Miller Fisher Variant of Guillain–Barré Syndrome in a Child

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Miller Fisher syndrome (MFS), a rare form of Guillain–Barré Syndrome, presents with the classical triad of ophthalmoplegia, areflexia, and ataxia. We describe the case of a 7-year-old boy who presented with diplopia, speech difficulty, dysphagia, gait disturbance, and difficulty in eyeball movements since 5 days. On examination, the child was having ataxia, areflexia, ophthalmoplegia, drooling of saliva, dysphonia, and absent gag reflex. MFS and brain stem encephalitis were kept as the differential diagnoses. The patient improved gradually over 3 weeks, following a treatment with intravenous immunoglobulin.

Keywords: Brain stem encephalitis, immunoglobulins, Miller Fisher syndrome

INTRODUCTION

Miller Fisher syndrome (MFS), an autoimmune disorder, is a rare variant of Guillain–Barré syndrome (GBS). It was first recognized by James Collier in 1932. Later, in 1956, Charles Miller Fisher reported three clinical cases with classical triad of ataxia, areflexia, and ophthalmoplegia as a variant of GBS. MFS accounts for 5%–10% of GBS in adults, with a male predominance (male:female ratio of 2:1), but in pediatric age-group, it is a very rare entity. Here we report a 7-year-old boy having ophthalmoplegia, ataxia, and areflexia along with respiratory paralysis. The boy gradually recovered following a course of intravenous immunoglobulin (IVIg) and supportive management.

CASE REPORT

A 7-year-old boy was referred to us for acute onset of diplopia, dysphagia, speech, and gait difficulty of 5 days, without any seizures, loss of consciousness, or weakness of any part of body. On examination, the child was conscious, afebrile, with pulse rate of 110/min, respiratory rate of 24/min without distress, and oxygen saturations of 99% on room air. Blood pressure was 130/70 mm Hg in right arm in supine position (>95th percentile). He was pale, but he did not have icterus, cyanosis, clubbing, lymphadenopathy, or edema. On neurological examination, it was found that his higher mental functions were intact. He was having dysphonia, complete ophthalmoplegia with bilateral severe abduction palsy, ptosis, drooling of saliva, and absent gag reflex. On motor examination, normal bulk of muscles and tone, power >3/5, and absent deep tendon reflexes were observed. There was no sensory involvement. Autonomic instability was found in the form of fluctuating heart rate (between 55 and 120 beats/min) and blood pressure (between 90/56 and 138/96 mm Hg). The child had sensory ataxia. Other systemic examinations were normal. He had hemoglobin level of 10.5 gm% and total leukocyte count of 7200/mm3 (neutrophils, 91%, lymphocytes, 5%, and monocytes, 2%). On admission, serum electrolyte levels, calcium levels, renal parameters, and chest X-ray were all found to be normal. Cerebrospinal fluid (CSF) examination was also normal. On day 2 of admission, the condition of the child worsened with drowsiness and shallow respiration with fever, requiring mechanical ventilation for 6 days. He was started on IVIg in a dose of 2 g/kg divided over 5 days, along with other supportive treatment in the form of IV antibiotics, maintenance fluids, and fever control. He was gradually started on nasogastric feeding, after extubation, from day 8 of admission. During the course in ward, approximately

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12 days after admission, the child developed tender, erythematous nodules over the anterior aspect of left shin, along with bilateral pain and tenderness in hip joints, radiating to the thighs. Biopsy from nodules was suggestive of erythema nodosum. X-rays of the hip joints were unremarkable; however, ultrasonography revealed reactive arthritis with effusions. The child was started on naproxen 20 mg/kg along with bilateral lower limb skin traction for the management of hip arthritis. Magnetic resonance imaging of brain was suggestive of multiple foci of blooming in bilateral frontal, parietal, occipital and bilateral cerebellar cortices, and patchy sulcal hyperintensities (left more than right), involving bilateral parietal lobes with leptomeningeal enhancement. Nerve conduction velocity (NCV) studies were normal. Anti-Ganglioside 1b Immunoglobulin G (GQ1b IgG) antibody titers were negative. The child gradually responded to the treatment with improvement in eye movements, noticed first, followed by improvement of speech. He was started on oral feeds after the appearance of gag reflex. At the time of discharge, the child was able to talk fluently and walk normally, without any visual complaints.

**DISCUSSION**

MFS is a heterogeneous group of immune-mediated neurological diseases. Charles Miller Fisher, in 1956, reported three clinical cases with a classical triad of ataxia, areflexia, and ophthalmoplegia as a variant of GBS. MFS accounts for 5%–10% of GBS in adults, but in pediatric age-group, it is a very rare entity. MFS, like GBS, occurs following nonspecific respiratory or gastrointestinal infections. Many infectious agents have been identified, the notable ones being *Campylobacter jejuni* and *Haemophilus influenzae*. Diplopia is the most common presenting complaint followed by ataxia, both of which were present in our patient. Pediatric forms usually have a milder presentation with predominantly ocular involvement. A few exceptions, like in our case, may also have respiratory failure and transient coma. Urinary retention or incontinence as a complication can be seen in up to 20% cases, although it is transient. Distal paresthesias are also reported in MFS.

The presence of anti-GQ1b antibodies in strong association with MFS was first reported in 1992 by Chiba et al. Immunological studies have shown direct pathological role of monoclonal anti-GQ1b antibodies in the development of MFS symptoms. H-reflex in NCV studies acts as a diagnostic tool in MFS in children as it’s absence indicates areflexia; however, it is reported to be absent in only 70% of cases in studies conducted by Sekiguchi et al. and Ito et al. In our patient, H-reflex was found to be normal.

MFS overlaps in clinical presentation with Bickerstaff brain stem encephalitis (BBE). Few recent studies suggest that MFS and BBE are not separate conditions, but a continued spectrum of a disease called “anti-GQ1b antibody syndrome.” Anti-GQ1b antibodies are present in 90% cases of both MFS and BBE. This overlap suggests that common autoimmune mechanisms function in the pathogenesis of these illnesses. Other entities included in this syndrome are GBS and acute ophthalmoparesis. Molecular mimicry between the ganglioside and an infectious agent of the antecedent infection may be a mechanism of antibody production. However, our patient was negative for this antibodies. Campylobacter infection is also known to cause complications such as erythema nodosum, reactive arthritis, and brain stem encephalitis, but the blood and stool cultures in our child were negative.

Although a self-limiting disease, we noticed a dramatic clinical improvement in our patient following a course of IVIg. Good supportive care and immunotherapy treatments, such as IVIg and plasmapheresis, hasten the recovery of these patients. Even though MFS is rare in children, strong clinical suspicion helps in the early diagnosis and management, leading to fast clinical recovery.

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**Conflicts of interest**

There are no conflicts of interest.

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