Paper

Guillain-Barre syndrome in Sri Lanka: subtypes and trends

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Abstract

Objectives: To evaluate Guillain-Barre syndrome (GBS) subtypes in Sri Lanka.

Design setting: The patients satisfying established criteria for diagnosis of GBS were included. The cases were classified into GBS subtypes based on electrodiagnostic findings.

Patient intervention: None

Measurements: Clinical neurophysiological evaluations were done. The studies were repeated as appropriate.

Results: The evaluations were done between 2 and 143 days from onset (median = 7 days). There were 1153 patients (Male: Female = 1.4 :1) with age 1 to 86 years (mean = 43.7). Of them 191 (16.6%) were below 13 years (Male: Female = 1.2:1). GBS subtypes were demyelinating type 577 (50%), axonal forms 475 (41.2%), Miller-Fisher syndrome 5 (0.4%) and unclassifiable 96 (8.3%). Among the children there were 99 (51.8%) with demyelinating type, 82 (42.9%) with axonal forms, 10 (5.2%) with unclassifiable findings and none with MFS. There was some clustering of both demyelinating and axonal cases in the early and late months of the year whereas in children there is excessive occurrence of GBS cases of both types in the first 5 months of the year. There is a second peak of axonal GBS later in the year. Overall tendency of reduction in the number of cases, especially axonal forms, is noticeable over the years.

Interpretation: The age and sex distribution of the cases is similar to that of other countries. The occurrence of axonal subtypes is prominent. The proportions of GBS subtypes and case clustering in children may be related to the preceding infection.

Index words: acute inflammatory demyelinating polyradiculoneuropathy, acute motor axonal neuropathy, Axonal Guillain-Barre syndrome, seasonal variations, Miller-Fisher syndrome

Introduction

Guillain-Barre syndrome (GBS) was considered primarily an acute demyelinating neuropathy and was named acute inflammatory demyelinating polyradiculoneuropathy (AIDP)[1,2]. The concept of axonal GBS was first brought forward by Feasby et al[3]. Subsequently GBS due to acute primary axonal neuropathy got firmly established, especially after the studies in northern China. These cases of acute motor axonal neuropathy (AMAN) reported from China showed a distinct seasonal variation and age preponderance, occurring more frequently in summer months among children and young adults[4,5]. When sensory nerve fibres are also affected, in addition to motor involvement, in axonal GBS, this subtype is called acute motor and sensory axonal neuropathy (AMSAN)[3,6]. Other recognized subtypes include Miller-Fisher syndrome (MFS) and several minor variants[6,7]. The demyelinating and axonal subtypes of GBS can often be distinguished by electrodiagnostic studies whereas MFS is largely a clinical diagnosis[7].

In North America and Europe, patients with GBS usually have AIDP and only a minority (5%) has axonal subtypes[8]. Reports from other regions such as northern China, Japan and Central and South America have shown that axonal subtypes constitute a relatively higher proportion (30-47%) of GBS cases[4,5,9,10]. In India, axonal forms of GBS have been detected in 11% of all cases of GBS and a higher proportion (44%) has occurred in a younger group of patients aged 1 to 18 years[11,12].

Though a case of primary axonal GBS has been reported from Sri Lanka[13], large scale data is lacking. We have studied the cases of GBS over several years to determine the proportions of different subtypes and identify any trends in incidence.

Methods

Data were obtained by reviewing the database of consecutive cases that fulfilled established diagnostic criteria for GBS[14] and presented for neurophysiological assessment. Study involved patients seen over a period of 9 years between 1 October 2003 and 30 September 2012. The selected cases were previously healthy and those with diabetes, uraemia, and any other condition which had the potential to affect the peripheral nervous system were excluded. The demographic data recorded

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included age, gender, date of symptom onset, duration of symptoms, clinical history and neurological findings. The subjects underwent sensory nerve conduction studies (NCS) in sural, ulnar, median and superficial radial nerves, motor NCS in peroneal, tibial, ulnar and median nerves. Orthodromic method was used for median and ulnar sensory studies whereas antidromic method was used for sural and superficial radial nerve studies. F wave study was carried out in tibial and ulnar nerves. Surface stimulation and recording techniques were used according to established methods[15,16].

The cases were classified into AIDP, AMAN and AMSAN by applying previously used criteria[8,17] based on NCS findings. The subjects having pure motor conduction blocks (CB) with temporal dispersion of compound muscle action potentials or motor conduction slowing were classified as AIDP whereas those without such changes were classified as AMAN[17]. The subjects who were initially unclassifiable had repeat NCS and assigned to a GBS subtype according to the findings. Some cases could not be classified to a subtype even after repeating the NCS and were categorised as unclassifiable. Those having ophthalmoplegia, areflexia and ataxia without overlap clinical features were classified as Miller-Fisher syndrome irrespective of NCS findings. Those with above triad with additional clinical features were classified according to NCS findings as described above.

All the tests were performed on Neuropack® MEB 9200 K (Nihon Kohden, Tokyo, Japan) nerve conduction/ electromyography/evoked potential testing equipment.

Results

Patients

A total of 1153 patients were included in the study. Of them 673 were males and 480 were females (Male: Female = 1.4:1). The age range was 1 to 86 years (mean = 43.7). There were 191 (16.6%) patients below 13 years of age, of whom 103 were males and 88 were females (Male: Female = 1.2:1). The clinical neurophysiological evaluations were done between 2 and 143 days from the onset. A vast majority was assessed within the first week (median = 7 days).

Subtypes

There were altogether 577 (50%) with demyelinating type GBS (AIDP), 475 (41.2%) with axonal type (AMAN and AMSAN), 5 (0.4%) with MFS and 96 (8.3%) with unclassifiable electrodiagnostic findings. Among the children below 13 years of age, there were 99 (51.8%) with demyelinating type, 82 (42.9%) with axonal forms, 10 (5.2%) with unclassifiable findings and none with MFS.

Unclassifiable cases had miscellaneous nerve conduction abnormalities in the electrodiagnostic assessment. Commonest observation among them was F wave abnormality (40% of cases).

Trends

When the cases were studied according to the month of onset, only a mild fluctuation of total number of cases with slightly greater numbers of cases observed to occur in early and late months of the year (Figure 1). Both AIDP and axonal forms display the same trend. In children below 13 years of age, there is excessive occurrence of GBS cases of both types in the first 5 months of the year (Figure 2). There is a second peak later in the year in the months of September, October and November. This second peak is peculiar because it consists of greater numbers of axonal forms than AIDP in all 3 months.

There is an overall tendency of reduction in the total number of cases over the years (Figure 3). This reduction is especially contributed to by a reduction of axonal forms.

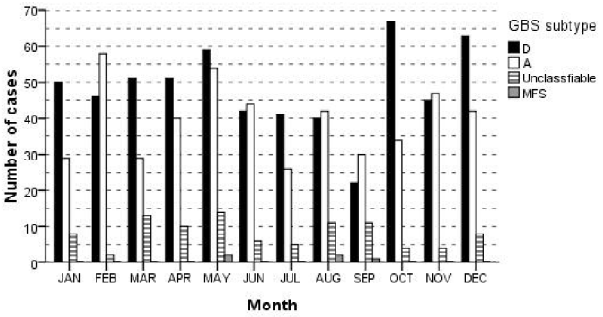

Figure 1. Monthly variation of Guillain-Barre syndrome subtypes over the period of study in all the cases. D = Acute inflammatory demyelinating polyradicul-neuropathy; A = axonal forms; MFS = Miller-Fisher syndrome; Unclassifiable = cases unclassifiable to other subtypes.

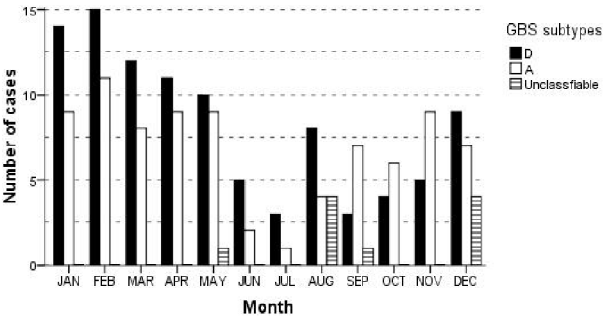

Figure 2. Monthly variation of Guillain-Barre syndrome subtypes over the period of study in children below 13 years of age. D = acute inflammatory demyelinating polyradiculneuropathy; A = axonal forms; Unclassifiable = cases unclassifiable to other subtypes (there were no cases of Miller-Fisher syndrome is this group).

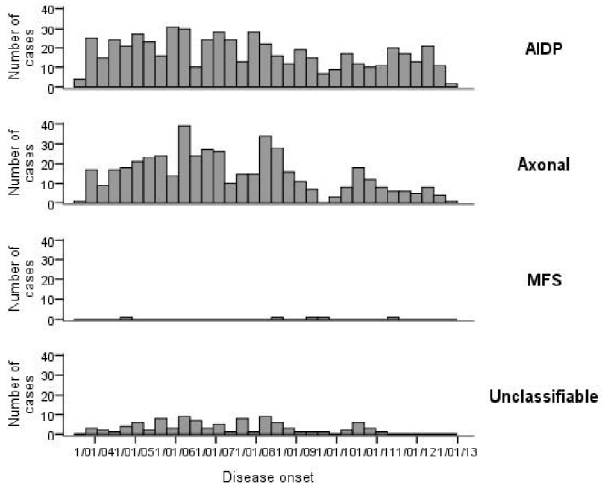

Figure 3. Annual variation of Guillain-Barre syndrome subtypes over the period of study in all the cases. AIDP = Acute inflammatory demyelinating polyradiculneuropathy; Axonal = axonal forms; MFS = Miller-Fisher syndrome; Unclassifiable = cases unclassifiable to other subtypes.

Discussion

The age distribution and male preponderance observed in patients with GBS in Sri Lanka are similar to those of other countries[4,5,8-12]. Majority of cases are of demyelinating type GBS (AIDP) while the axonal type (AMAN and AMSAN) also contributes to over 40%. Similar distribution of subtypes is observed among the children less than 13 years of age. These figures are closer to those of other Asian and South American countries and are markedly different from North America and Europe where axonal forms are rare. These differences of occurence of pathological subtypes may be related to the type of organism responsible for the preceding infection which occurs in about two-thirds of all the cases of GBS[18,19]. Axonal GBS is known to have a particular association with *Campylobacter jejuni* infection[9,10,20] and it could be a potential causative agent in Sri Lanka as well. This is a largely unexplored area in this country so far. Very low numbers of MFS cases observed is not unusual. However there could be under-detection because some typical cases may not have presented for neurophysiological studies because clinical diagnosis is obvious.

Observation of case clustering particularly in children could be related to outbreaks of infections for which weather and environment changes may play a role. Since there are no clearly demarcated climatic seasons and the weather patterns widely vary in different localities even within a climatic zone, analysis of the relationship between the weather patterns and GBS is complex.

Overall reduction in number of cases over the years might reflect a trend of diminishing incidence of infections by potential causative agents for GBS. On the other hand this may reflect a reduction in the number of referrals to our centre due to availability of better neurological services with appointment of more neurologists to other centers in the country.

The present study reflects the profile of GBS subtypes in Sri Lanka. Further studies into infective aetiologies and their prevention may be based on these findings.

References

1. Brown WF, Feasby TE. Conduction block and denervation in Guillain-Barre polyneuropathy. *Brain* 1984; **107**: 219-39.
2. Albers JW, Donofrio PD, McGonagle TK. Sequential electrodiagnostic abnormalities in acute inflammatory demyelinating polyradiculoneuropathy. *Muscle and Nerve* 1995; **8**: 528-39.
3. Feasby TE, Gilbert JJ, Brown WF, et al. An acute axonal form of Guillain-Barré polyneuropathy. *Brain* 1986; **109**: 1115-26.
4. McKhann GM, Cornblath DR, Ho TW, et al. Clinical and electrophysiological aspects of acute paralytic disease of children and young adults in northern China. *Lancet* 1991; **338**: 593-7.
5. McKhann GM, Cornblath DR, Griffin JW, et al. Acute motor axonal neuropathy: a frequent cause of acute flaccid paralysis in China. *Annals of Neurology* 1993, **33**: 333-34.
6. Griffin JW, Li CY, Ho TW, et al. Pathology of the motor-sensory axonal Guillain-Barré syndrome. *Annals of Neurology* 1996; **39**: 17-28.
7. Fisher M. An unusual variant of acute idiopathic polyneuritis (syndrome of ophthalmoplegia, ataxia, and areflexia). *New England Journal of Medicine* 1956; **255**: 57-65.
8. Hadden RDM, Cornblath DR, Hughes RAC, et al and the Plasma Exchange/Sandoglobulin Guillain-Barré Syndrome Trial Group. Electrophysiological classification of Guillain-Barré syndrome: clinical associations and outcome. *Annals of Neurology* 1998; **44**: 780-8.
9. Paradiso G, Tripoli J, Galicchio S, Fejerman N. Epidemiological, clinical and electrodiagnostic findings in childhood Guillain-Barre syndrome: a reappraisal. *Annals of Neurology* 1999; **46**: 701-07.
10. Ogawara K, Kuwabara S, Mori M, et al. Axonal Guillan-Barre syndrome: relation to antiganglioside antibodies and *Campylobacter jejuni* infection in Japan. *Annals of Neurology* 2000; **48**: 624-31.
11. Gupta D, Nair M, Baheti NN, et al. Electrodiagnostic and clinical aspects of Guillain-Barré syndrome: an analysis of 142 cases. *J Clinical Neuromuscular Disease* 2008; **10**(2): 42-5
12. Kannan MA, Kishore R, Jabeen SA, et al. Clinical, electrophysiological subtypes and antiganglioside antibodies in childhood Guillain-Barré syndrome. *Neurology India* 2011; **59**(5): 727-32.

13. Senanayake B, Fernando MAH, Ranawaka UK, et al. Acute primary axonal Guillain-Barre syndrome. *Ceylon Medical Journal* 2000; **45**: 36-38.

14. Asbury AK, Cornblath DR. Assessment of current diagnostic criteria for Guillain-Barré syndrome. *Annals of Neurology* 1990; **27** (Suppl): S21-S24.

15. Buschbacher RM. Manual of Nerve Conduction Studies. 2nd ed. New York: Demos Medical Publishing; 2000.

16. Kimura J. Neurology India Electrodiagnosis in Diseases of Nerve and muscle: principles and practice. 2nd ed. New York: Oxford University Press; 2001.

17. Uncini A, Kuwabara S. Electrodiagnostic criteria for Guillain-Barrè syndrome: a critical revision and the need for an update. *Clinical Neurophysiology* 2012; **123**(8): 1487-95.

18. Winer JB, Hughes RAC, Anderson MJ, et al. A prospective study of acute idiopathic neuropathy. II. Antecedent event. *Journal of Neurology Neurosurgery Psychiatry* 1988; **51**: 613-18.

19. Guillain-Barre Syndrome Study Group. Guillain-Barre syndrome: an Italian multicentre case-control study. *Neurological Sciences* 2000; **21**: 229-34.

20. Ho TW, Mishu B, Li CY, et al. Guillain-Barre syndrome in northern China. Relationship to *Campylobacter jejuni* infection and anti-glycolipid antibodies. *Brain* 1995; **118**: 597-605.