Repeat Stroke Associated with 'Migraine with Aura' and Middle Cerebral Artery Stenosis: a Case Report and Review of Literature.

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Abstract

We present a 21 year-old female, known migraineur, who presented with visual aura followed by throbbing left hemicranial headache, associated with sudden onset of weakness of the right side of the body and moderate to severe pains on the paretic limb (mixed lacuna stroke), three days after the onset of headache. She had a similar episode about 12 months prior to the present ictus. Findings on examination revealed essentially, right spastic hemiparesis with dysaesthesia and subtle right facial paresis. Brain MRI (magnetic resonance imaging) was normal, while MRA (magnetic resonance angiography) revealed middle cerebral artery (M_2) stenosis. She was managed with aspirin, propranolol, amitriptyline and physiotherapy on which she made steady progress.

Key words: Migraine, stroke, middle cerebral artery, magnetic resonance imaging

Introduction

Several population-based studies had reported an increased risk of stroke [1-4] in association with migraine and migraine with aura, [5] especially in women[6].
The possibility that migraine and stroke share common pathogenetic processes in the central nervous system has been suggested. [7] Both disorders are characterized by release of inflammatory mediators such as vasoactive peptides [8] and enhanced platelet reactivity. [9] During an aura, constriction of blood vessels is present, [10] reducing the

cerebral blood flow (CBF) by approximately 27%. [11] A reduced CBF in conjunction with vasoactive compounds may predispose to coagulopathies and arterial thrombosis. Middle cerebral artery (MCA) stenosis is a relatively rare condition, occurring in only 7 to 8% of patients presenting with stroke in the MCA distribution.[12, 13, 14] Patients with intracranial disease are more likely to present with an unheralded stroke.[15] The risk of stroke in patients with intracranial stenosis is high,[16,17 ,18] . Risk of stroke associated with MCA stenosis is at least 8% per year.[17, 19] The incidence of stroke in patients with MCA stenosis is higher than that in patients with extra cranial carotid stenosis.[15, 19]

The stenotic occlusion may also lead to transient ischemic attack apart from frank stroke. We present a 21-year old female Nigerian, a known sufferer of migraine with aura, who had two episodes of ischemic stroke associated with left middle cerebral artery stenosis on magnetic resonance angiography.

Case Report

A. S is a 21 year-old known migraineur for five years who presented with nine days history of seeing flashes of light associated with zigzag light pattern. This was followed a few minutes later by moderate to severe, throbbing left hemicranial headache. She also had associated photophobia and sonophobia. About the same time she noticed sudden onset of weakness of the right side of the body associated with excruciating pain on the same side. There was no vomiting and she did not lose consciousness. She was neither hypertensive, nor diabetic and there was no morning joint stiffness/pain, recurrent spontaneous abortion, or facial rash. No preceding history of palpitation and neither was there a history suggestive of cardiac decompensation. She had the first and similar episode about 12 months earlier.

Examination revealed a young female, not pale, not in respiratory distress and no pedal edema.

Nervous system examination revealed clear sensorium, normal speech and cognition. She had subtle right seventh nerve paresis, upper motor neuron type. Other cranial nerves were all grossly normal. She had right spastic hemiparesis with Medical Research

Council (MRC) power grade 3+ in the right upper limb and grade 4 in the right lower limb associated with dysaesthesia in the paretic limbs.

Chest X-ray, electrocardiogram (ECG), and transthoracic echocardiography, revealed normal findings. Complete blood count, including erythrocyte sedimentation rate (ESR), was all within normal reference value. Her fasting lipid profile was within normal range. Brain MRI done 20-days after the onset of ictus was normal, but brain magnetic resonance angiography (MRA) revealed left middle cerebral artery (M2), stenosis. (Fig. 1).

She was managed with aspirin, propranolol, amitryptilline tablets, and other routine management for acute ischemic stroke, along with regular physiotherapy. She made gradual and sustained improvement. She was later referred for neurovascular surgical assessment.

Discussion

Middle cerebral artery (MCA) occlusive disease may lead to an ischemic event via three mechanisms: (1) deep lacuna infarcts that develop when the exiting branch of the lenticulostriate perforating artery is trapped within the thromboatheroma; (2) development of atheromatous ulceration with thrombosis and subsequent distal embolization; and (3) hemispheric hypo perfusion caused by significant MCA obstruction and inadequate collateralization.[1, 20, 21, 22, 23, 24] None of these mechanisms is mutually exclusive, and a given lesion can cause neurological sequelae by any or all three. In fact, some researchers have postulated that hypoperfusion may potentate the effect of distal emboli. Hypoperfusion decreases blood flow and pressure, precluding adequate clearance of distal emboli in an already poorly perfused area.[20]

Unfortunately, only a few literatures had addressed the relative frequency with which each of these three mechanisms is responsible for subsequent neurological sequelae in MCA stenosis. In a study involving 22 patients with MCA stenosis and acute strokes, 46% were of the deep lacuna type, whereas the remaining 54% were of the distal hemispheric type.[21] The latter group was not divided into embolic or hypoperfusion subgroups. Both Segura and colleagues[22] and Wong and associates[20] used transcranial Doppler ultrasonography (TCD) to evaluate symptomatic MCA stenosis patients: 36%

and 33% of patients, respectively, demonstrated evidence of microemboli distal to the stenosis. Finally, Mohr et al[1] evaluated the data from Hinton and associates[24] and concluded that 13 of 16 patients with symptomatic MCA stenosis demonstrated clinical evidence of homodynamic insufficiency. Based on these few studies, it is difficult to state that one mechanism is the most common cause of neurological dysfunction in MCA stenosis. However, it appears safe to conclude that each mechanism is a significant contributor to the development of stroke.

The association between a history of migraine (yes/no) and an elevated stroke risk has been investigated in several previous studies.[25] The authors of a case-control study in young women reported that approximately 70% of migraineurs complained of headache in the 3 days immediately preceding the stroke. [26]

A history of migraine was associated with a two-fold increased risk of an incident thrombotic or hemorrhagic stroke or a TIA, and the association was most pronounced in patients who had the last migraine event recorded within a month prior to the stroke date. In most of these studies, the risk for ischemic stroke was higher than for hemorrhagic stroke. Jousilanti et al, however, reported even a higher risk for hemorrhagic stroke than for ischemic stroke in women. In a previous meta-analysis, [25] the risk of ischemic stroke was increased 2.9-fold in migraineurs with aura, and 1.6-fold in those without aura. Stang et al [5] also found a 2- to 3-fold increased stroke risk in migraineurs with aura of 55 years of age or older.

In conclusion, a patient with migraine with aura is largely predisposed to cerebral ischemia and this coupled with an occlusive disease of the MCA greatly accentuates and makes multifold the risk of a TIA and even frank stroke. Hence unusual causes of stroke should be considered in younger patients with repeat or recurrent stroke.

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