Marchiafava-Bignami Disease : A Case Report

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Abstract

Marchiafava-Bignami Disease (MBD) is a rare, severe and usually fatal neurological disorder associated with chronic alcoholism. Previously, the definite diagnosis was confirmed at the autopsy. After the era of modern imaging technology, diagnosis was based on clinical profiles, history of alcoholism and specific location of pathology in corpus the callosum demonstrated by MRI. The authors reported a case of MBD in a 41 year-old alcoholic Thai male who presented with acute confusion and ataxia. MRI of the brain demonstrated demyelination, edema and necrosis of the corpus callosum with extensive symmetrical subcortical white matter lesions. He had a dramatic recovery after treatment with intravenous thiamine. Follow-up MRI revealed atrophic and cystic changes of the corpus callosum and almost complete resolution of the subcortical lesions. Recently, 15 cases of MBD with specific corpus callosal lesion, demonstrated by MRI, were published in the English literature. All had a favorable outcome after treatment with thiamine. Only one case had extensive extracallosal lesions and this case also had a good recovery after treatment. Now, MBD is not a fatal disease and early diagnosis and treatment are crucial.

Key word : Marchiafava-Bignami Disease, Alcohol, Corpus Callosum

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Marchiafava-Bignami disease (MBD) is a rare neurological disorder associated with chronic alcoholism. In 1903, Marchiafava and Bignami observed necrosis and cystic degeneration of the corpus callosum in an autopsy series of three Italian red wine drinkers. Since then, almost 200 cases of MBD have been reported[1]. The clinical features of this disease are diverse. MBD is categorized in three

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subtypes by the clinical course: acute, subacute and chronic forms. Patients may present with dysarthria, dysphagia, gait disturbance, interhemispheric disconnection syndrome, confusion or imparied consciousness[1-6]. The histopathological finding consisted of demyelination, bleeding, necrosis and cystic degeneration of the corpus callosum, particullary in the medial zone[1,7,8]. Pathogenesis of this entity is still poorly understood[1,9]. Previously, definite diagnosis was based on autopsy findings. After MRI was introduced, the diagnosis can possibly be documented earlier and recovery after prompt treatment with thiamine is dramatic[6].

CASE REPORT

A 41 year-old Thai male was admitted in November 2000. He could not provide a detailed history. His son noticed that the patient's speech and gait had deteriorated 2 days before admission. He was confused and did not take any meal. Apart from a history of chronic alcoholism he did not take any medication and had no history of drug or substance abuse. His relatives informed that he had a history of chronic excessive alcohol consumption since the age of 14 years. Every evening he drank 35 degree whisky and had changed to drink 28 degree Seang Chun, a much cheaper one, during the last 10 years. He drank about 500 ml a day. He also had two attacks of alcoholic withdrawal syndrome characterized by "rum fits" 2 years ago. He had no known other medical or psychiatric illness.

On physical examination, he was thin and appeared calm and passive. His vital signs were normal. (BT = 37 C, BP = 120/80 mm Hg, PR = 70/min and RR = 16/min) At the beginning of the interview, he became irritable and had difficulty in answering questions. Consequently, memory and other cognitive function testings could not be performed. He had neither ophthalmoplegia nor nystagmus. No definite sensory loss and motor weakness were observed. Deep tendon reflexes were +2 in all extremities. The positive neurological findings included bilateral presence of palmo-mental reflex, mild dysarthria and moderate gait ataxia. The other neurological and general examinations were unremarkable.

The laboratory examinations showed hemoglobin of 13.6 g/dl, white blood cells count of 6,700 cells/mm^3, platelet count of 473,000/mm^3, normal urine and stool examinations. He had normal blood chemistry, including plasma glucose, blood urea nitrogen, creatinine, electrolytes, calcium, phosphate, magnesium, bilirubin, albumin, globulin and coagulogram. Elevation of the liver enzymes (SGOT = 257 U/l, SGPT = 186 U/l), which might reflect chronic alcoholism were observed. The CSF was clear and no cell was found. The CSF protein was 26 mg/dl and CSF glucose was 91 mg/dl, while simultaneous plasma glucose was 114 mg/dl. CSF cultures for bacteria, tuberculous bacilli and fungus were negative. The serology for HIV and syphilis were also negative.

The first MRI of the brain was carried out on a 1.0T superconducting unit. Abnormal hyposignal intensity on T1WI, and high signal intensity on T2WI, FLAIR and diffusion weighted imaged involving the central layer of the whole corpus callosum, suggestive of demyelination or necrosis, and a small cystic lesion in the splenium of the corpus callosum were observed. The anterior commissure was swollen and caused compression of the bilateral frontal horns of the lateral ventricles. Enhancement after gadolinium administration was found at the genu and the splenium of the corpus callosum. The same abnormal signal intensities were also found at the subcortical white matters of bilateral occcipital, temporal lobes including numerous smaller lesions scattered throughout the subcortical fronto-parietal white matter symmetrically. A mild degree of diffuse cerebral atrophy was demonstrated. (Fig. 1-3)

Acute MBD was diagnosed based on clinical profiles and imaging findings. Treatment with intravenous thiamine (100 mg/d in 5 days and followed by oral thiamine 300mg/d) and other nutritional supports, as well as cessation of alcohol, were started. In a few days, the patient gradually recovered. The speech improved first and he was able to communicate with medical personnel and his family members. He regained his appetite, and showed steady gait in the first week.

As soon as he had recovered, neuropsychological tests proceeded. Intellectual function, tested by WAIS-R, showed mild mental retardation. (Full scale IQ = 67) Bender Gestale test showed signs of organic brain disease. He had mild myopia and his visual fields were full. He had mild tactile anomia on his left hand and mild finger agnosia with eyes closed was worse on the left hand. He had no alien hand syndrome.

On the 28th day after admission, the 2nd 1.5T superconducting unit of MRI of the brain was obtatined. Marked atrophy of the whole corpus callosum and persistence of cystic lesion in the splenium

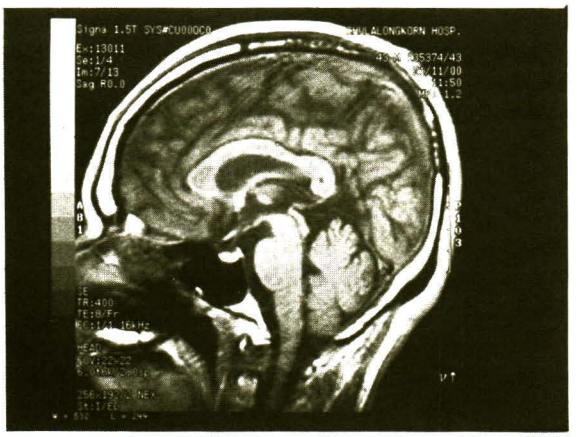

Fig. 1. Sagittal T1WI MRI demonstrates abnormal hyposignal intensity the involving the central layer of the whole corpus callosum and a small cystic lesion in the splenium of the corpus callosum.

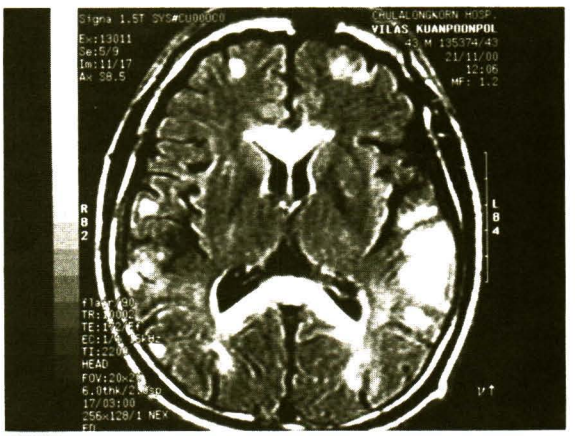

Fig. 2. Axial FLAIR image demonstrates hypersignal intensity lesions involving the corpus callosum and subcortical white matters.

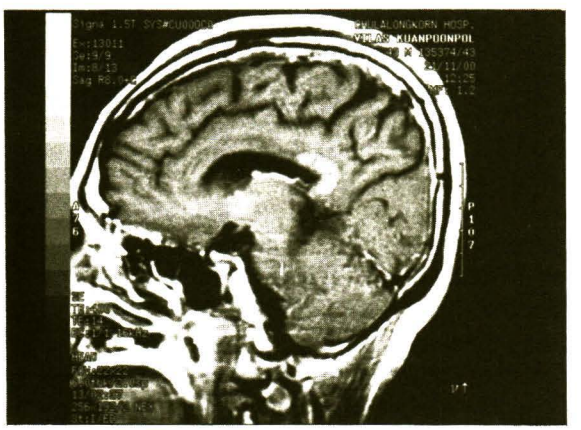

Fig. 3. Sagittal T1WI MRI with gadolinium enhancement demonstrates an enhanced lesion at the splenium of the corpus callosum.

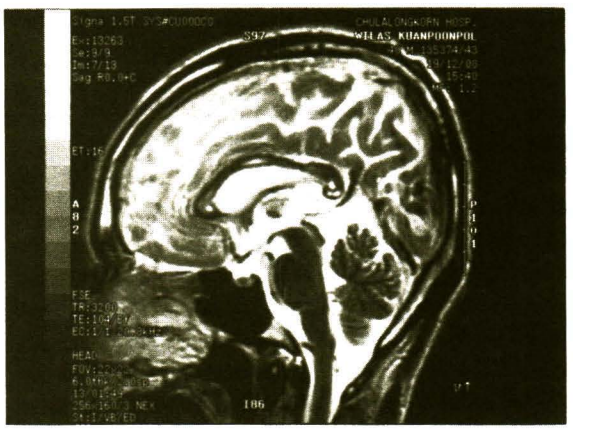

Fig. 4. Sagittal T2WI MRI demonstrates marked atrophy of the whole corpus callosum and cystic changes in the genu, body and splenium of the corpus callosum.

were demonstrated. Cystic changes in the genu, body and splenium of the corpus callosum, replaced previous edema and demyelinating lesions. The extensive subcortical white matter lesions demonstrated in the previous MRI study were almost completely resolved. (Fig. 4) At that time, he had no ataxia and dysarthria. The palmo-mental reflex was still present.

DISCUSSION

In the past, MBD was a fatal disease and the diagnosis was usually made at autopsy. The cardinal histopathologic features of MBD are necrosis and subsequent demyelination of the corpus callosum, particularly the medial part. However, the pathology such as acute bleeding, cavitation, cystic

formation can be detected[1]. Detailed examinations reveal absence of neuroglial proliferation and presence of astrocytic gliosis in the demyelinated areas of the corpus callosum[4,7,8]. The classical locations of the lesion are anterior commissure, rostrum, genu and splenium or the entire length of the corpus callosum[1]. In some cases, lesions in the centrum semiovale and other subcortical areas may be encountered. Apart from lesions in the corpus callosum and related myelinated tracts, cortical lesions have also been observed[4]. In 1939, Morel first described the cortical changes in the form of "cortical laminar sclerosis" and described these lesions as a continuous sheet of macroglial cells in the third cortical layer with neuronal loss and rarefaction of the myelin fibers outside the third cortical layer, predominantly in the frontal cortex[4]. In a re-examination of Morel's case 4 by Jequier and Wildi in 1956, necrosis of corpus callosum was detected[4]. In 1959, Delay et al added the presence of spongiosis in the third cortical layer to this description. They suggested that laminar sclerosis might result form the interruption of the callosal fibers[4]. In 1966, Rancurel also observed the lesions that fitted to cortical laminar sclerosis in 19 out of 103 cases of MBD[4].

Recently, 15 cases of MBD with specific lesion, demonstrated by MRI, were published in the English literature[1,2,6,10,11]. Among 7 cases with available literature in Thailand, the authors found that the clinical presentations included disorientation 71 per cent (5 cases), gait disturbance 71 per cent (5 cases), difficulty in talking and eating 57 per cent (4 cases), syndrome of interhemisphereic disconnection 57 per cent (4 cases) and impaired memory 14 per cent (1 case). Three cases presented in the acute phase, 1 case presented in the subacute phase and 3 cases presented in the chronic phase. In the acute phase, oedema and gadolinium enhancement of the corpus callosum were demonstrated by MRI[1,2,10]. While atrophic and cystic changes of the corpus callosum were observed in the chronic phase[1,2,6]. Only one subacute case, reported by Ruiz-Martinez et al had widespread subcortical fronto-parietal white matter lesions[6]. Some of the literature reported the serial changes of the lesions[1,6]. Chang et al reported serial studies of the corpus callosum on MRI in two acute cases.[2] They observed the demyelination and oedema of the corpus callosum at the time of diagnosis and diminished signal intensity in the corpus callosum on the 7th days. Atrophic, necrotic and cystic changes were found at 54 and 74 days after treatment. Ruiz-Martinez reported one subacute case[6]. His first MRI showed a linear lesions in the genu and more focal lesions in the splenium of the corpus callosum, and the MRI also demonstrated a wide nonspecific abnormal signal in the subcortical white matter of the frontal and parietal lobes. Follow-up MRI 2 months later showed almost complete resolution of the hemispheric white matter lesions. All of the 15 cases had early diagnosis and prompt treatment with thiamine. All of them had a favorable outcome. The present case had typical corpus callosal lesions, with oedema and gadolinium enhancement at the anterior commissure and splenium, which represented changes in the acute phase[1,2,10]. MRI also demonstrated extracallosal white matter lesions that were more extensive, compared to Ruiz-Martinez's case. According to the follow-up MRI, the corpus callosal changes were similar to the cases of Chang and Ruiz-Martinez. However, the extensive white matter lesions had disappeared only within one month compared to a previous study which revealed disappearance of this type of lesions in 2 months [6]. To our knowledge, this is the first case report of acute MBD with extensive extracallosal lesions in Thailand.

Alcoholism causes many neurological disorders[9]. The common and classical syndrome of the alcoholic related central nervous system disorder is Wernicke Korsakoff syndrome[9]. A number of clinical experimental studies confirmed that malnutrition, especially thiamine deficiency from chronic alcoholic consumption, is the major causation of Wernicke Korsakoff syndrome[9]. MBD, an uncommon neurological disease associated with alcoholism, is a very rare disease compared to Wernicke Korsakoff syndrome[9]. So studies of its pathogenesis are much more limited[1,2,6,10,11]. Fifteen previous cases and the present case had dramatic improvement after treatment with thiamine. Thiamine will therefore have a critical role in the pathogenesis of MBD. However, cessation of alcoholic drinking, other nutritional factors and direct alcoholic intoxication may also play a role.

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โรคมาร์เคียฟาวา–บิคนามิ : รายงานผู้ป่วย

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โรค Marchiafava–Bignami เป็นความผิดปกติของระบบประสาทชนิดหนึ่งที่สัมพันธ์กับการดื่มสุราเป็นเวลานาน เป็นโรคที่พบได้ไม่บ่อยและผู้ป่วยใหญ่มักจะเสียชีวิต แต่เดิมการวินิจฉัยที่แน่นอนจะได้จากการชันสูตรศพ หลังจากที่มีเทคนิคการตรวจทางรังสีวินิจฉัยใหม่ ๆ การวินิจฉัยจะทำได้โดยอาศัยข้อมูลทางคลินิกของผู้ป่วย ประวัติการดื่มสุราร่วมกับการตรวจคลื่นแม่เหล็กไฟฟ้าความถี่สูง (เอ็ม อาร์ ไอ) ซึ่งจะพบพยาธิสภาพที่จำเพาะของสมองส่วน corpus callosum รายงานผู้ป่วยโรค Marchiafava–Bignami ในผู้ป่วยชายไทย อายุ 41 ปี ที่มีประวัติดื่มสุราเป็นเวลานาน มีอาการสำคัญคืออาการสับสนเฉียบพลันและเดินเซ การตรวจ เอ็ม อาร์ ไอ ของสมองพบลักษณะ demyelination, edema และ necrosis ของสมองส่วน corpus callosum ร่วมกับรอยโรคของเนื้อขาวของสมองทั้งสองข้างแบบสมมาตร ผู้ป่วยมีอาการดีขึ้นมากหลังจากได้รับวิตามินบีหนึ่ง การตรวจ เอ็ม อาร์ ไอ ติดตามซ้ำพบการเปลี่ยนแปลงแบบ atrophic และ cystic ของ corpus callosum และพบว่ารอยโรคที่เนื้อขาวของสมองสองข้างหายไปด้วย รายงานผู้ป่วยโรค Marchiafava–Bignami ก่อนหน้านี้จำนวน 15 ราย พบลักษณะพยาธิสภาพที่จำเพาะของ corpus callosum จากการตรวจด้วย เอ็ม อาร์ ไอ มีเพียงหนึ่งรายที่พบรอยโรคนอก corpus callosum ร่วมด้วย ทุกรายมีอาการดีขึ้นมากหลังจากได้วิตามินบีหนึ่ง ในปัจจุบันโรค Marchiafava–Bignami ไม่ใช่โรคที่จะทำให้เสียชีวิตอีกแล้ว การวินิจฉัยและการรักษาเริ่มแรกมีความสำคัญมาก

คำสำคัญ : มาร์เคียฟาวา–บิคนามิ, สุรา, คอร์ปัสคอลลอสัม

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