



**Case Report**

Medicine Science 2017;6(3):567-9

**Ischemic stroke in young age?**

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Received 23 June 2017; Accepted 17 March 2017

Available online 28.03.2017 with doi: 10.5455/medscience.2017.06.8605

**Abstract**

The etiology of young patients with ischemic stroke differs from the etiology of elderly population and is still a subject of investigation. In the patients who are 40 years old and under 40 years other etiologies like vasculopathies, cardioembolism or coagulopathies are the most frequently seen causes for the ischemic stroke. A specific diagnostic approach is very important for young patients with ischemic stroke. If untreated, infective endocarditis is virtually always a fatal disease. Fever, cardiac soufflé, and nonspecific symptoms, such as myalgia and fatigue, are common. This case report also emphasizes that we should not forget infective endocarditis in the etiology of systemic embolisms, especially in young patients.

**Keywords:** Endocarditis, embolism, stroke

**Introduction**

Acute ischemic stroke is generally seen in advanced ages, although it may develop in young patients as well. Onset age of acute stroke has been reported as 75 in Western countries [1]. It is relatively rare in young adults; studies have usually reported the age range of stroke in young people to be between 15 and 45 years [2], whereas the yearly incidence was given in some studies as 6-20/100.000 for young adults. The majority of strokes in young adults are of ischemic origin [3]. Causes of ischemic stroke in young adults are grouped differently than causes in advanced ages and require more comprehensive studies in order to determine the underlying reason; these studies include cerebral angiography, transoesophageal echocardiography, tests to determine coagulation disorders, and investigation of collagen vascular diseases [4].

Infective endocarditis (IE) is an infectious disease associated with growing bacteria, and it progresses with the involvement of cardiac valves, congenital cardiovascular lesions, prosthetic valves, or other prosthetic material. Embolic events are common, and life-threatening complications in patients with IE and may cause difficulty in the diagnosis because these events can mimic other diseases and pathological conditions [5]. In this case report, we discuss the recommendation that physicians should consider infective endocarditis in differential diagnosis when they find ischemic stroke in young patients.

**Case report**

A 20-year-old patient was admitted to our ED with complaints of speech impediment, numbness in the right

half of the face, headache, and numbness in the right hand. The patient's history included a diagnosis of partial mitral posterior leaflet cord rupture and moderate mitral insufficiency. A physical examination revealed the patient's blood pressure to be 100/70, a heart apex beat of 84, and a fever of 36.2 °C. A 2/6 systolic murmur was discovered upon cardiac examination. During the neurologic examination, the patient was conscious, oriented, and cooperative with dysarthric speech and right facial paralysis. Muscle strength was 5/5 bilaterally, and cerebellar, balance, and walking tests were normal. An electrocardiography revealed a sinus rhythm of V2-4 T (-), and a V5-6 biphasic T. An echocardiographic ECHO revealed ejection fraction EF of 60% vegetation in the mitral valve, partial cord rupture, and vegetation in the mitral valve posterior leaflet. The department of radiology interpreted the Cranial Computed Tomography as no acute pathology and the Diffusion Magnetic Resonance as linear left sylvian fissure with restriction of lacunar acute diffusion in the middle cerebral artery irrigation area. The patient was hospitalized in the neurology clinic with the preliminary diagnosis of ischemic stroke.

At follow-up, the patient was consulted by the infection clinic with the preliminary diagnosis of infective endocarditis. The patient, with streptococcus sanguis identified in his blood, was put on antibiotherapy. A cranial computed tomography CT was ordered on the fourth day of hospitalization based on the general status of the patient; he was impaired, his eyes were deviated toward the left, and a left intracerebral hematoma and shift were observed. The patient was taken for an urgent operation by the department of neurosurgery, where the hematoma was removed and duraplasty was performed. During follow-up, the patient's muscle strength was evaluated as 0/5 in the right upper extremity and 0/5 in the right lower extremity. At the time of discharge, he was lucid, conscious, cooperative, and motor aphasic. He showed right central paresis and no involuntary

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movements, and his muscle strength was evaluated as 0/5 in the right upper extremity and 3/5 in the right lower extremity.

## Discussion

Stroke experienced at a young age remains an unsolved global problem. So far, there are several publications from many countries about the aetiology, epidemiology, and prognosis of young stroke. These reports reveal that cardiologic reasons, coagulation disorders, and vasculopathies are predominant in the aetiology of ischemic stroke in young adults [6-7]. Infective endocarditis is an infection of the endocardium layer of the heart with an incidence of 1.9 – 6.2/100.000, and the causative agents may be bacteria, viruses, or fungi [8-9]. Antimicrobial therapy is quite challenging in IE and requires following certain rules. Treatment is usually continued for 4 to 6 weeks (may be extended to between 8 and 12 weeks). However, recent studies indicate that a combination treatment for 2 weeks may be enough, especially in the IE cases caused by *S. viridans* species of streptococci.

The administration of antimicrobial prophylaxis before invasive procedures that could lead to bacteraemia has been thought as a strategy to prevent IE for many years worldwide. However, there is still no randomized controlled study demonstrating the efficacy of this application [10]. Within the last decade, surgery has increasingly become important in the treatment of IE. Left-sided IE cases should be followed up in a centre with emergency surgical intervention facilities. Heart failure, embolic events, and septic shock cannot be prevented with antibiotics in the cases of serious valvular damage. Early surgical intervention decreases mortality in IE patients with indication. Surgical intervention should be attempted in the acute period in 25-50% and in the convalescence period in 20-40% of IE cases. The most important surgical indications in IE include heart failure, uncontrolled infections, and prevention of emboli [11].

Performing surgery in patients with neurological complications

The European 2009 guidelines recommend waiting at least a month for surgery in patients with intracranial haemorrhage but to not delay surgery in patients with other neurologic complications who have indications [12]. Mortality rate from IE has decreased over the last three decades, although it is still as high as 20-25% despite proper treatment. This high incidence of mortality in patients with IE results from embolic events. Septic embolisms that develop in 20-43% of the cases often affect the extracardiac organs, with the central nervous system being affected in 60% of the cases [13]. In natural valve endocarditis cases, embolisms of local and septic vegetation involving the endocarditis valve and surroundings and septicaemia-related extracardiac complications are often encountered. Right cardiac endocarditis may be complicated by pulmonary artery embolism, pulmonary infarction, pneumonia, and lung

abscess. Left cardiac endocarditis may be complicated by infarctions and abscesses of the brain, heart, kidneys, spleen, or bowel, and systemic embolism. Numerous studies have reported that the involvement of several organs, such as brain, kidneys, spleen, or coronary arteries, is common, with the central nervous system being the most frequently involved [14].

With regard to heart disease, our patient had a known mitral partial cord rupture and related mitral insufficiency that had been identified one year previously. On an ECHO examination, there were echodense 1x3 cm-diameter motile vegetations extending along the valve in the posterior side of the mitral valve and an ischemic infarct area in the brain which suggested left cardiac endocarditis. Clinical manifestation of the patient's condition progressed to septic embolism-related mycotic aneurysm and mycotic aneurysm rupture.

## Conclusion

Systemic stroke is extremely rare, especially in young patients. Infective endocarditis is a condition which is known to cause ischemic stroke. Infective endocarditis is a disease with currently increasing incidence and a high rate of mortality. Before these patients show clinical findings specific to infective endocarditis, they may present with the complications of systemic embolism. Our patient and his diagnostic course again demonstrates that we should first consider IE in young patients presenting with ischemic stroke identified during our emergency practice.

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