Moyamoya disease in a boy with the history of idiopathic thrombocytopenic purpura

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Abstract

Introduction: Moyamoya disease (MMD) is a progressive intracranial vaso-occlusive condition which may lead to ischemic or hemorrhagic insults. The vast majority of these patients also have well recognized associated conditions as the risk factors. Hereby we report a case of MMD presented with cerebral ischemic attack. Widespread investigations did not show any associated risk factors other than a history of idiopathic thrombocytopenic purpura (ITP) which has not been reported previously as a risk factor.

Keywords: **Moyamoya disease, Idiopathic thrombocytopenic purpura, Ischemic stroke.**

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Introduction

Moyamoya disease is characterized by progressive steno-occlusive changes at the terminal portions of the both internal carotid arteries and their proximal branches with arterial collateral vessels at the base of the brain. In rare cases, this process also involves the posterior circulation, including the basilar and posterior cerebral arteries.[1] The term "moyamoya" (Japanese for "puff of smoke") was coined by Takeuchi and Shimizu in 1957 to describe the diagnostic appearance of angiogenesis on a catheter angiogram.[2] Since its initial discovery, most features of the disease have completely understood; however, its etiology is still unknown.

The incidence of the disease is high among Japanese and Koreans and far lower in Caucasians. There is a slight female predominance. Solitary cases are much more frequent but the risk of occurrence in the patients' parents and siblings was 30–40 folds higher than that of the general population.[3]

The vast majority of these patients also have well recognized associated conditions as the risk factors including radiotherapy to the head or neck, Down's syndrome, neurofibromatosis type 1 (with or without tumors of the hypothalamic–optic pathway), and sickle cell disease. There are also some rare associated conditions such as congenital cardiac anomaly, renal-artery stenosis, giant cervicofacial hemangiomas, and hyperthyroidism.[4-7]

It has been considered that Patients with the characteristic moyamoya vasculopathy who also have well recognized associated conditions are categorized as having the moyamoya syndrome, whereas patients with no known associated risk factors are said to have moyamoya disease.[1] Genetic factors appear to play a major role in MMD. Most familial cases appear to be polygenic or inherited in an autosomal dominant fashion with incomplete penetrance. A recent study reported a major gene locus for autosomal MMD on chromosome 17q25.[8] Angiogenetic cytokines may play a role in progression of steno-occlusive changes and/or angiogenesis of collaterals.

Four main clinical presentations are recognized including cerebral infarction, transient ischemic attacks (TIA), cerebral hemorrhage and epileptic seizures.[9] Ischemic symptoms predominate in children. In addition to overt stroke or TIA, there may also be progressive decline in cognitive function, related to chronic cerebral hypoperfusion.[10-12] The predominant presentation in children is mainly TIA or ischemic stroke which occur repeatedly and occasionally on alternating sides. The attacks are liable to occur after conditions of hyperventilation such as crying resulting in constriction of cerebral arteries. Intracerebral, intraventricular or subarachnoid hemorrhage occur more frequently in adults than children.

The clinical diagnosis is based on cerebral angiography. Moyamoya vessels are visualized as multiple small round or tortuous low intensity areas

extending from the suprasellar cisterns to the basal ganglia. Occlusive changes in the distal internal carotid, anterior cerebral artery and middle cerebral artery, ischemic cerebral lesions and collaterals can also be visualized.[13] The diagnostic criteria include: (i) stenosis or occlusion of the terminal portions of the internal carotid arteries and proximal portions of the anterior and/or middle cerebral arteries; (ii) abnormal vascular networks seen in the arterial phase in the vicinity of the arterial occlusion. The disease is called definite or probable in situations of bilateral or unilateral involvement respectively. The probable cases in childhood are likely to progress to bilateral lesions within 2.2 years, whereas those in adulthood tend to remain unchanged.[14]

The natural history of moyamoya is variable. Disease progression can be slow, with rare, intermittent events, or fulminant with rapid neurologic decline.[4] However, regardless of the course, moyamoya inevitably progresses in the majority of patients.[15,16] Young age of onset predicts a more aggressive clinical course; however, there is a spectrum of outcomes and some patients are minimally affected.[17]

Several treatments have been considered for prevention of recurrent cerebral ischemia. Medical treatments (such as vasodilators, low molecular dextrans and steroids) have not been proved to be effective.[18] A variety of surgical techniques have been developed, aimed at improving blood flow to the chronically hypoperfused brain with revascularising the ischemic cerebral cortex. Direct bypass surgery such as superficial temporal artery to middle cerebral artery or indirect bypass surgery (placing the vascularized soft-tissue flap on the surface of brain) can improve clinical signs. The latter is preferred for young children,[19] but the indications for, and timing of, surgical revascularization in pediatrics moyamoya are controversial, especially as the natural history is so variable.[18]

Case Report

Our patient was a 14 year old boy who referred to us because of right side hemiparesis and difficulty in speech. These problems occurred suddenly while the patient was awake. There was no associated impaired consciousness, headache, vomiting, visual or bulbar symptoms or incontinence.

The birth of this boy of Persian origin was uncomplicated and his parents who were first cousins did not have a history of any particular hereditary disease. His first years of life passed without any problem. He had an 8 years old healthy brother. There was not a history of stroke in young age in his family. There was also no history of any long term drug therapy.

He has a history of ITP since he was 4 years old and the follow up was discontinued five years later because of recovery. Since then no symptoms has emerged which could be related to ITP.

In the first observation, the patient was mildly drowsy, but was arousable

readily by verbal stimulation. He was not feverish, the vital signs were within normal limits, and there was no constitutional symptoms or signs. He was oriented to time, person and place and he could obey the orders easily. He had Broca type of aphasia, with normal comprehension but impaired uttering or writing. Pupils were round, symmetric and reactive to light and accommodation. There was no ophthalmology, but mild gaze evoked nystagmus to the right could be elicited. Fundoscopic examination was normal. Right hemiparesis and central facial palsy as well as mild decreased deep tendon reflexes in right limbs compared to left side were detectable.

Routine lab tests including CBC, ESR, Electrolytes, PT, PTT, Urine analysis, ABG were normal. Test panel for hypercoagulative and collagen vascular disorders were normal as well. Doppler sonography of both common carotid arteries and their branches revealed to be normal. CT scan showed a hypodense area in the left frontotemporal region (figure 1).

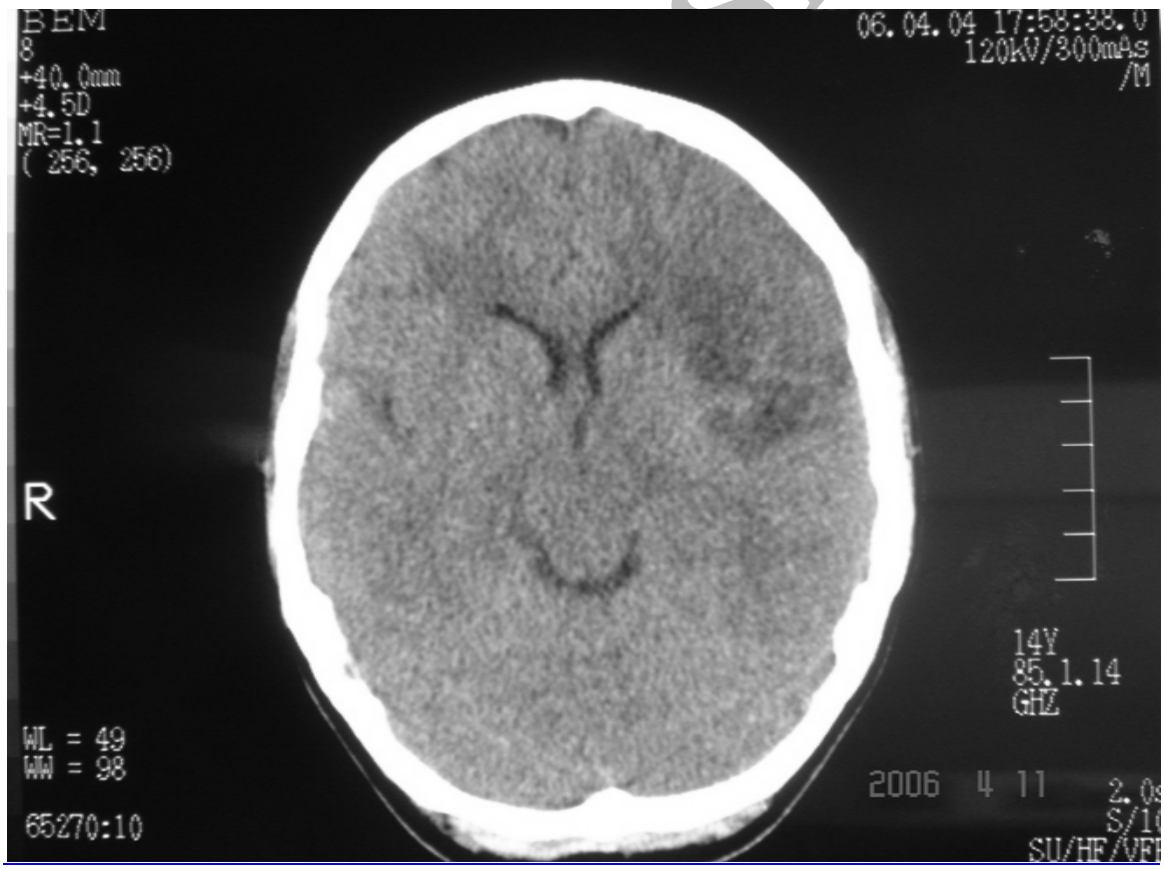

Figure 1: cerebral CT scan showed a hypodense area in the left frontotemporal region

Brain MRI showed more extensive infarct zone with evidences for small vessel disease (Figure 2).

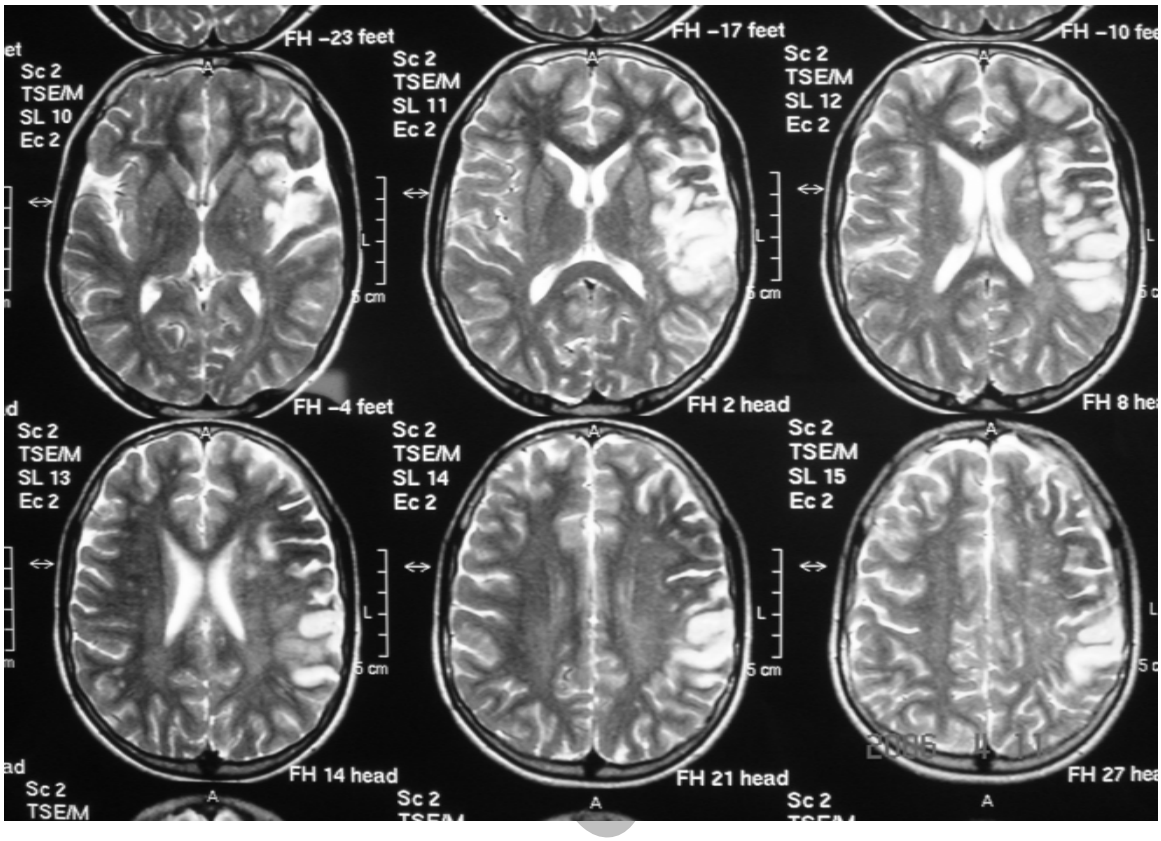

Figure 2: Brain MRI showed more extensive infarct zone with evidences for small vessel disease

Magnetic resonance angiography was performed and proved the diagnosis of moyamoya disease (Figure 3).

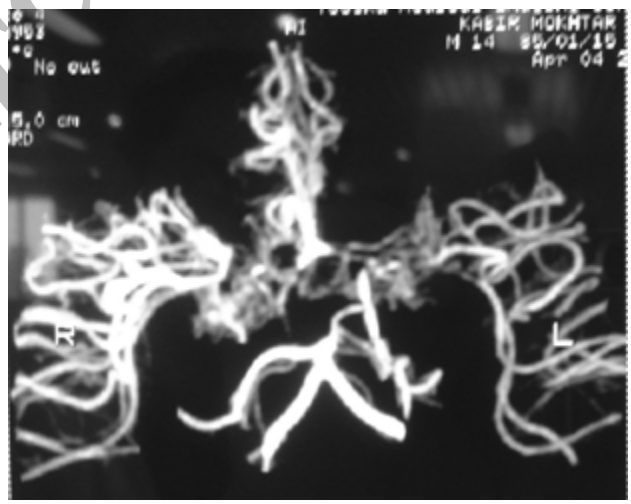

Figure 3: Magnetic resonance angiography with extensive collateral formation which proved the diagnosis of moyamoya disease

He was treated with aspirin and rehabilitation and discharged with improvement in language function with mild residual hemiparesis on right side. Revascularization surgery was suggested to his parents, but they chose non surgical conservative approach. Follow up examination 2 years later showed normal neurological examination.

Discussion

Widespread investigations showed that our case had none of mentioned known risk factors of the disease, so he seems to be a case of moyamoya disease rather than syndrome. Association of MMD with ITP has not been reported yet.

Among immune mediated thrombocytopenic conditions including ITP, thrombotic thrombocytopenia purpura (TTP), heparin-induced thrombocytopenia (HIT), and antiphospholipid syndrome (APS) platelet and endothelial cell activation occurs in all except ITP, resulting in a prothrombotic state and an increased risk of thrombosis.[20] There is a case report of a moyamoya disease associated with TTP[21] which could be explained, but ITP could not be considered as an associated risk factor. Hypercoagulable disorder have been reported as some case reports in ITP but all of them were after a short course following splenectomy.[22]

Although according to the long-term follow-up studies of untreated patients, progressive neurologic deficits and poor outcome were reported in 50 to 66 percent,[23-25] but there was no vascular insult or deterioration in our patient within 2 years of follow up even without any surgical treatment. It may be in favor of better prognosis in our patient compared to eastern asian cases, but it is necessary to follow up more patients with at least 5 years period.

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بیماری مویامویا دریک پسربا سابقه بیماری پورپورای ایدیوپاتیک ترومبوسیتوپنیک

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چکیده

سابقه وهدف: بیماری مویامویا یک بیماری ناشی از انسداد عروق داخل جمجمه است که می تواند به حوادث عروقی ایسکمیک یا خونریزی دهنده منجر شود. اغلب بیماران عوارضی را به عنوان فاکتورهای خطر زمینه ساز بیماری عروقی فوق دارند.

در این مقاله یک بیمار مویامویا با حمله ایسکمی مغزی معرفی می شود. بررسی های همه جانبه در این بیمار عارضه ای را به عنوان فاکتور خطر نشان نداد. تنها سابقه ای از بیماری پورپورای ترومبوسیتوپنیک ایدیوپاتیک در بیمار ذکر می شد که معمولا به عنوان فاکتور خطر بروز مویامویا تلقی نمی شود.

واژگان کلیدی: مویامویا. پورپورای ایدیوپاتیک ترومبوسیتوپنیک