Paper

Pattern of incidence in Guillain-Barre syndrome admitted to Teaching Hospital, Galle, Sri Lanka from 1995 to 2000

K D Pathirana[1], **C Hewage**[2]

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Abstract

Guillain-Barre syndrome (GBS) is the commonest cause of acute flaccid paralysis in Sri Lanka. Annual incidence of GBS in Sri Lanka is not known. The aim of this study was to find out the incidence of GBS in administrative district of Galle, Sri Lanka based on hospital records.

Method: We conducted a retrospective analytical study to find out the incidence and epidemiological patterns of GBS in patients admitted to Teaching Hospital Galle (THG). We scrutinized the case notes of all the patients categorized G 61.0 of 10th Edition of International Classification of Diseases Classification, from 1995 through 2000. The cases fulfilling NINCDS criteria for GBS were included in the study. We excluded the patients referred from other districts for calculation of the incidence of GBS in Galle. Official population statistics and the regional rainfall recorded in the meteorological department were used for analysis.

Results: There were 114 patients fulfilling the inclusion criteria over the study period. Seventy-six patients were from Galle District and 54% were males. The age distribution showed a bimodal pattern with peak incidence in 10-19 age group and a smaller peak in 30-39 age group. Number of cases from Galle District reported in years 1995 to 2000 was 8, 16, 15, 18, 8 and 11 respectively. This is equivalent to a crude incidence of 0.8, 1.6, 1.5, 1.8, 0.8 and 1.1 per /100,000 population for each year respectively considering the mean population of 1.04 million. Mean crude incidence for the study period was 1.26 per 100000.

Seasonal variation with clustering following high rainfall was seen in years 1996, 1997 and 1998. Identified preceding illnesses recorded in the notes were upper respiratory tract infection in 22.7%, diarrhoea in 14%, varicella in 8% and non-specific viral infection in 14%.

Conclusion: The mean incidence of GBS in Galle District is 1.26 per 100,000 population with a range of 0.8 to 1.8 over the study period. The age distribution and seasonal variation are different from those reported from many other countries. The clinical features and preceding illness were similar to those described in other series.

Index words: Guillain-Barre syndrome, Epidemiology, Sri Lanka

Introduction

Following the near eradication of poliomyelitis, GBS has become the commonest cause of acute flaccid paralysis in many countries. The incidence of Guillain Barre Syndrome varies from country to country with a wide range in incidence worldwide. In a recent meta-analysis of community based studies, Sejver et al has found that the incidence varies from 0.62/100,000 population to 2.66/100,000 in western European and North American countries[1]. Global annual incidence varies from 0.4 to 4.0/100,000 with a median of 1.3.[2,3] Developing countries have reported a higher incidence than that of the developed world. Incidence of GBS in Sri Lanka and many south Asian countries is not known.

A seasonal variation in incidence had been reported in some studies from Sao Paulo (Brazil),[4] Taiwan[5] and Iran[6]. Although a seasonal pattern had been observed by some clinicians in Sri Lanka there are no publications in the literature. With the known pathogenesis of immune mediated mechanisms augmented by infections it is likely that the seasonal pattern seen in Sri Lanka is related to epidemics of diarrhoea and upper respiratory tract infections. Therefore this may in turn be related to the patterns of rainfall and floods.

The aims of this study were to find out the incidence of GBS during 1995 to 2000 from the hospital records, to see whether the there is a seasonal pattern of cases and if so whether the seasonal pattern is related to those of diarrhoea, upper respiratory tract infection, or other possible precipitating factors like vaccination. Although a community based prospective study is ideal for estimating the true incidence, the information obtained from this study too would be useful for planning the management strategies and identifying the causative factors in our region. During the study period THG was the only tertiary care centre in Southern Sri Lanka. Although there were patients transferred to THG from other districts patients with acute illness like GBS going to centres outside THG was unusual. Those who are transferred out of THG were initially registered in THG. Cross boarder references bypassing THG was not

[1] *Professor in Medicine and Consultant Neurologist, Faculty of Medicine, Galle, Sri Lanka,* [2] *Senior Lecturer in Physiology, University of Sri Jayawardenepura, Nugegoda, Sri Lanka.*

practiced by doctors in primary or secondary care centres. Hence it was assumed the patients who were residents in Galle District admitting to THG will reflect the incidence of GBS in the district of Galle.

Methods

Case notes of patients diagnosed as GBS were obtained from the record rooms of Teaching Hospital Galle (THG), from 01st January 1995 to 31st December 2000. During this period THG was the only tertiary care hospital in the district with facilities to manage patients with any paralytic illness like GBS. Patients fulfilling NINCDS diagnostic criteria were included in the study. Age, gender, date of onset, locality of the patient and preceding events like diarrhoea, upper respiratory infection, other viral infections, lymphoma and other malignancies, vaccination prior to the diagnosis of GBS were recorded. The number of cases of diarrhoeal illnesses reported to hospital was obtained from hospital statistics. Official population statistics were obtained from the District Secretariat in Galle and official rainfall figures for the corresponding period was obtained from the meteorological department. For calculation of the incidence only the residents in Galle District were considered.

The incidence of GBS for each year is calculated using official statistics of the population in the Galle District obtained from the Department of Census and Statistics. The incidence of each category is grouped according to the likely date of onset and the locality. The patients coming from other areas than Galle District were excluded from the calculations of the incidence. The pattern of the incidence was plotted with incidence of diarrhoea and monthly rainfall of the area obtained from the Department of Meteorology for the corresponding period.

Results

There were 114 patients fulfilling above criteria over the study period. Seventy six patients were from Galle District. The age distribution (Figure 1) shows a bimodal pattern with peak incidence in 10-19 age group and in 30-39 age group. There were 41 (53%) males and 35 females. Age specific incidence varied from 0.74 to 1.71 per 100,000 population. The incidence for the age group below15 years was 1.11 per 100,000 population (Table 1).

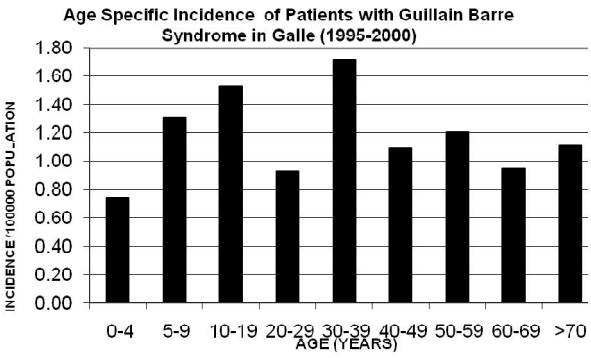

Figure 1.

Table1. Age specific incidence rate in different years per 1000000 population 1995-2000)

Age (years)	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
<4	0	0	1.12	3.36	0	0
5-9	0.98	0.98	1.96	1.96	0.98	1.96
10-19	0.48	2.88	1.92	2.4	0.96	1.44
20-29	0.62	1.24	1.86	1.24	0	1.24
30-39	0.68	2.04	0.68	2.04	2.04	1.36
40-49	1.65	0.82	2.46	0.82	0	0.82
50-59	1.21	3.63	0	0	0	2.42
60-69	1.54	0	0	1.54	3.08	0
>70	0	0	4.48	4.48	2.24	0

The mean population of Galle District for the study period was 10.14 million. Numbers of cases reported in years 1995 to 2000 were 8, 16, 15, 18 and 8 and 11 respectively. This is equivalent to a crude incidence of 0.8, 1.6, 1.5, 1.8, 0.8 and 1.1 per /100,000 population for each year respectively. Mean incidence for the study period was 1.26 per 100,000.

Seasonal variation was noted with clustering of cases around months of December-January and May-June. There was no clear association with the incidence of diarrhoea or respiratory tract infections. The seasonal clustering occurred with or followed the high rainfall in years 1996, 1997 and 1998 and 2000 (Figure 2). Preceding events were recorded in 34 (44%) patients. Identified preceding illnesses were upper respiratory tract infection in 18 (22.7%), diarrhoea in 5 (14%), non-specific viral fever in 5 (14%) and varicella infection in 3 (8%). One patient had mumps and another viral hepatitis.

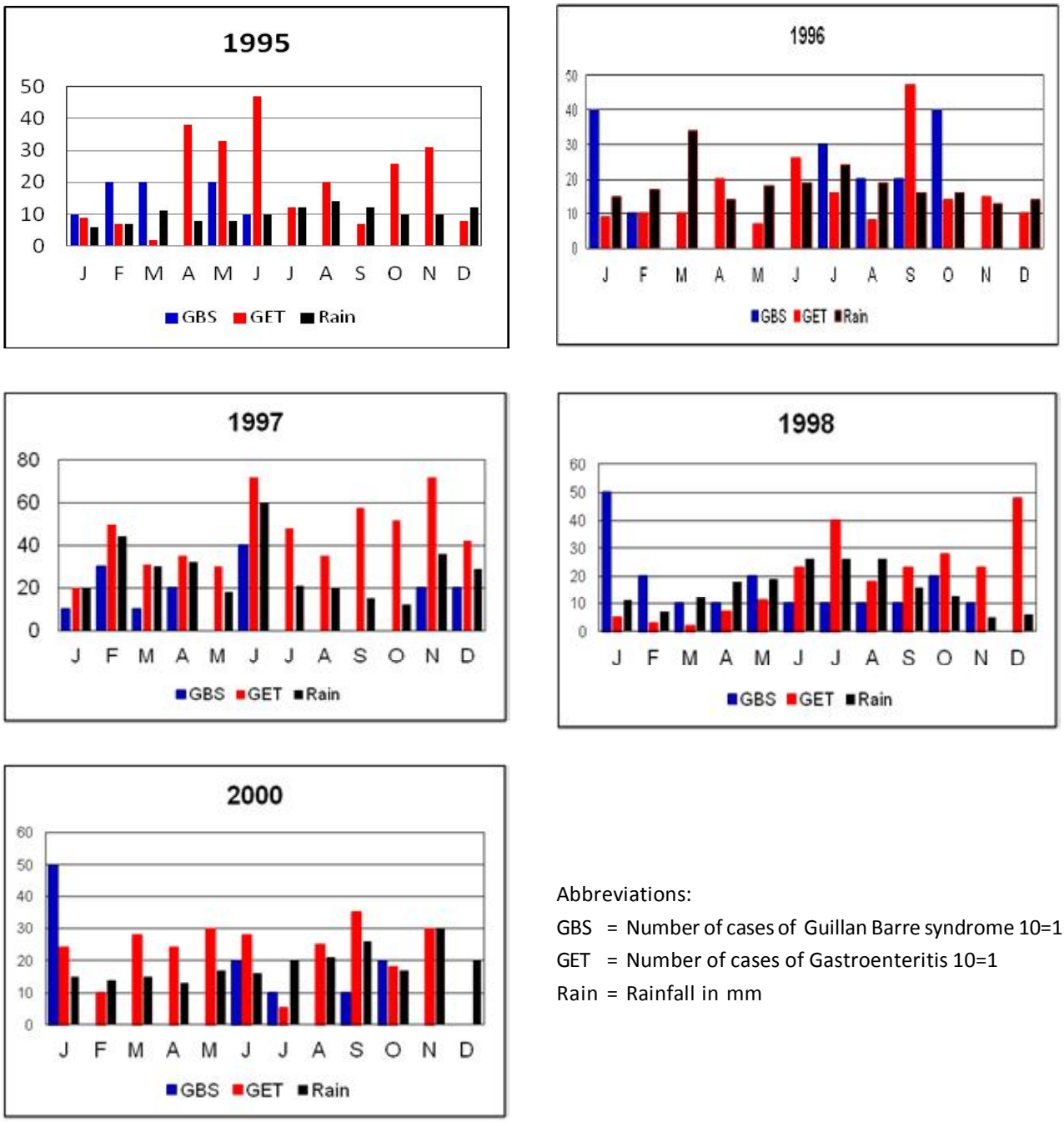

Figure 2. Relationship between Guillain Barre syndrome, gastroenteritis and regional rainfall in Galle 1995-2000.

Discussion

No proper incidence studies of GBS in Sri Lanka are available. THG is an ideal location to study the incidence of GBS. Nearly all patients with acute severe illnesses in Galle District are sent to THG for management. "Cross border" referrals of patients with GBS out of Galle without attending THG were very unusual during the study period. All the patients suspected to have GBS were referred to THG by the doctors in the peripheral hospitals (personal communications). Therefore the figure we found is very likely to reflect the true incidence of clinically significant GBS accurately. Very mild cases of GBS may not have been referred to THG or may not have been diagnosed as GBS and possibility of very mild cases being missed is still a possibility. A rare occurrence of wrong ICD classification is a potential cause for error.

We found that the incidence of GBS varied from 0.8 to 1.8 per 100,000 population over the study period with a mean incidence of 1.26 per 100,000. This value is between the reported incidence in most of developed and developing countries[1-9]. The age specific incidence in our series is different from that of the developed countries. In most of the other series the incidence is higher among elderly with the peak incidence in 5th or 6th decade of life[2,6,12,13] whereas it was the 2nd or 4th decade in our series. The higher incidence seems to follow or occur with the higher rainfall.

Seasonal variation in incidence is reported from some countries and not from others. For example, in Western Norway and Stockholm[11,12] a higher incidence had been reported in summer and winter, while in Taiwan and Southern Finland[14,15] it is during spring. In China and Paraguay, the higher incidence is during summer[16,17]. Studies in Western Australia and Spain has shown no seasonal variation[18,19]. In our study a higher incidence was seen during the months of December-January and May-June. Sri Lanka being a tropical country, no seasons are seen, but the months of December, January coincide with the winter and May, June with the summer season of the temperate countries.

The incidence in the age group below 15 years is 1.1 per 100,000 population which is higher than reported from developed countries[2] but lower than those reported from developing countries like Iran and Bangladesh[7,20]. This figure is of importance in planning acute flaccid paralysis surveillance in the polio eradication program.

Although *Campylobacter jejuni* infection is known as the commonest precipitating event, upper respiratory tract infections were the commonest in many retrospective studies. This is observed in our study too. Our study shows that GBS in Sri Lanka is very much similar in clinical epidemiology to that in other countries except for minor variations especially with respect to peak age incidence and preceding illnesses. Clustering of cases was seen during the rainy season.

References

1. Sejvar JJ, Baughman AL, Wise M, Morgan OW. Population incidence of Guillain-Barré syndrome: a systematic review and meta-analysis. *Neuroepidemiology* 2011; **36**: 123-33.
2. Hughes RA, Rees JH. Clinical and epidemiologic features of Guillain-Barré syndrome. *Journal of Infectious Diseases* 1997; **176** (Suppl. 2): S92-8.
3. Pithadia AB, Kakadia N. Guillain-Barré syndrome. *Pharmacological Reports* 2010; **62**(2): 220-32.
4. Rocha MS, Brucki SM, Carvalho AA, Lima UW. Epidemiologic features of Guillain-Barré syndrome in São Paulo, Brazil. *Arquivos de Neuro-psiquiatria.* 2004; **62**(1): 33-7.
5. Hung PL, Chang WN, Huang LT, Huang SC, Chang YC, Chang CJ, Chang CS, Wang KW, Cheng BC, Chang HW, Lu CH. A clinical and electrophysiologic survey of childhood Guillain-Barré syndrome. *Pediatric Neurology* 2004; **30**(2): 86-91.
6. Borhani Haghighi A, Banihashemi MA, Zamiri N, Sabayan B, Heydari ST, Safari A Lankarani KB. Seasonal variation of Guillain-Barré syndrome admissions in a large tertiary referral center in southern Iran: a 10 year analysis. *Acta Neurologica Taiwan* 2012; **21**(2): 60-3.
7. Tang J, Dai Y, Li M, Cheng M, Hong S, Jiang L, Cai F, Zhong M. Guillain-Barré syndrome in Chinese children: a retrospective analysis. *Pediatric Neurology* 2011; **45**(4): 233-7.
8. Dias-Tosta E, Kückelhaus CS. Guillain Barré syndrome in a population less than 15 years old in Brazil. *Arquivos de Neuropsiquiatria* 2002; **60**(2-B): 367-73.
9. Linden V, da Paz JA, Casella EB, Marques-Dias MJ. Guillain-Barré syndrome in children: clinical, laboratorial and epidemiologic study of 61 patients. *Arquivos Neuropsiquiatria* 2010; **68**(1): 12-7.
10. Prevots DR, Roland W. Sutter. Assessment of Guillain Barre Syndrome mortality and morbidity in the USA: Implication for Acute Flaccid Paralysis Surveillance. *Journal of Infectious Diseases* 1997; **175**(suppl1) 151-5.
11. Kennedy RH, Danielson MA, Mulder DW, Kurland LT. Guillain Barre Syndrome – a 42-year epidemiologic and clinical study. *Mayo Clinic Proceedings* 1978; **53**: 93-9.
12. Larsen JP, Kvale G, Nyland H. Epidemiology of Guillain Barre Syndrome in the county of Hordaland, Western Norway. *Acta Neurologica Scandinavica* 1985; **71**: 43-7.
13. Jiang GX, De Pedro-Cuesta J, Fredrikson S. Guillain Barre Syndrome in South West Stockholm 1973-91. Quality of registered hospital diagnoses and incidence. *Acta Neurologica Scandanavica* 1995; **91**: 109-17.
14. Rong-Kuo Lyu, Lok Ming Tang, Shaw-Yi Cheng, Wen-Chuin Hsu, Sien-Tsong Chen. Guillain Barre Syndrome in Taiwan. *Journal of Neurology Neurosurgery and Psychiatry* 1997; **63**: 494-500.

15. Farkkila M, Kinnunen E, Weckstrom P. Survey of GBS in Southern Finland. *Neuroepidemiology* 1991; **10**: 236-41.

16. Mckhann GM, Cornblath DR, Griffin JW, Ho, TW, Jiang Z, et al. Acute motor axonal neuropathy: frequent cause of acute flaccid paralysis in China. *Annals of Neurology* 1993; **33**: 333-42.

17. Hart DE, Rojas LA, Rosario JA, Recalde H, Roman GC. Childhood Guillain Barre Syndrome in Paraguay 1990-1991. *Annals of Neurology* 1994; **36**: 859-63.

18. Hankey GJ. Guillain Barre Syndrome in West Australia 1980-1985. *The Medical Journal of Australia* 1997; **146**: 130-3.

19. Sedano MJ, Calleja J, Canga E, Berciano J. Guillain Barre Syndrome in Cantabria – Spain. An epidemiological and clinical study. *Acta Neuroligica Scandinavica* 1994; **89**: 287-92.

20. Islam Z, Jacobs BC, Islam MB, Mohammad QD, Diorditsa S, Endtz HP. High incidence of Guillain-Barre Syndrome in children in Bangladesh. *Emerging Infectious Diseases* 2011; **17**(7): 1317-18.