Review Article

RFP Journal of Biochemistry and Biophysics
Volume 4 Number 2, July – December 2019

Guillain-Barré Syndrome (GBS): Attack of Self Immune System to the Peripheral Nerves

Sachin C Narwadiya[1], Gulshan J Karhade[2]

Author's Affiliation: [1]Scientist C, Department of Science & Technology, Vigyan Prasar, A-50, Institutional Area, Sector 62, Noida, Uttar Pradesh 201309, India. [2]Laboratory Technologist, Department of Laboratory Technologist, Ayurveda Central Research Institute, Regional Ayurveda Research Institute for Mother and Child Health, Near Gharkul Parisar, N.I.T. Complex, Nandanwan, Nagpur, Maharashtra 440009, India.

How to cite this article:

Sachin C Narwadiya, Gulshan J Karhade. Guillain-Barré Syndrome (GBS): Attack of Self Immune System to the Peripheral Nerves. RFP Journal of Biochemistry and Biophysics. 2019;4(2):61–64

Abstract

Guillain-Barré syndrome (GBS) is referred to a rare condition in which a person's self-immune system attacks his own peripheral nerves. The disease was first detected by the French physician Jean-Baptiste Octave Landry in 1859. After this during 1916, Georges Guillain, Jean Alexandre Barré, and André Strohl also confirmed the disease onset in some soldiers. The disease can affect the people of all ages but more common in adult males. The disease has recovery, if treated. In case of severity which is rare can lead to total paralysis. Guillain-Barré syndromecan adversely affect the nerves that control muscle movement, transmit pain, temperature, feeling the touch sensations. Muscle weaknesses, loss of sensation in the legs and/or arms are the resultant symptoms may arise in the patient suffering from GBS. The symptoms will start in the legs and further spread to face and arms. In GBS 20–30% peoples may experience the chest muscle affected and difficulty in breathing. Sometimes the swallow and speak abilities also get affected. Most of peoples recover fully from GBS, but some people have long-term nerve damage. 3–5% of GBS patients may die from complications, which include paralysis of the muscles that control breathing, blood infection, lung clots or cardiac arrest. As per the National Health Portal web site information the cause of GBS is unknown. It sometimes linked with triggering by an infectious illness like gastrointestinal infection or a lung infection. Some countries from Europe and Asia have also reported familial occurrence of GBS. According to World Health Organization (WHO) overall incidence of GBS is 0.4 to 4.0 people per 100000 per year.[1]

Keywords: Autoimmune disease; Guillain-Barré syndrome (GBS); Systemic lupus erythematous; World health organization (WHO).

Introduction

An autoimmune disease is a condition in which a person's immune system mistakenly attacks his/ her body organs. The immune system normally protects us from bacteria and viruses. Immune System on sensed bacteria and viruses as foreign invaders, it sends out an army of fighter cells to attack them. Immune system has capacity to identify which are foreign cells and which are own cells?

In case of an autoimmune disease, the immune system by mistakes recognizes our own body organs like your joints or skin, as foreign. Than it releases proteins called autoantibodies that attack healthy cells. Some common examples of autoimmune disease are Type 1 diabetes damages the pancreas,

Corresponding Author: Gulshan J Karhade, Laboratory Technologist, Department of Laboratory Technologist, Ayurveda Central Research Institute, Regional Ayurveda Research Institute for Mother and Child Health, Near Gharkul Parisar, N.I.T. Complex, Nandanwan, Nagpur, Maharashtra 440009, India.

E-mail: gulshankarhade@rediffmail.com

Received: 09.10.2019 | **Accepted:** 02.11.2019

systemic lupus erythematous (SLE), affect the whole body, Guillain-Barré syndrome (GBS) in which peripheral nervous system affected.[2]

Guillain-Barré syndrome (GBS) is referred to a rare condition in which a person's self-immune system attacks his own peripheral nerves. The disease was first diagnosed by the French physician Jean-Baptiste Octave Landry in 1859. After this during 1916, Georges Guillain, Jean Alexandre Barré, and André Strohl also diagnosed two soldiers with the illness and described the albumin cytological dissociation of increased spinal fluid protein concentration but a normal cell count.

The disease can affect the people of all ages but more common in adults and in males. The disease has recovery if treated. In case of severity which is rare can lead to total paralysis. Guillain-Barré syndromecan adversely affect the nerves that control muscle movement, transmit pain, temperature, feeling the touch sensations. Muscle weaknesses, loss of sensation in the legs and/or arms are the resultant symptoms may arise in the patient suffering from GBS. The symptoms will start in the legs and further spread to face and arms. In GBS 20–30% peoples may experience the chest muscle affected and difficulty in breathing.

Sometimes the swallow and speak abilities also get affected. Most of peoples recover fully from GBS, but some people have long-term nerve damage. 3%-5% of GBS patients may die from complications, which include paralysis of the muscles that control breathing, blood infection, lung clots or cardiac arrest.

Symptoms

Guillain-Barré syndrome started with symptom of weakness or tingling sensations starting from Legs. This can spread to arms and face. These symptoms can lead to paralysis of the legsarms, or muscles in the face for some peoples.

The ability to speak and swallow may become affected in severe cases of Guillain-Barré syndrome. These cases are considered life-threatening, and affected individuals should be treated in intensive-care units. Most people recover fully from even the most severe cases of Guillain-Barré syndrome, although some continue to experience weakness. About 3–5% of Guillain-Barré syndrome patients die from complications, which can include paralysis of the muscles that control breathing, blood infection, lung clots, or cardiac arrest.[1]

Causes

Guillain-Barré syndrome caused after bacterial of viral infection. Guillain-Barré syndrome may also be triggered by vaccine administration or surgery. It is observe that there is increased number of cases of GBS in countries having Zika Virus infections high in numbers[1]. Guillain-Barré syndrome has at least four subtypes of acute peripheral neuropathy. The histological appearance of the acuteinflammatory demyelinating polyradiculoneuropathy (AIDP) subtype is similar to the experimental autoimmune neuritiscaused by T-cells directed against peptides from the myelin proteins P0, P2, and PMP22. The exact role of T-cell-mediated immunity in AIDP is not clear while there is evidence for the involvement of antibodies and complement. There is evidence that axonal subtype of Guillain-Barré syndrome, acute motor axonalneuropathy (AMAN), and acute motor and sensory axonal neuropathy (AMSAN), are initiated by antibodies togangliosides on the axolemma that target macrophages to invade the axon at the node of Ranvier. About a quarter ofpatients with Guillain-Barré syndrome have had a recent *Campylobacter jejuni* infection, and axonal forms of the diseaseare especially common in these people.[6]

Classification of GBS

As per symptoms the GBS is classified into axonal and demyelinating forms.

Sensory and motor: AIDP or acute motor-sensory axonal neuropathy (AMSAN).

Motor: Acute motor demyelinating neuropathy (AMDN) or Acute motor axonal neuropathy (AMAN)

Miller-Fisher syndrome: Ophthalmoplegia, ataxia, and areflexia or also referred to as Fisher's syndrome. Bickerstaff's brainstem encephalitis (BBE): similar to Miller-Fisher syndrome but also has encephalopathy or hyper-reflexiaor both.[7]

Pharyngeal-cervical-brachial: Acute arm weakness, swallowing dysfunction, and facial weakness.[8]

Acute pandysautonomia: Diarrhoea, vomiting, dizziness, abdominal pain, ileus, orthostatic hypotensionand urinary retention, bilateral tonic pupils, fluctuating heart rate, decreased sweating, salivation, andlacrimation.[9,10] Pure sensory: acute sensory loss, sensory ataxia, and areflexia but no motor involvement.[11]

Diagnosis

The diagnosis of Guillain-Barré syndrome itself is simple for the neurologist to diagnose. Diagnostic criteria exist and have stood the test of time. Many GBS patients show an acute neuropathy reaching a peak in duration of 4 weeks, weakness, hyporeflexia or areflexia, and indicated raised protein concentrations in CSF.[6] In patients lacking sensory involvement other disorders like poliomyelitis, myasthenia gravis, electrolyte disturbance, botulism, or acute myopathy also needed to be looked. Hypokalaemia is a often ignored alternative diagnosis. Once the diagnosis of an acute peripheral neuropathy is confirmed, Guillain-Barré syndrome indicated, but it will not be the only, cause. The Physician may also look for alternative causes such as diphtheria, vasculitis, porphyria, tick paralysis, and toxic neuropathy while examining the patient and taking their history.[6]

Indian Scenario on GBS Research

Some case based studies were reported in India and as such there are no incidence studies of GBS was executed among Indians.[3,4] In the review article titled as India's contribution on "Guillain-Barre syndrome": Mapping of 40 years research by Shri Ram concluded that bibliometric analysis of literatures on GBS available through Scopus database during 1973–2012 revealed that research on GBS is running on in many countries specially USA has maximum numbers of literatures on GBS approximately 22.48% of global share. In context of India, it is on 10th number in overall publication. The Sanjay Gandhi Post-graduate Institute of Medical Research at Lucknow published maximum papers among Indian Organizations 31 publications. The Fig. 1 stated that the Axonal GBS in India has 8% patients of world.

Conclusion

The Guillain-Barré syndrome (GBS) is disease which is not so common in India. If not treated, than it can lead to the death also. In its type the disease is unique in autoimmune diseases. The attack on Peripheral Nervous System and commonness in symptoms with other nervous disorder sometime confuse treating physician. The proper diagnosis is the key to manage Guillain-Barré syndrome (GBS). In Zika Virus affected countries there is greater risk of Guillain-Barré syndrome (GBS), hence these countries can take precautionary actions. These countries can train their doctors for the treatment and diagnosis of the disease.

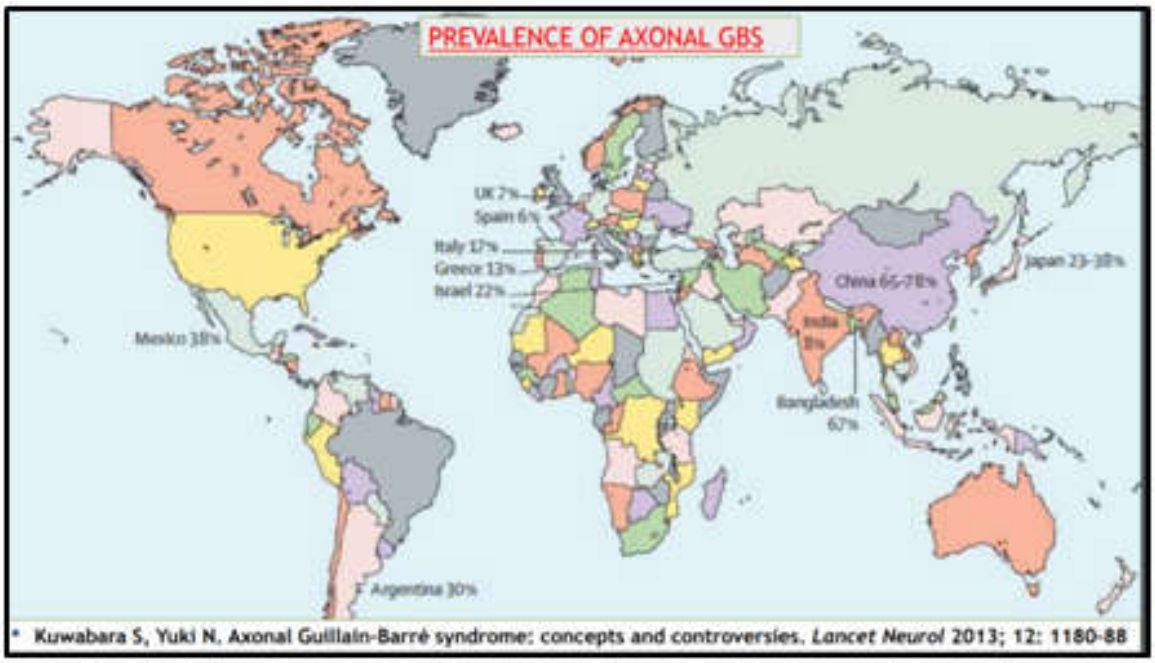

Fig. 1: Prevalence of axonal GBS Worldwide (2013).

References:

1. https://www.who.int/news-room/fact-sheets/detail/guillain-barr%C3%A9-syndrome/accedded on 27-09-2019
2. https://www.healthline.com/health/autoimmune-disorders/accessed on 26-09-2019
3. Naik KR, Saroja AO, Patil BP. Familial Guillain-Barré syndrome: First Indian report. Ann Indian Acad Neurol 2012;15:44–7.
4. Medknow Journal Mateen FJ, Cornblath DR, Jafari H, Shinohara RT, Khandit D, Ahuja B, et al. Guillain-Barré Syndrome in India: Population-based validation of the Brighton criteria. Vaccine 2011;29:9697–701.
5. Shri Ram. India's contribution on Guillain-Barre syndrome: Mapping of 40 years research. Neurology India 2013;61(4):375–82.
6. Hughes RA, Cornblath DR. Guillain-Barré syndrome. Lancet. 2005 Nov 5;366(9497):1653–66.
7. Bickerstaff ER. Brain-stem encephalitis; further observations on a grave syndrome with benign prognosis. Br Med J. 1957 Jun 15;1(5032):1384–7.
8. Ropper AH. Unusual clinical variants and signs in Guillain-Barré syndrome. Arch Neurol. 1986 Nov;43(11):1150–2.
9. Mericle RA, Triggs WJ. Treatment of acute pandysautonomia with intravenous immunoglobulin. J Neurol Neurosurg Psychiatry. 1997 May;62(5):529–31.
10. Anzai T, Uematsu D, Takahashi K, et al. Guillain-Barré syndrome with bilateral tonic pupils. Intern Med 1994;33:248–51.
11. Ropper AH. Further regional variants of acute immune polyneuropathy. Bifacial weakness or sixth nerve paresis with paresthesias, lumbar polyradiculopathy, and ataxia with pharyngeal-cervicalbrachial weakness. Arch Neurol. 1994 Jul;51(7):671–5.