AUCTORES
Globalize Your research

Journal of Neuroscience and Neurological Surgery
Carlos Rath, J Neuroscience and Neurological Surgery

Open Article

Research Article

Neuroinfectious Diseases: Guillain Barre Syndrome Clinical Features Suggestive of Early Diagnosis

Carlos Rath1*, Jodi Lewis1

Department of Neurosurgery, Cuba

Corresponding Author : **Carlos Rath,** ,Department of Neurosurgery, Cuba **E-mail:** Carloos@yahoo.com

Received date: April 20,2017 ;**Accepted date : April 28,2017**; **Published date: May 11,2017.**

Citation: **Carlos Rath, Jodi Lewis** Neuroinfectious Diseases: Guillain Barre Syndrome Clinical Features Suggestive of Early Diagnosis, . **Doi:** 10.31579/2578-8868/021

Abstract

Guillain Barré syndrome is one of the best examples of a post infectious immune disease and offers insights into the mechanism of tissue damage in other more common autoimmune diseases. Controlled epidemiological studies have linked it to infection with *Campylobacter jejuni* in addition to other viruses including cytomegalovirus and Epstein Barr virus. The syndrome includes several pathological subtypes, of which the most common is a multifocal demyelinating disorder of the peripheral nerves in close association with macrophages. Evidence from histological examination of peripheral nerve biopsy and postmortem samples suggests that both cell mediated and humoral mechanisms are involved in the pathogenesis. Immunological studies suggest that at least one third of patients have antibodies against nerve gangliosides, which in some cases also react with constituents of the liposaccharide of *C jejuni*. In the Miller Fisher variant of the disease, these antiganglioside antibodies have been shown to produce neuromuscular block, and may in part explain the clinical signs of that disorder. Treatment with both intravenous immunoglobulin and plasma exchange reduces the time taken for recovery to occur, although mortality remains around 8%, with about 20% of patients remaining disabled.

Keywords

Guillain Barré syndrome, *Campylobacter jejuni*, antiganglioside antibodies, intravenous immunoglobulin treatment, plasma exchange.

Introduction

The year 2016 marks 100 years since the first description of Guillain–Barré syndrome (GBS), which is now recognised as the commonest cause of acute post-infectious flaccid paralysis worldwide.[1] Although rare (with an incidence of 1–2 cases per 100 000), GBS remains an important neurological emergency. The majority of patients with GBS develop ascending paralysis, which starts in the legs and typically spreads to the arms. Cranial nerve involvement is also common and 25% of patients develop respiratory depression and require mechanical ventilation. In Miller Fisher syndrome, which is a rare variant of GBS, cranial nerve involvement and ataxia predominate. Awareness of early symptoms and signs can lead to earlier referral to secondary care, and therefore earlier treatment. In this mini-review we highlight the core clinical features of GBS and discuss important differential diagnoses.

Pathogenesis

GBS is a post-infectious neuropathy and known to be triggered by certain infections, including *Campylobacter jejuni*, *Haemophilus influenza*, *Mycoplasma pneumoniae*, Epstein–Barr virus, cytomegalovirus, hepatitis E, and influenza virus.One question patients may ask their GP is: can the flu vaccine trigger GBS? Although this was thought to be a problem in the 1976 swine flu epidemic, recent studies have shown that the flu vaccine does not trigger GBS, and in fact patients who contract influenza virus are at greater risk of developing GBS.

Material & Methods

This study was conducted at Bhopal Memorial Hospital and Research Center (BMHRC), Bhopal, India, after obtaining the ethical approval by the Institutional Ethics Committee. In this retrospective analysis, medical records of 66 referred cases with the diagnosis of GBS admitted to BMHRC from 2002 to 2013 were reviewed and analyzed during April to June, 2014.

The data related to age, sex, date of admission, antecedent illness, duration of symptoms before admission, muscle power graded by the Medical Research Council (MRC) scale [Hughes' functional scores (F-Scores)[15], details of Intensive Care Unit (ICU) complications if any, need for ventilation, details of investigations including CSF and electrodiagnostic analysis, complete blood profile, lipid profile, serum electrolytes, coagulation profile, blood grouping and information about TPE as therapy instituted were obtained. As per the hospital policy, all patients received TPE as the treatment of choice. Critical and supportive care comprising respiratory care including mechanical ventilation as and when required, cardiac monitoring, DVT prophylaxis, management of infections, nutritional care and physiotherapy were integral part of the treatment. Patients were classified according to MRC Manual Muscle Testing grading system (0-5) and functional grading scales: grade 0 - healthy, grade 1 - minor symptoms and signs of neuropathy, grade 2 - able to walk five min without assistance, grade 3 - able to walk five min with assistance, grade 4 - confined to bed or chair bound, and grade 5 - requiring assisted ventilation. All patients were divided into four groups based on the four seasons of the year depending on the time of their admission in the hospital. The groups were named as S1 spring season (February to April), S2 summer season (May to July), S3 rainy season (August to October) and S4 winter season (November to January) considering the geographical situation of central India.

Results

Of the 66 patients, 47 were male. The mean age of the patients was 40.69±18.8 yr. The mean ages of male and female patients were 40.82±21.19 yr (10-74 yr) and 40.36±11.34 yr (20-60 yr), respectively. The male-to-female ratio was 2.4:1. Maximum number of patients (21.2%, n=14) were in the age group of 60 yr and above. The next common age group was 20-29 yr in which 19.7 per cent (n=13) patients were seen [Table 1].

Age (yr)	Male (n)	Female (n)	Total (%)
10-19	10	0	10 (15.2)
20-29	9	4	13 (19.7)
30-39	3	3	6 (9.1)
40-49	5	7	12 (18.2)
50-59	7	4	11 (16.7)
60 and above	13	1	14 (21.2)
Total	47	19	66

Table 1: Age and sex distribution of Guillain–Barre syndrome (GBS) patients

Nearly 62.1 per cent patients (n=41) had history of preceding illness [Table 2].

Illness	Male (n)	Female (n)	Total (%)
None	17	8	25 (37.9)
Flu-like illness	11	5	16 (24.2)
Diarrhoea	6	3	9 (13.6)
Surgery	2	0	2 (3.0)
Malarial fever	1	0	1 (1.5)
Recurrent onset of GBS	3	0	3 (4.5)
Food poisoning	1	0	1 (1.5)

Table 2: Antecedent events observed in patients with GBS

Flu-like illness as evidenced by fever and cough was found to be the most common antecedent event preceding GBS in 24.2 per cent patients (n=16) followed by gastroenteritis in 13.6 per cent patients (n=9). One patient each presented with the uncommon antecedent events as food poisoning and malarial fever. All patients developed neurological illness within two weeks of the onset of the symptoms [Table 3].

Clinical symptoms/sign	Male (n)	Female (n)	Total (%)
Quadriparesis	35	14	49 (74.2)
Paraparesis	12	5	17 (25.8)
Cranial involvement	5	3	8 (12.1)
Bladder involvement	0	0	0
Respiratory involvement	10	4	14 (21.2)
Sensory symptoms	2	0	2 (3.0)
Signs			
Areflexia	47	19	66 (100)
Sensory abnormality	2	0	2 (3.0)
Sphincter involvement	0	0	0
Variants			
AIDP	27	5	33 (50)
AMAN	17	12	29 (43.9)
AMSAN	1	1	2 (3.0)
Mixed axonal variety	1	1	2 (3.0)

AIDP, acute inflammatory demyelinating polyneuropathy; AMAN, acute motor axonal neuropathy; AMSAN, acute motor sensory axonal neuropathy

Table 3: Clinical symptoms, sign and variants in patients.

Majority of the patients were admitted to the hospital with progressive weakness in all four limbs (quadriparesis) in 74.2 per cent patients (n=49) as a common clinical feature followed by paraparesis in 25.8 per cent patients (n=17). Dysphagia and respiratory distress were noted in eight patients (12.1%) each. None of the patients were found to have bladder and bowel involvement. All patients had areflexia and two patients (3%) developed sensory involvement All patients underwent nerve conduction velocity testing as the diagnostic testing. The majority (n=33, 50%) were found to be of AIDP followed by AMAN variants (n=29, 43.9%) and 3.0 per cent patients (n=2) were diagnosed as AMSAN.

Discussion

In our study, there was a male preponderance (more than twice that of females) which conformed to the findings of a systematic review which reported that the incidence increased with increase in age, 50 or more years and the distribution of age existed with two peaks In our study, progressive muscular weakness of all four limbs was the common presenting clinical feature and flu-like illness followed by gastroenteritis the most common antecedent illness, similar to that reported earlierThe most common variant of GBS was AIDP followed by AMAN. Other studies from different parts of the world have reported 80-90 per cent frequency from Europe and the USA and Indian studies reporting 48.8 to 85.2 per cent A large study from northern India comprising 328 patients reported AIDP in 73.8 per cent patients and better outcome compared to AMAN . Contrary to our findings, AMAN has been reported at a frequency of 67 per cent in a study from Bangladesh .

In this retrospective analysis, two peaks were found with equal number of GBS patients, one in S1 group (February to April) and the other in S2 group (May to July). Sharma *et al* [have reported maximum cases in summer (May to July), with majority of patients presenting in the month of May. The seasonal variation may be attributed to the sudden temperature differences in the seasonal conditions making certain months more prone to infections of gastrointestinal and respiratory tract, important antecedent factors of GBS. A study from Southern Iran reported significant seasonal and monthly variation with 50 per cent patients being admitted from February to June and maximum occurrence in spring and winter [. Sriganesh *et al*[reported a higher incidence between March and August, similar to our study. Zaheer *et al*[reported a bimodal incidence of GBS during April-May (24%) and July-August (32%) as compared to the other months of the year. Kalita *et al*have reported poor prognosis in AMAN variant mostly occurring in summers and complete recovery in AIDP variant which was frequent in rainy season. Our study also demonstrated that in GBS and its variants, respiratory complications (maximum in S4) and duration of hospital stay (maximum in S3) showed a seasonal variation. However, the sample size was small to establish this association clearly and retrospectively limited parameters were studied. About 12.12 per cent patients reported respiratory complications and one patient required mechanical ventilation and scored poor grade on F-score and muscle power grading of 1/5 on MCR scores. Many factors seem to be predictors for respiratory complications and thereby mechanical ventilation including progressively rapid muscular weakness, ineffective cough, bulbar involvement, rapid decrease in vital capacity. Critical care unit is required for the management of GBS patients with respiratory involvement Hughes *et al*[reported rehabilitation as important as the immunotherapy and considered it as an integral part of the treatment of the patients with GBS. In our study, proper turning and positioning of patients to prevent bed sores and exercise therapy for maintaining muscle tone and further improvements of power were an important part of multidisciplinary care. None of the patients died during the time of the treatment and only one patient required ventilator support. All patients were advised physiotherapy treatment during the time of discharge. Early detection of the symptoms and early interventions are important factors for better prognosis of GBS

The efficacies of various modalities of treatment in GBS have been a matter of discussion and debate. Hughes *et al*[reported both TPE and IVIg as equally effective treatment modalities of GBS. Another study reported similar effectiveness of TPE in the treatment of various neurological diseases including GBS In this retrospective analysis, TPE was used as the standard treatment of choice in all seasons. All patients were stable and recovered well and improved in their functional grade and MRC scores at the time of discharge. No mortality related to pulmonary embolism was noted.

Conclusion

In this study, the outcome analysis was limited to the period of hospital stay of the patients. A further study can be designed to assess the outcome analysis of the patients on regular follow up after discharge. Further, climatic conditions might vary from region to region within the country and in other parts of the world making the observations differ. Finally, being a tertiary care centre, patients do not come directly and are referred early for TPE mainly before developing serious complications. Thus, only one of our patients was shifted to ventilator and hence the study analyzed the non-ventilated patients in majority. However, it can serve as an adjunct to other studies done on the ventilated patients. A well-designed prospective analysis needs to be planned to study the effect of seasonal variations in the patients with GBS across the various geographic locations along with markers to establish the associations in terms of clinical features, demographics and type of immunotherapy given.

Refernces

1. Guillain G, Barré J, Strohl A. Sur un syndrome de radiculo-nevrite avec hyperalbuminose du liquide cephalorachidien sans reaction cellulaire. Remarques sur les characteres clinique et graphique des reflexes tendinaux. Bulletins et Memories de la Societe Medicale des Hopitaux de Paris 1916;40:1462–70.
2. Alter M. The epidemiology of Guillain-Barré syndrome. Ann Neurol 1990:27(suppl):S7–12.
3. Kaplan JE, Katona P, Hurwitz ES, *et al*. Guillain-Barré syndrome in the United States, 1979–1980 and 1980–1981. Lack of an association with influenza vaccination. JAMA 1982;248:698–700.
4. Carpo M, Pedotti R, Allaria S, *et al*. Clinical presentation and outcome of Guillain-Barré and related syndromes in relation to anti-ganglioside antibodies. J Neurol Sci 1999;168:78–84.
5. Yuki N. Molecular mimicry between gangliosides and lipopolysaccharides of Campylobacter jejuni isolated from patients with Guillain-Barré syndrome and Miller Fisher syndrome. J Infect Dis 1997;176(suppl 2):S150–3.
6. Asbury AK, Arnason BG, Karp HR, *et al*. Criteria for the diagnosis of Guillain-Barré syndrome. Ann Neurol 1978;3:565–6
7. Asbury AK, Cornblath DR. Assessment of current diagnostic criteria for Guillain-Barré syndrome [see comments]. Ann Neurol 1990;27(suppl):S21–4.
8. Hughes R. *Guillain-Barré syndrome*. London: Springer-Verlag, 1990.
9. Winer JB, Hughes RA, Anderson MJ, *et al*. A prospective study of acute idiopathic neuropathy. II. Antecedent events. J Neurol Neurosurg Psychiatry 1988;51:613–18.
10. Vriesendorp FJ, Mishu B, Blaser MJ, *et al*. Serum antibodies to GM1, GD1b, peripheral nerve myelin, and Campylobacter jejuni in patients with Guillain-Barré syndrome and controls: correlation and prognosis [see comments]. Ann Neurol 1993;34:130–5.
11. Mishu B, Ilyas AA, Koski CL, *et al*. Serologic evidence of previous Campylobacter jejuni infection in patients with the Guillain-Barré syndrome. Ann Intern Med 1993;118:947–53.
12. Jacobs BC, Rothbarth PH, van der Meche FG, *et al*. The spectrum of antecedent infections in Guillain-Barré syndrome: a case–control study. Neurology 1998;51:1110–15
13. Rees JH, Gregson NA, Hughes RA. Anti-ganglioside GM1 antibodies in Guillain-Barré syndrome and their relationship to Campylobacter jejuni infection. Ann Neurol 1995;38:809–16.
14. Dowling PC, Cook SD. Role of infection in Guillain-Barré syndrome: laboratory confirmation of herpesviruses in 41 cases. Ann Neurol 1981;9(suppl):44–55.
15. Langmuir AD, Bregman DJ, Kurland LT, *et al*. An epidemiologic and clinical evaluation of Guillain-Barré syndrome reported in association with the administration of swine influenza vaccines. Am J Epidemiol 1984;119:841–79.
16. Toro G, Vergara I, Roman G. Neuroparalytic accidents of antirabies vaccination with suckling mouse brain vaccine. Clinical and pathologic study of 21 cases. Arch Neurol 1977;34:694–700.
17. Ho TW, Hsieh ST, Nachamkin I, *et al*. Motor nerve terminal degeneration provides a potential mechanism for rapid recovery in acute motor axonal neuropathy after Campylobacter infection [see comments]. Neurology 1997;48:717–24.
18. Hariharan H, Naseema K, Kumaran C, *et al*. Detection of Campylobacter jejuni/C.coli infection in patients with Guillain-Barré syndrome by serology and culture. New Microbiol 1996;19:267–71
19. Asbury AK, Arnason BG, Adams RD. The inflammatory lesion in idiopathic polyneuritis. Its role in pathogenesis. Medicine 1969;48:173–215.
20. Prineas JW. Pathology of the Guillain-Barré syndrome. Ann Neurol 1981;9(suppl):6–19. 21. Lampert P. Mechanism of demyelination in experimental allergic neuritis. Electron microscopic studies. Lab Invest 1969;20:127–38.