

Guillain-Barré syndrome associated with hyper-IgE-emia

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Peripheral neuropathy associated with hyper-IgE-emia have been rarely reported. Here we present a 72-year-old man with acute motor axonal neuropathy who had relatively poor prognosis. The serum was weakly positive for IgG GQ1b and GT1a, and serum IgE was significantly elevated. He was transferred to a rehabilitation center with Medical Research Council grade 3 lower extremity weakness on admission day 65. We would suggest that hyper-IgE-emia may increase the magnitude and rate of neural damage in this case.

Key words: Guillain-Barré syndrome; Hyper-IgE-emia; Hyper IgE syndrome

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Elevated immunoglobulin E (IgE) can be detected in various conditions such as allergic asthma, atopic eczema, anaphylaxis, parasite infection, vasculitis, IgE myeloma, and hyper-IgE syndrome (HIES).¹ The binding of IgE to specific antigens causes mast-cell degranulation, resulting in an inflammatory reaction.² Here we present a patient with Guillain-Barré syndrome (GBS) who exhibited elevated serum IgE.

CASE

A 72-year-old man was admitted for paresthesia in both feet and a gait disturbance that had progressed for the previous 3 days. He was generally healthy except for frequent skin abscesses and eczema. He denied any medical history of allergy or a family history of immune deficiency. A neurologic examination revealed symmetric muscle weakness (Medical Research Council [MRC] grade 4) in the distal lower limbs and decreased deep tendon reflexes. The findings of laboratory tests were normal except for creatinine kinase (390 IU/L), lactate dehydrogenase (448 IU/L), and myoglobin (244.5 ng/mL). Brain magnetic resonance imaging also produced normal results. Cerebrospinal fluid analysis revealed albuminocytologic dissociation, normal cell count and glucose level, but elevated protein (183.2 mg/dL). A nerve conduction study (NCS) and electromyography showed that the compound muscle action potentials were slightly low in all of the nerves examined on the

admission day. Somatosensory evoked potentials were normal.

Following a diagnosis of GBS, intravenous immunoglobulin (IVIg) was started. The muscle weakness progressed rapidly in both lower limbs (MRC grade 2) and upper limbs (MRC grade 3) over the next few days. Pneumonia appeared on day 3, whose progression resulted in mechanical ventilation being started on day 5 after admission. Facial diplegia was noted on day 7. The serum was weakly positive for IgG GQ1b and GT1a. Serum IgE was significantly elevated (5,715.7 IU/mL, normal range: 0–100 IU/mL), whereas IgA, IgM, and IgG were within the normal ranges. The serum eosinophil count was 191/ μ L, corresponding to 2.2% of whole blood cells. Serology tests for parasites, human immunodeficiency virus, hepatitis B and C, cytomegalovirus, Epstein-Barr virus, herpes simplex virus types 1 and 2, varicella zoster virus, and *Campylobacter jejuni* were all negative.

Two weeks after starting IVIg administration, improvements in upper extremity weakness, facial diplegia, and respiratory distress permitted ventilator weaning. However, lower extremity weakness had not changed. Follow-up NCS findings

were compatible with acute motor axonal neuropathy (Fig. 1), and his follow-up serum IgE level had increased to 7,528.3 IU/mL. His IgE level decreased to 4,260.9, 2,645.1, and 2,223.4 IU/mL at weeks 1, 2, and 3 after administering high-dose IV methylprednisolone pulse therapy. On day 65 he was transferred to a rehabilitation center with MRC grade 3 lower extremity weakness.

DISCUSSION

Differential diagnosis of hyper-IgE-emia is very extensive, but the final diagnosis is mostly based on the clinical history and physical findings. The present patient did not have any problematic history except for his recurrent skin infection with eczema. However, the level of IgE was extremely high and beyond that expected in patients with pure skin allergy problems. The findings of extensive laboratory tests were all negative, including the eosinophil count and parasite panel. Finally we considered HIES, which is a rare primary immunodeficiency disease with a genetic association, but data from

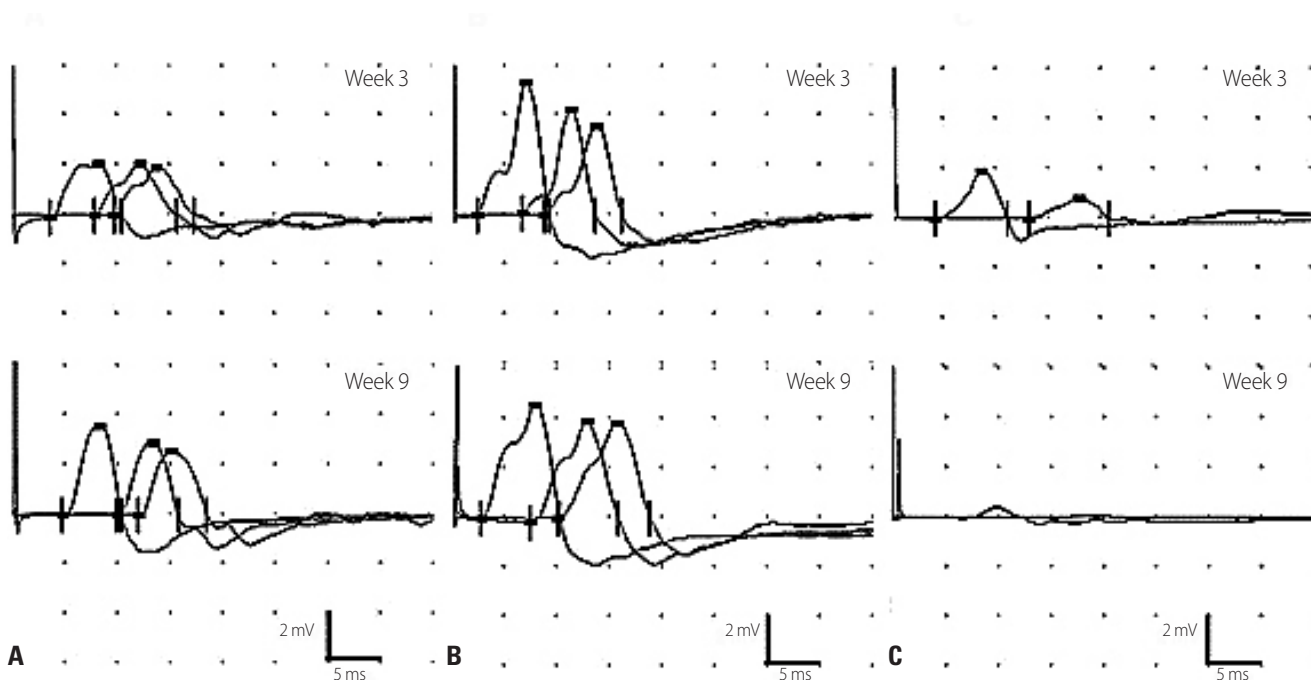


Fig. 1. Data from nerve conduction studies. Motor nerve conduction studies revealed normal velocities but variable decreases in amplitude in the median (A), ulnar (B), and tibial (C) nerves. The compound muscle action potential amplitude in the median nerve had improved by week 9, while that in the tibial nerve had decreased.

a genetic evaluation were not available. Although peripheral nerve involvement is not a well-known complication, a few cases of hyper-IgE-emia associated with subacute or chronic polyneuropathy have been reported.^{3,4} However, to our knowledge this is the first case of GBS associated with hyper-IgE-emia. It is possible that GBS and the hyper-IgE-emia in this case were coincidental. Nevertheless, the elevation in IgE might have played a role in the pathogenesis of this case with GBS.^{5,6} In the pathogenesis of GBS, multiple factors including breakdown of blood–nerve barrier (BNB) and extent of inflammation are all relevant to producing auto-antibody-mediated nerve fiber injury.⁷ A healthy peripheral nervous system is tightly sealed by the BNB, which has a very low permeability to serum immunoglobulins.⁸ Therefore, in the absence of a local inflammatory response, diffusion of an antibody into the nerve is unable to initiate a functional deficit.⁸ Mast cells activated by IgE trigger disruption of the BNB as an initial GBS insult, and this is followed by macrophage activation.⁹ Therefore, hyper-IgE-emia may increase the magnitude and rate of neural damage in early GBS. Further research regarding the role of IgE in GBS might help to identify the mechanisms underlying the induction of GBS.

Conflicts of Interest

The authors have no financial conflicts of interest.

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