulants. The vitamin K-dependent coagulation factor is known to be essential to avoid hemorrhagic transformation in ischemic stroke. Anticoagulant medicines such as warfarin, inhibits the vitamin K-related hemostatic cascade, thereby raising the risk of hemorrhagic transformation [19]. Trends toward more severe hemorrhagic transformation in anticoagulant-treated ischemic stroke patients has been reported, in which patients on warfarin may have a tenfold increase in the chance of having a hemorrhagic stroke [8,20]. In the possible event of hemorrhagic transformation, clinicians should use warfarin with caution, especially in patients with a history of stroke and advanced age population (>75 years). As a rule of thumb, warfarin administration must ensure that the benefits outweigh the risks/losses [21].

Study showed that ICH, despite being asymptomatic, may worsen long-term neurologic prognosis. After 3 months, the presence of hemorrhagic transformation was associated with a lower functional result [22]. The presence of intraventricular hemorrhage, the initial volume of ICH, and neurologic worsening on arrival were all independent predictors of clinical prognosis [21].

Conclusion

Most cardioembolic patients have a history of cardiac rhythm disturbances and are on anticoagulants, putting them at risk for hemorrhagic transition following recurrent infarction. The most common risk factors for hemorrhagic transformation in these patients are massive cerebral infarction, a history of prior stroke, and the use of anticoagulants. Warfarin use should be of particular concern to clinicians since hemorrhagic transformation is related to worse functional results, morbidity, and mortality.

Patient consent

All of the authors, including: Wulandari, Soni Azhar Pribadi, and Mohammad Saiful Ardhi, confirmed that written, informed consent for publication of their case was obtained from the patient(s).

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