VOLUME - 10, ISSUE - 03, MARCH - 2021 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Neurology

CLINICAL AND ELECTROPHYSIOLOGICAL PROFILE OF GUILLAIN BARRE SYNDROME AT A TERTIARY CARE CENTER IN TAMIL NADU

Dr K Balamurali	MD., DM, Associate Professor, Department of Neurology, Theni Government Medical College, Theni Allinagaram, Tamil Nadu 625531.
Dr Jithin Antony Bose	MD** Senior Resident , Govt. Thanjavur Medical College, Thanjavur-613004, Tamil Nadu, India.
Dr Jayasankar V R*	M.D, Senior Resident, Govt. Thanjavur Medical College, Thanjavur-613004, Tamil Nadu, India.*Corresponding Author
Dr Shameer P	M.D, Senior Resident, Govt. Thanjavur Medical College, Thanjavur-613004, Tamil Nadu, India.
Dr Ponnu Sankar	DCH., DNB, Senior Resident, Govt. Thanjavur Medical College, Thanjavur-613004, Tamil Nadu, India.

ABSTRACT **Introduction:** Guillain Barre Syndrome (GBS) is an acute, self-limited, autoimmune inflammatory disorder of the peripheral nervous system triggered usually by infections or other antecedent events. It has a worldwide distribution of 0.9 to 2/100,000 cases per year. In natural course of the illness 10 to 20% will remain severely disabled and about 5% die. There are no specific diagnostic tests but a combination of the clinical features with absence of cellular reaction and high protein on CSF and Nerve conduction studies can diagnose the disease with good accuracy. **Materials and Methods:** The Study was a prospective observational Study conducted at a tertiary referral centre in central Tamilnadu. All patients aged 18 years or more with diagnosis of GBS or GBS variants as per the NINDS GBS criteria (Asbury and Cornblath -1990) presenting within two weeks of onset of weakness were included in this study. After clinical examination by two neurologists, a nerve conduction study at admission and during hospital stay were performed. A follow up at 12 weeks was obtained and data was analysed. **Results:** A total of 20 patients fulfilling the diagnostic criteria were included in the study. Youngest patient was of 19 years and the oldest was of 61 years. The mean age was 35 years. There was slight male preponderance. The mean duration of hospital stay was 22 days and 7 patients required mechanical ventilation. Diarrhoea and upper respiratory tract infection accounted for 25 % each as antecedent illness and varicella in 2 patients (10 %). 40 % didn't report any antecedent illness and majority (75 %) presented within one week of onset of symptoms. 70 % reached the nadir of illness after one week into the illness. 45 % had a GBS disability score of more than 3. Lower cranial nerve involvement was seen in 15(75%) patients. Thirty four out of the 17 (85%) patients had absent reflexes. Objective sensory impairment was present in 10(50%) patients. Autonomic dysfunction was present in 5 (25%) patients. Heart rate variability was seen in most of the patients followed by blood pressure fluctuations. 17 (85%) patients had an MRC score less than 40. 12 patients had albuminocytological dissociation. On nerve conduction study a demyelinating pattern was more common ,noted in 9(45 %) patients than axonal, 9 patients had a sensory ratio of more than 1 which is very specific for GBS. Ulnar ratio-11 patients had an ulnar ratio of >0.78.A ratio less than 0.78 ruled out GBS. 15 out of the 20 patients received IVIG and plasmapheresis was used in 3 patients and both treatment modalities was used in 2 patients. The most common complication encountered was sepsis which occurred in 4 out of 20 patients (20%). The majority of patients 15(75%) had achieved a Hughes score of 1 or less at 12 weeks. At 12 weeks, only 3 patients(15%) had bad outcome(Hugh score of 3) and rest (85%) had good outcomes(hugh score0-2) at 12 weeks. Out of the 20 patients, there was only one GBS variant which was pharyngeal variant . None of the patients in the study expired during or at the end of the study. **Conclusion:** Although a self-limiting disease, small subset of GBS patients can have life long disability and it can even result in death. Early Neuro critical care unit admission, early initiation of IVIG ,early ventilation and dedicated neurorehabilitation programs will result in good outcome for these patients.

KEYWORDS : Guillain Barre Syndrome, AIDP, Peripheral Neuropathy, Critical care, Neuro-immunology,

Guillain Barre Syndrome (GBS) is an acute, self-limited, autoimmune inflammatory disorder of the peripheral nervous system triggered usually by infections or other antecedent events. Jean-Baptiste Octave Landry in 1859 Initially described it as ascending weakness preceded by fever, malaise and pain leading to death from respiratory failure(1). It has a worldwide distribution of 0.9 to 2/100,000 cases per year. Although various treatment modalities are available to reduce the mortality and disability, most of them provides only partial recovery and outcome hasn't changed a great deal in the last two decades.If the patient is allowed to follow the natural history 10 to 20% will remain severely disabled and about 5% die(2,3).

The term Guillain Barre syndrome (GBS) refers to a clinical entity that is characterised by rapidly evolving symmetrical limb weakness, loss of deep tendon reflexes, absent or mild sensory signs, and variable autonomic dysfunction. There are no specific diagnostic tests but a combination of the above features with absence of cellular reaction on CSF and Nerve conduction studies can diagnose the disease with good accuracy.(4) The aim of this study to study the clinical profile and compare the various clinical and electrophysiological parameters which will help in early diagnosis and prognostication.

MATERIALS AND METHODS

The Study was a prospective observational Study conducted at a tertiary referral centre in central Tamilnadu from 2018 march to 2020 march.All patients aged 18 years or more with diagnosis of GBS or GBS variants as per the NINDS GBS criteria (Asbury and Cornblath -1990) presenting within two weeks of onset of weakness were included in this study. Two neurologists did the complete neurological examination (cranial nerve, muscle power, reflexes, and sensory examination, GBS disability scale at admission) at admission. A nerve conduction study (CMAP, SNAP and F response) of at least one upper limb and lower limb at admission was performed. Data was added from subsequent conduction studies and CSF study done as part of routine

clinical care.Treatment modalities used and complications were recorded for analysis. A follow up at 12 weeks was obtained for all patients using GBS disability scale, (adapted from Hughes et al.,1978) was done at our neuromuscular clinic.The data was analysed using SPSS version 21 software (SPSS Inc, Illinois, Chicago).

RESULTS

A total of 20 patients fulfilling the diagnostic criteria were included in the study.

Demographic details:
Youngest patient was of 19 years and the oldest was of 61 years. The mean age was 35 years. There were 12 Males and 8 Females and the slight male preponderance accounted for the Male: Female ratio of 1.5:1.

Duration of hospital stay
In our study the mean duration of hospital stay was 22 days and majority of patients (92%) admitted in the Neuromedicine ICU. 3 patients had prolonged stay of more than one month and 7 patients required mechanical ventilation.

Seasonal distribution of cases
The cases were relatively equally distributed over different seasons except for the months October to December.

Antecedent illness
Diarrhoea and upper respiratory tract infection accounted for 25 % each as antecedent illness and varicella in 2 patients (10 %). 40 % didn't report any antecedent illness.

Days between onset of disease and admission.
Majority (75 %) presented within one week of onset of symptoms.

Onset to Nadir
70 % reached the nadir of illness after one week into the illness.

GBS disability score (Hughes score) at admission
Hughes GBS disability score was calculated which ranged from 0(normal) to 6 (death) and the majority belonged to score of 4(40%). 45 % had a GBS disability score of more than 3 that is inability to walk without support before initiation of treatment.

Past history
Past history of GBS was not seen in any of our patients.

Clinical Examination
Lower cranial nerve involvement was seen in15(75%) patients.The facial nerve was the most common cranial nerve involved ,in about 12 patients ,one patient had 9 and 10^{th} cranial nerve involvement .

Neck flexor weakness was seen in 14 (70%) patients. Thirty four out of the 17 (85%) patients had absent reflexes. Objective sensory impairment was present in 10(50%) patients. Autonomic dysfunction was present in 5 (25%) patients. Heart rate variability was seen in most of the patients followed by blood pressure fluctuations. Other abnormalities noted were gastrointestinal dysfunction such as constipation and urinary retention.

MRC sum score
MRC sum score was estimated for all patients and was subdivided into two groups of <40 and ≥ 40 MRC sum score. 17 (85%) patients had an MRC score less than 40.

CSF evaluation
The CSF was examined in 16 of the 20(80%) patients. Out of them 12 patients had albuminocytological dissociation was seen (60%) .

Nerve conduction study at admission
All patients underwent electrophysiological study soon after admission and were classified into 5 groups (primary demyelinating, primary axonal, equivocal, normal and unresponsive) according to Hadden et al. A demyelinating pattern was more common ,noted in 9(45 %) patients than axonal, which was noted in 8(40%) patients. Out of the 20 patients, 1 (5%) had equivocal findings, 1 (5%) had normal nerve conduction studies and one(5%) had unresponsive nerves. Follow up nerve conduction studies were done as required at specified time points.

Sensory Ratio
9 patients had a sensory ratio of more than 1 which is very specific for GBS

Ulnar ratio-11 patients had an ulnar ratio of >0.78.A ratio less than 0.78 ruled out GBS Treatment

In this study, 15 out of the 20 patients received IVIG and plasmapheresis was used in 3 patients and both treatment modalities was used in 2 patients.

ICU admission, ventilation and complications
All the patients were admitted in the neuro-medical ICU and 11 patients (55%) required mechanical ventilation. The most common complication encountered was sepsis which occurred in 4 out of 20 patients (20%). The most common cause of sepsis was ventilator associated pneumonia (3 patients) and UTI(1 patient). One patient had pulmonary edema from which he recovered.

Follow up at 12 weeks
All patients were followed up at 12 weeks. The disability at 12 weeks was assessed and GBS disability score at 12 weeks were analysed. The majority of patients 15(75%) had achieved a Hughes score of 1 or less. Two patients had Hughes score of 3 and 3 patients had a hugh score of 2.

Outcome at 12 weeks
The primary outcome measured was the GBS disability score at 12 weeks. The outcome was dichotomized as good (score 0-2) and bad (≥ 3).Out of the 20 patients, only 3 patients(15%) had bad outcome(Hugh score of 3) and rest (85%) had good outcomes(hugh score0-2) at 12 weeks. In this study majority of patients had a good outcome at 12 weeks.

GBS Variants
Out of the 20 patients, there was only one GBS variant which was pharyngeal variant . Hughes score at end of study period
All patients were followed up at end of study to assess Hughes score and outcome. 19 out of 20 patients had good outcome at end of study .The mean duration of follow up was 24.66 ± 10.76 months. The patientwith poor outcome had a Hughes score of 3 after 12 weeks.Patient continues to have improvement of deficits. None of the patients in the study expired during or at the end of the study.

DISCUSSION

Guillain Barre Syndrome is a recognised cause of paralytic neuropathy with clearcut clinical and electrophysiological findings. If allowed to follow the natural course, 5% of patients can die of the disease and 20% can end up with disability. Many studies have proven the same(5,6). This study was perfomed in IP patients attending a tertiary care hospital in South India to examine the clinical profile of GBS and compare the various clinical and electrophysiological parameters which will help in early diagnosis and prognostication. In our study, there was a male

preponderance with a M:F ratio of 1.5:1. This was comparable with previous epidemiological studies which had demonstrated male preponderance. This is in contrast to the other autoimmune diseases which are more seen in females.A study by Dhadke et al in India also showed similar results.(7) In our study a majority of patients were aged above 30 years. In many population based studies, increased incidence was in people aged 50 years(8) or more but in our study most of the study group belonged to less than 40 years(70%). Several studies have shown a bimodal age peak in occurrence of GBS.(9).In our study there was no evidence of bimodal distribution.This was similar to the study done by Winner et al.(10).The cases of GBS were relatively equitably distributed over the different seasons except from October to December. There was no seasonal clustering of cases.Being a tropical country ,the incidence of infections that could cause GBS is higher in India,especially during these months.This could probably explain the seasonal clustering of cases seen in studies done in countries like India.(11,12) .

Most of the time a history of preceding illness within 4 weeks is reported in GBS. In this study around half of the patients reported a preceding infection within 4 weeks of onset of symptoms. Most common infection reported was diarrhoea followed by upper respiratory tract infection. Many studies have shown similar results ,with around 70% of cases of GBS being associated with a preceding illness . The incidence of antecedent infection was found to be 52% in a study by Sunder et al.(13) The result from our study was similar to those described in several other studies.(14) All our patients were admitted to neuro-medical intensive care unit. In several other studies ,most of the patients were admitted to wards.(15) The patients in our study group reported within 14 days of weakness ,hence the clinical and electrophysiological parameters could be assessed in these patients in the initial acute phase of the illness. Most of the patients were admitted in our hospital within 1 week of onset of weakness and treatment was initiated within 6-12 hours. In our study all patients reached nadir within 2 weeks with majority reaching nadir by 1st week, which was in contrast to many other studies where nadir was reached by 2 weeks(16).

Cranial nerve involvement was noted in 15 patients (75%) and the most common cranial nerve involved was facial and only one patient had 9 and 10th cranial nerve involvement. Similar result was seen in most of the studies with facial nerve being most commonly involved followed by bulbar palsy. Similar result was seen in a study by Banker et al which showed that around 2/3rd of the patients had cranial nerve palsies(17).Neck flexor weakness was seen in 14 patients (70%)(18). Objective sensory findings were seen in 10 patients(50%) while areflexia was seen in 85% of the patients. Autonomic dysfunction was seen in 25% of our patients. It ranged from isolated tachy- or bradycardia without hemodynamic fluctuations to variations in BP. Similar results were seen in a study conducted in India.(19)Most of our patients had a GBS disability score greater than 3 indicating significant disability before treatment initiation. Similar distribution was seen in a study by Koningsveld et al. (20).In our study, most of the patients (60%) had albumino-cytological dissociation on CSF examination performed after 1 week of illness. The most common NCS pattern was demyelinating followed by axonal which was consistent with several other studies such as by Hughes et al and Mishra et al in which demyelinating pattern was most commonly seen followed by axonal.(21). Most of the studies showed higher number of patients treated with IVIG which was similar to our study .

In our study all patients were followed up at 12 weeks and also at study endpoint. None of the patients were lost to follow up. In our study 15% of the patients had a bad outcome at 12 weeks.Most other studies showed that around 20-30% of the patients had bad outcome.(22) The number of patients with bad outcome was much lower in our study compared to other studies.

CONCLUSION:

Although a self-limiting disease, small subset of GBS patients can have life long disability and it can even result in death. Early Neuro critical care unit admission, early initiation of IVIG ,early ventilation and dedicated neurorehabilitation programs will result in good outcome for these patients.

REFERENCES

1. Skalski, P, Owecki, M.K. & Magowska, A.M. Jean Baptiste Octave Landry (1866–1940). J Neurol 266, 2341–2343 (2019).
2. Van den Berg B, Walgaard C, Drenthen J, Fokke C, Jacobs BC, van Doorn PA. Guillain-Barré syndrome: pathogenesis, diagnosis, treatment and prognosis. Nat Rev Neurol 2014; 10: 469–82.
3. Guillain-Barré syndrome Hugh J Willison, Bart C Jacobs, Pieter A van Doorn. Lancet 2016; 388: 717–27
4. Yadegari S, Nafissi S, Kazemi N. Comparison of electrophysiological findings in axonal and demyelinating Guillain-Barre syndrome. *Iran J Neurol*. 2014;13(3):138-143.
5. Hughes RA, Cornblath DR. Guillain-Barre syndrome. Lancet 2005;366:1653-1666.
6. Hughes RA, Swan AV, Raphael JC, et a I. Immunotherapy for Guillain-Barre syndrome: a systematic review. Brain 2007;130:2245-57.
7. Dhadke SV, Dhadke VN, Bangar SS, Korade MB. Clinical profile of Guillain Barre syndrome. J Assoc Physicians India. 2013 Mar;61(3) :168-72.
8. Ng KK, Howard RS, Fish DR, et al Management and outcome of severe Guillain Barre Syndrome.QJM : 1995; 88: 243-250.
9. McGrogen A, Madle G, Seaman H, de Vries C. The Epidermology of Gullillian-Barre Syndrome Worldwide. Neuroepidermology. 2008;32(2):150-163.
10. Dowling PC,Menonna JP, Cook SD, Guillain Barre Syndrome in Newyork.NewJersy. JAMA. 1997; 38: 317-18. 97. Winner S, Evans J. Age-Specific Incidence of Guillian Barre Syndrome in Oxfordshire. QJM. 1990;77(3):1297-1304.
11. Nachamkin I, Arzate Barbosa P, Ung H, Lobato C, Rivera AG,Rodriguez P et al. Patterns of Guillain Barre Syndrome in children: Results from a Mexican population, Neurology 2007; 69:1665-1676.
12. Mathew T, Srinivas M, Nadig R, Arumugam R, Sarma G. Seasonal and monthly trends in the occurrence of Guillian-Barre syndrome over a 5- year period: A tertiary care hospita –based study from South India.
13. Sundar U, Abraham E, Gharat A, Yeolekar ME, Trupti Trivedi, Duvedi N. Neuromuscular respiratory failure in Guillain Barre Syndrome. Evaluation of clinical and electrodiagnostic predictors. JAPI 2005; 53: 764-68.
14. Ashok kumarB, Meena AK, Kaul S, Borgohain R, Sita jeyalakshmi S, Suvarna A, et al. Clinical, electrophysiological pattern and outcome of Guillain Barre Syndrome in relation to antiganglioside antibodies. Thesis done in NIMS, 2006.
15. .Van Leeuwen N, Lingsma H, Vanrolleghem A, Sturkenboom M, Van Doorn P, Steyerberg E et al. Hospital Admissions, Transfers and Costs of Guillain-Barre Syndrome. Plos One. 2016;11(2).
16. Dimachkie M, Saperstein D. Acquired Immune Demyelinating Neuropathies. Continuum: Lifelong Learning in Neurology. 2014;20;1241-1260.
17. Amita Bhargava, Basavaraj F. Banakar, Guruprasad S. Pujar, and Shubhakaran Khichar.A study of Guillain–Barré syndrome with reference to cranial neuropathy and its prognostic implication. J Neurosci Rural Pract. 2014 Nov; 5(Suppl 1): S43–S47.
18. Abai S, Kim SB, Kim JP, Lim YJ. Guillain-barré syndrome combined with acute cervical myelopathy. *J Korean Neurosurg Soc*. 2010;48(3):298-300. doi:10.3340/jkns.2010.48.3.298
19. Singh N, Jaiswal A, Misra S, Srivastava P. Assessment of autonomic dysfunction in Guillian-Barre syndrome and its prognostic implications. ActaNeurologicaScandinavica. 1987;75(2);101-105.
20. Van Koningsveld R, Steyerberg EW, Hughes RAC, et al. A clinical prognostic scoring system for Guillain-Barre syndrome. Lancet Neurol 2007;6:589-94.
21. Dimachkie M, Saperstein D. Acquired Immune Demyelinating Neuropathies. Continuum: Lifelong Learning in Neurology. 2014;20;1241-1260.
22. Saravanan, P (2008) A Study on Guillain Barre's Syndrome Clinical Profile and Treatment Outcome. Masters thesis, Madras Medical College, Chennai.