Case Report

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Miller Fisher syndrome with early intracranial hypertension and delayed bilateral simultaneous facial nerve palsy: a case report

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Abstract

Miller Fisher syndrome (MFS), a variant of Guillain–Barré syndrome, is characterized by ataxia, areflexia and ophthalmoplegia. This case report describes a 40-year old male that presented with a 3-day history of unsteady walking and numbness on both hands, and a 2-day history of seeing double images and unclear articulation. Lumbar puncture revealed an opening pressure of 260 mm H_2O. Plasma serology was positive for anti-ganglioside M1-immunoglobulin M (anti-GM1-IgM) antibodies and negative for anti-ganglioside Q1b (anti-GQ1b) antibodies. The patient was diagnosed with MFS based on the clinical course and neurophysiological findings. On the 4th day of treatment with intravenous immunoglobulin (IVIG), his ataxia and unsteady walking improved, but his bilateral eyeballs were fixed, and over the next few days he developed bilateral peripheral facial paralysis. After 5 days of IVIG treatment, methylprednisolone treatment was offered and the patient's symptoms gradually improved. Early intracranial hypertension and delayed facial nerve palsy may be atypical presentations of MFS. Anti-GM1-IgM antibodies may be the causative antibodies for MFS. If the IVIG therapy does not stop the progression of the disease, the addition of corticosteroid therapy may be effective. However, the relationship between IgM type, anti-GM1 antibody and MFS remains unclear and requires further research.

Keywords

Miller Fisher syndrome, intracranial hypertension, facial nerve palsy, treatment

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Introduction

Miller Fisher syndrome (MFS) is considered to be a variant of Guillain–Barré syndrome (GBS).[1] Its clinical symptoms include external ophthalmoplegia, ataxia and hyporeflexia or areflexia of the tendons of the four limbs.[1] The anti-ganglioside Q1b (anti-GQ1b) antibodies are always positive.[2] MFS rarely manifests as intracranial hypertension and delayed bilateral facial nerve palsy. The present case report describes a man with MFS with early intracranial hypertension and delayed bilateral simultaneous facial nerve palsy, without anti-GQ1b antibodies but with anti-ganglioside M1-immunoglobulin M (anti-GM1-IgM) antibodies.

Case report

A 40-year-old unmarried male presented to the Department of Neurology, Third Affiliated Hospital of Guangzhou Medical University, Guangzhou, Guangdong Province, China in April 2017 with a 3-day history of unsteady walking and numbness on both hands, and a 2-day history of seeing double images and unclear articulation. He had a cold for the 2 weeks prior to presentation. He did not have any relevant medical history. The symptoms gradually worsened and on the 4th day he was admitted to the hospital.

On admission, the general medical examination was normal. A neurological examination revealed the following: unclear articulation, velar nasal, the movement of the bilateral eyeballs was slightly limited, the pharyngeal reflex was obtuse, areflexia with no limb muscle weakness and an ataxic gait. The remainder of the neurological examination was normal.

Brain computed tomography and magnetic resonance imaging revealed no abnormalities. Routine laboratory examinations were normal, including blood cell count, blood biochemistry, cancer index and immunological examinations. Various antiviral antibodies were negative. Lumbar puncture was performed on day 4 and revealed an opening pressure of 260 mm H_2O (the patient had no headache), cerebrospinal fluid protein content 290 mg/l and a cell count of 12×10^6/l. Lumbar puncture was conducted again after 1 week when the pressure had spontaneously returned to normal levels, protein levels improved and the separation of proteins and cells occurred. Serum anti-GM1-IgM was found to be positive, but anti-GQ1b and the remaining antibodies were all negative. Nerve conduction examinations were normal.

The patient was diagnosed with MFS and was treated with 0.4 g/kg per day of intravenous immunoglobulin (IVIG) for 5 days. On the 4th day of treatment with IVIG (i.e. 9 days after the onset of symptoms), his ataxia and unsteady walking improved, but his bilateral eyeballs were fixed, and over the next few days he developed consecutive bilateral peripheral facial paralysis. After IVIG treatment, the patient was given 3 days of 1000 mg/day methylprednisolone via intravenous drip. The dose was halved every 3 days until the dose reached 60 mg/day methylprednisolone via intravenous drip. Then the drug was taken orally and the dose was gradually decreased. On the 18th day after onset of symptoms, facial paralysis, dysarthria, dysphagia and ataxia further improved. On the 19th day after onset of symptoms, the patient was discharged from hospital. At 2 weeks after hospital discharge, the bilateral facial paralysis had recovered, ataxia was eliminated, walking was obviously improved and the movement of the eyeballs had partially recovered. On the 3rd week after discharge, the movement of the eyeballs had obviously improved, mild diplopia remained, speaking with a twang had disappeared and coughing while drinking

had been eliminated. One month after discharge, the patient's eyeballs moved freely and the diplopia had disappeared.

This study was conducted in accordance with the declaration of Helsinki. This study was conducted with approval from the Ethics Committee of the Third Affiliated Hospital of Guangzhou Medical University. Written informed consent was obtained from the patient for publication of this case report.

Discussion

In 1956, Miller Fisher reported a case whose main manifestations were external ophthalmoplegia, ataxia and tendon areflexia; and this was named Miller Fisher syndrome.[1,2] In 2011, the Brighton Collaboration Group for international vaccine safety monitoring set bilateral external ophthalmoplegia, bilateral tendon hyporeflexia or areflexia and ataxia without weakness in the limbs, disturbance of consciousness, pyramid sign, single-time-phase course of disease and other diseases as the core features.[3] A definite diagnosis of MFS can be made when the separation of protein and cells in the cerebrospinal fluid and nerve conduction examination are normal, or only the sensory nerve is involved.[3–5] The present patient's clinical manifestations, cerebrospinal fluid examination and nerve electrophysiological examination all conformed to the diagnostic criteria. In addition, other than the above three symptoms, the current patient also had damaged cranial nerves III, IV, VI, IX and X in the early period of the course of the disease. On the 4th day after treatment with IVIG, the patient's dizziness and unsteady walking improved, but he had bilateral facial paralysis. Generally, bilateral facial paralysis occurs in the early period of the disease and it is clinically rare that this symptom occurs during treatment or at the recovery stage.[6–8] These specific reasons remain unclear and are worthy of further discussion.

In addition, the patient had intracranial hypertension, which was discovered during the early lumbar puncture, but he had no headache, vomiting or other manifestations of intracranial hypertension. Is early intracranial hypertension one of the early manifestations of MFS? A previous study described two MFS patients with benign intracranial hypertension.[9] One patient was a 2-year-old girl who had vomiting, strabismus and other symptoms.[9] The other patient was a 9-year-old girl who had forehead pain and vomiting.[9] These two patients had increased pressure of the cerebrospinal fluid.[9] However, the protein level in the cerebrospinal fluid was not elevated and the number of cells was normal.[9] Furthermore, in the present case, the examination of the cerebrospinal fluid conducted on the 4th day after the onset of the disease found that intracranial pressure had increased and had reached 260 mm H_2O. Furthermore, cerebrospinal fluid proteins were normal, which was in line with a previous report,[9] and the number of cells increased to 22×10^6/l (normal range, 0–8×10^6/l). Lumbar puncture was conducted again after 1 week when the pressure had spontaneously returned to normal levels, protein levels improved and the separation of proteins and cells occurred. At present, the causes of increased intracranial pressure remain unknown. The possible causes could be excessive cerebrospinal fluid in the choroid plexus, less absorption of the cerebrospinal fluid by arachnoid granulations and increased venous sinus pressure.[10–12] The brain imaging of the patient revealed no signs of diffuse encephaloedema. In addition, when the cerebrospinal fluid pressure increased, the protein level in the cerebrospinal fluid did not increase. The patient had an increased number of early cells and an inflammatory response. Hence, an inflammatory response may be the cause

of the increased cerebrospinal fluid in the choroid plexus, which further increased cerebrospinal fluid pressure. Previous studies have shown that antibodies were positive in 83% of MFS patients.[13–15] The patient in the present study had damaged cranial nerves III, VI, IX and X. However, the anti-GQ1b antibodies were negative and the anti-GM1-IgM antibodies were positive. Anti-GM1-IgM antibodies are the common antibodies of classical GBS, showing the same immunological pathogenesis.[2]

At present, the treatment options for GBS are IVIG or plasma exchange (PE).[2] The combination of steroids and IVIG in the early course of the disease has achieved good curative effects.[16] However, some research has reported that the combined treatment resulted in worse effects compared with either single treatment.[17] A previous study found that among the four cases that were reported, one patient had late facial nerve palsy after treatment with IVIG and two patients treated with PE also had late facial nerve palsy.[8] Hence, the authors concluded that IVIG or PE cannot effectively stop the development of the disease.[8] In our opinion, we agree with this previous report with regard to the treatment of the current patient.[8] Following IVIG treatment, the current patient still had a damaged oculomotor nerve, limited movement of the eyeballs and eyeball fixation. In addition, on the 4th day of treatment of IVIG, the patient developed bilateral facial nerve palsy. The symptoms improved after methylprednisolone was administered. As IVIG and PE are expensive, we would advocate the use of steroids for MFS, with IVIG or PE only being used when necessary. This suggested approach should be verified in larger clinical trials. In addition, the relationship between IgM type, anti-GM1 antibody and MFS remain unclear and require further research.

Declaration of conflicting interest

The authors declare that there are no conflicts of interest.

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