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Clinico-electrophysiological profile and predictors of functional outcome in Guillain–Barre syndrome (GBS)

Rajesh Verma *, Tejendra Sukdeo Chaudhari, Tushar Premraj Raut, Ravindra Kumar Garg

Department of Neurology, King George's Medical University, Lucknow, UP 226003, India

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ABSTRACT

Introduction: Guillain–Barre syndrome (GBS) is an acute polyradiculoneuropathy with varied severity of presentation.
Aims: To study the clinical and electrophysiological profile of patients with GBS and to determine the factors associated with poor functional outcome and need for mechanical ventilation.
Settings and design: It was a hospital-based prospective observational study.
Methods and material: 90 patients with GBS diagnosed as per Asbury and Cornblath criteria were enrolled and followed up for 6 months. Various epidemiological, clinical and electrophysiological parameters were evaluated. Hughes motor scale was used to measure functional outcome. Factors associated with poor functional outcome and need for mechanical ventilation were determined.
Results: 90 patients (56 males; 34 females; mean age of 29.3 ±15.2 years) were enrolled in this study. Amongst these 6 (6.7%) patients died during in-hospital stay. Antecedent infection was present in 29 (32.2%), autonomic dysfunction in 31 (34.4%), bulbar palsy in 21 (23.3%), neck flexor weakness in 52 (57.8%). 60 cases (66.7%) were of axonal variety and 30 (33.3%) of demyelinating variety. On univariate analysis, predictors associated with poor functional outcome at 6 months were autonomic dysfunction ($p = 0.013$), neck flexor weakness ($p = 0.009$), requirement of ventilatory assistance ($p = <0.001$), MRC sum score < 30 on admission ($p = <0.001$) and axonal pattern on electrophysiological assessment ($p = <0.001$). On multivariate analysis, MRC sum score < 30 on admission ($p = 0.007$) and axonal pattern on electrophysiological assessment ($p = <0.001$) were independently associated with poor functional outcome at 6 months. Factors associated with need for mechanical ventilation were presence of autonomic dysfunction ($p = <0.001$), cranial nerve palsy including facial palsy ($p = <0.001$) and bulbar palsy ($p = 0.002$), neck flexor weakness ($p = <0.001$), low MRC sum score (<30) ($p = 0.001$), and low proximal CPN CMAP amplitude to distal CPN CMAP amplitude ratio ($p = 0.042$); none of them being significant on multivariate analysis.
Conclusions: Detailed evaluation of the clinical and electrophysiological profile may help in predicting the functional outcome and need for mechanical ventilation in patients with GBS.

1. Introduction

Guillain–Barre syndrome (GBS) is a monophasic illness characterised by acute onset, immune mediated polyradiculoneuropathy, axonal or demyelinating, clinically manifesting as acute onset areflexic quadriparesis with or without bulbar palsy and sometimes leading to weakness of respiratory muscles thus requiring mechanical ventilatory support [1]. Infection-induced aberrant immune response resulting from molecular mimicry and formation of cross reacting antibodies, contributed by complement activation and certain host factors modifying host susceptibility, has been implicated in the immunopathogenesis of GBS [2]. Preceding infectious illness is present in almost two-thirds of the patients in the form of either upper respiratory tract infection (URTI) or diarrhoea most commonly due to *Campylobacter jejuni* [3]. This clinical entity usually manifests with variable severity and outcome. As far as prognosis is concerned, few clinical prediction models have been suggested to predict outcome of these patients during the initial stages of the illness [4,5]. Mechanical ventilation is required in around 20–30% of patients with GBS, especially in patients who show rapid progression of weakness, autonomic dysfunction, bulbar palsy, and bilateral facial weakness, and is associated with poor functional outcome [6,7]. Over a period of time, various modalities of treatment have been suggested and recommended for treatment of GBS such as intravenous immunoglobulin (IVIG) and plasma exchange (PE) therapy which are especially useful in severely affected patients. The present study highlights the clinical and electrophysiological data of patients with GBS admitted at our institute which is a large tertiary care institute. This study also evaluates the predictors of functional outcome at 6 months and various parameters associated with need for mechanical ventilation. Knowledge of these factors can be helpful in the betterment of management and prognostication of patients with GBS.

* Corresponding author. Tel.: +91 9335915823.
E-mail address: drrajeshverma32@yahoo.com (R. Verma).

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2. Material and methods

This is a prospective study of GBS patients admitted between the period of 2010 and 2012 at King George's Medical University, Lucknow, Uttar Pradesh, India. Our University is a tertiary care hospital in northern India catering to over 100 million people. Before enrolment, a written informed consent was taken from the patient or his/her relatives. The ethical approval was obtained from the institutional ethical committee. Fig. 1 shows the study design.

2.1. Clinical entry criteria

Patients who presented with acute onset, rapidly progressive, predominantly motor quadriparesis with or without bulbar palsy were evaluated. The clinical diagnosis of GBS was based upon the criteria suggested by Asbury and Cornblath with areflexia and progressive weakness of both arms and legs required for the diagnosis, other criteria being supportive to the diagnosis [1]. Miller Fisher syndrome, which is not covered by this criteria was diagnosed as a triad of acute onset of ophthalmoplegia, areflexia, and ataxia after ruling out other aetiologies.

2.2. Evaluation

On admission, the demographic and clinical data were gathered which included age, sex, season of presentation (Rainy: June–September, Summer: February–May, Winter: October–January), and history of antecedent illness in the form of URTI, diarrhoea and other viral illness. Time required to attain peak deficit was also noted in days (time from onset of symptoms to intubation in those patients who required mechanical ventilation and time from onset of symptoms to peak disability in non-ventilated patients). Detailed motor system evaluation was done including cranial nerve examination, power and reflexes. Presence of neck flexor weakness, cranial nerve involvement including weakness of facial and extraocular muscles, and bulbar palsy were noted. The routine investigations including complete blood count, blood sugar, and biochemical parameters including kidney and liver function tests were done in all patients. Cerebrospinal fluid (CSF) was examined for microscopic and biochemical parameters including protein and sugar.

2.3. Definition of various parameters

2.3.1. MRC sum score

The degree of weakness was estimated by calculating the MRC (Medical Research Council) sum score as the sum of MRC grades (ranging from 0 to 5) of six muscle pairs on both sides: upper arm abductors, elbow flexors, wrist extensors, hip flexors, knee extensors, and foot dorsiflexors. The MRC sum score ranges from 0 (tetraplegia) to 60 (no paralysis) [8].

2.3.2. Autonomic dysfunction

Patients who developed cardiac arrhythmias, fluctuations in heart rate and blood pressure including postural drop of blood pressure, sweating abnormalities, pupillary abnormalities, gastrointestinal dysfunction and urinary retention were considered to have autonomic dysfunction.

2.3.3. Ventilatory assistance

Patients who developed use of accessory muscles of breathing, clinical features of hypoxia, and abnormalities on arterial blood gas analysis (PaO_2 < 70 mm Hg; $PaCO_2$ > 45 mm Hg) were intubated and provided mechanical ventilation.

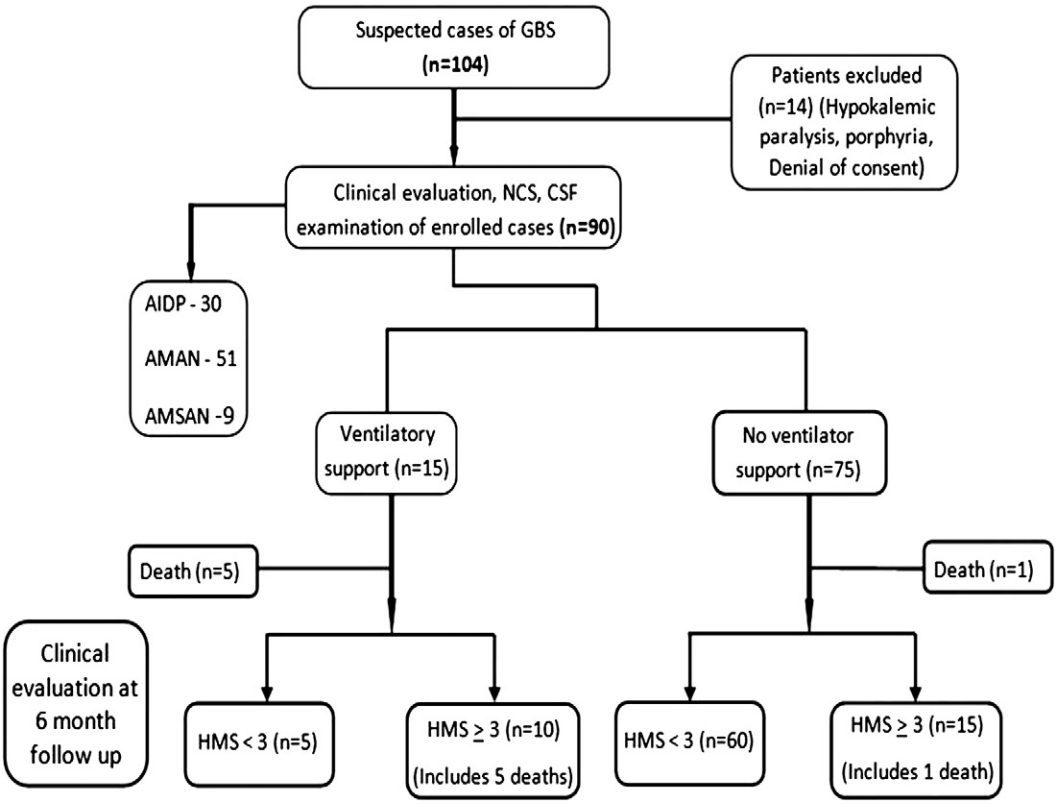

Fig. 1. Study design showing course of the study. NCS—nerve conduction study, CSF—cerebrospinal fluid, AIDP—acute inflammatory demyelinating polyneuropathy, AMAN—acute motor axonal neuropathy, AMSAN—acute motor sensory axonal neuropathy, HMS—Hughes motor scale.