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Electroneuromyographic Subtypes of Guillain-Barre Syndromes in Togo

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Abstract

Introduction: The distribution of electroneuromyographic subtypes of Guillain Barré syndrome (GBS) differs by geographic region. Axonal forms predominate in Asia and South America while demyelinating forms predominate in Europe and North America. In sub-Saharan Africa, this distribution is not known.

Objective: we proposed to report the electroneuromyographic forms encountered at the CHU Campus national reference center for GBS in Togo.

Methods: Data were collected retrospectively on files collected consecutively from November 1, 2013 to March 31, 2021. We included the records of patients in whom the clinic and the ENMG were unequivocal. The classification was made on the data of a spot review. The criteria of Rajabally al (2015) were used to distinguish between demyelinating, axonal, indeterminate and unexcitable subtypes. In addition, certain particular patterns have been sought to guide the classification: the "Sural spared" pattern defined as an absence of the sensory potentials of the median or ulnar with relative preservation of the sural, described as specific to the demyelinating subtype or the polyphase, edentulous, dispersed aspects of the motor potentials testifying to a de-remyelination.

Results: Data from 44 patients, all Togolese, were retained. They had an average age of 39.54±18.11 years, with extremes of 6 and 80 years. A female predominance was noted with a sex ratio of 0.4. The median time between encumbering and onset of

neurological disorders was 14.21 ± 7.07 days (ranges: 4 and 150 days). The following subtypes were found: demyelinating in 26 patients (59.09%), axonal in 16 patients (36.36%) and was unexcitable in two patients (4.55%). Diagnostic certainty was level one in 27 patients (61.36%) of patients and level two in 17 patients (38.64%).

Conclusion: The demyelinating subtype of GBS is the predominant in Togo followed by the AMAN subtype.

Keywords: Guillain Barré syndrome; electroneuromyography; ENMG; demyelinating; AMAN; Togo; Africa

Introduction

Guillain-Barré syndrome (GBS) is a polyradiculoneuropathy of immunological origin of subacute installation typically characterized by sensitivo-motor disorders of ascending evolution, albumino-cytological dissociation in the cerebrospinal fluid (CSL) and demyelinating involvement in the electroneuromyogram (ENMG) [1-3].

For two-thirds of cases, the occurrence of GBS is preceded, within three weeks to one month, by an acute viral or bacterial infectious episode of respiratory or digestive origin [4, 5]. The pathophysiological mechanism currently proposed is that of a molecular mimicry between the antigens presented by pathogens and gangliosides present in the peripheral nervous system [4, 5]. Antigenic mimicry would then be responsible for an autoimmune reaction directed against myelin, axon or paranodal regions. The role in the occurrence of GBS of certain germs (Campylobacter jejuni, Zika virus, etc.) and autoantibodies (antibodies to GQ1b mainly) is established [4-5].

At the paraclinical level, there is no specific biological marker of this condition and the diagnosis is evoked on diagnostic criteria that make it possible to properly categorize the subtype of GBS. However, the diagnosis is primarily clinical [1,4,5].

The epidemiological and clinical characteristics of GBS differ by geographic region. For example, axonal forms predominate in Asia and South America while demyelinating forms predominate in Europe and North America [6-9].

In sub-Saharan Africa, there are only a few reported cases of GBS. In Togo, a West African country where we do not have data on GBS, we conducted a hospital study at the CHU Campus in Lomé with the objective of reporting the subtypes of GBS in Togo.

Framework and Methodology

The neurology department of the CHU Campus located in the extreme south of Togo, which is one of the largest national reference centers for neurological conditions, served as the framework for our study. We carried out a cohort study consisting of patients followed in the neurology department of the CHU Campus of Lomé for a GBS. Patients with BRIGHTON diagnostic certainty GBS level 1 or 2 (Table I) [10] were enrolled consecutively from November 1, 2013 to March 31, 2021. We did not include in this study patients admitted for a clinical picture suggestive of GBS who did not perform a lumbar puncture or an electroneuromyographic examination, patients in whom GBS or another cause of paralysis is an antecedent and Patients with BRIGHTON diagnostic certainty GBS level 3 or 4 (Table I) [10]. The ENMG was carried out by a specialist practicing EMG for about ten years, reviewed by the dean of enMGists of Togo. Patients were classified according to Rajabally's criteria by demyelinating, axonal, indeterminate and unexcitable [11]. The particular pattern in favor of AIDP was retained before the "Sural spared" pattern is – to say – the absence of the sensory potentials of the median or ulnar with relative preservation of the sural [12] or the polyphasic, edentulous, dispersed aspects of the motor potentials (de-remyelination) [13]. Data were captured and analyzed using SPSS version 21 software. For descriptive analysis, quantitative variables were described by means (standard deviation) or median (interquartile interval) and qualitative variables by absolute frequencies and relative frequencies. Student's t-test was used for comparing means, and the $\chi 2$ test or Fisher's exact test for comparing percentages. The threshold of significance was set at 5%.

Table 1 : Brighton BMS Diagnostic Certainty Criteria [10]

Diagnostic criteria	Levels of diagnostic certainty			
	1	2	3	4
Bilateral weakness and flaccid limbs;	+	+	+	±
Decrease or abolition of osteotendinous reflexes in weak limbs;	+	+	+	±
Monophasic profile, with interval of 12 hours to 28 days between the onset of weakness and its nadir followed by a clinical plateau	+	+	+	±
Less than 50 mononucleated elements/mm³ in LCS	+	+	-	±
Hyperproteinorachia	+	±	-	±
ENMG pattern compatible with an SGB	+	±	-	±
Lack of another diagnosis explaining the weakness	+	+	+	+

+ Present; - Absent; ± Present or absent; LCS Cerebrospinal fluid; GBS Guillain-Barré Syndrome; ENMG Electroneuromyogram

Results

The data of 44 patients, all Togolese met our inclusion criteria on 7012 hospitalized patients: a hospital frequency of 0.63. Thirteen patients were male and 31 were female: a sex ratio of 0.4. They had an average age of 39.54±18.11 years with extremes of 6 and 80 years. The median time to visit a neurologist was 4.5 days, the average was 6.64±5.76 days with extremes of 1 and 25 days. The most common reason for consultation was heaviness of the limbs with a proportion of 86.36% (38 patients). Other reasons for consultation were paresthesia and difficulty swallowing in 5 patients (11.36%) and one patient (2.28%) respectively. At admission, 27 patients (61.36%) had lost the ability to walk. Of these, 7 patients (22.22%) required ventilatory assistance. Regarding the intensity of the deficit assessed by the MRC Sum Score, 25 patients (56.82%) had a score of less than 30; 11 patients (25%) a score between 31 and 40; 6 patients (13.64%) between 41 and 50 and two patients (4.54%) a score between 51 and 60. According to the DN4 Score, 25 patients (56.82%) had no neuropathic pain at admission. At admission, 14 patients (31.82%) of patients had paresthesias of gloves and socks. Five patients (11.36%) had sock paresthesias and spread to all. Regarding apnea counting, 18 patients (40.91%) of the patients had a score less than or equal to 20. Similarly, 7 patients (15.91%) of patients on admission required respiratory management. The dysautonomic disorders observed were: tachycardia bouts, blood pressure labilities, paralytic ileus and acute urine retention in the respective proportions of 18 patients (40.91%), 15 patients (34.09%), 7 patients (15.91%) and 4 patients (9.09%). Lumbar puncture (LBP) was performed in all patients. The average time to perform lumbar puncture compared to the onset of neurological symptoms was 13.55±13.27 days, with extremes of 2 and 54 days. PL data found albumino-cytological dissociation in 65.91% of cases (29 patients). The mean proteinrachia was 2.11±1.38 g/L, extremes of 0.31 and 4.60 g/L. The mean cytorachia was 2.31±3.09 cells/mm³ from the extremes of 0 to 10 cells/mm³. The mean time to completion of ENMG compared to onset of neurological symptoms was 14.21 ± 7.07 days, with a median of 15 days and extremes of 2 and 26 days. The ENMG found demyelinating lesions in 26 patients (59.09%), axonal in 16 patients (36.36%) and was unexcitable in two patients (4.55%). BRIGHTON diagnostic certainty was level one in 27 patients (61.36%) of patients and level two in 17 patients (38.64%).

Discussion

We reported the electroneuromyographic subtypes of GBS in Togo, a resource-limited country through this cohort study that included 44 cases of GBS. The main limitations of the single-center nature and the small sample size of the study.

During our study period the hospital frequency of GBS was 0.63%. These data are lower than the 1.44% hospital frequency reported by Basse et al. [14] in 2017 in Senegal. Our frequency is higher than the 0.40% frequency reported by Apetse et al. [15] In a study carried out in the same department over a shorter period. In our study the sex ratio was 0.40. Our results are close to those reported by Bhagat et al. [16] in Nepal in 2017 and Basse et al. [14] in Senegal the same year which reported female predominances of 51.6% and 69.23% respectively. GBS is reported, however, worldwide with male predominance [5,17].

In our study, the average age was 39.54±18.11 years. These figures are higher than those reported by Arami et al. [18] in Iran in 2006 and by Basse et al. [14] in Senegal which reported average ages of 34.43±23.9 years and 33.9 years respectively. The ages of

patients in our study population ranged from 11 to 86 years, with a higher proportion of patients in the age range from 40 to 59 years. These data are consistent with those reported by Mosseddaq et al. [19] in Morocco in 2019 and Basse et al. [14] in Senegal which reported peaks in the age group between 40-60 years and 30-40 years respectively.

In our series, the average time to completion of the ENMG compared to the onset of neurological symptoms was 14.21 ± 7.07 days with a median of 15 days, thus placing our results in the timely time of exploitability. Our results are close to the median time of 18.6 days reported by Rozé et al. [20] in 2017 in Martinique. Demyelinating forms were found in 47.37% of cases with in this group, the pure demyelinating form in 36.84% of cases and the demyelinating form with axonal involvement in 10.53% of cases. Axonal forms, represented exclusively by the AMAN (Acute Motor Axonal Neuropathy) form, were found in 47.37% of cases. The unexcitable form accounted for 5.26% of cases. Our results are close to those obtained in the series of Basse et al. [14] in Senegal which reported a proportion of 48.4% of demyelinating forms. In the series of Bhagat et al. [16] in Nepal in 2017, demyelinating forms and axonal forms were also reported in equal proportions and the axonal form was represented exclusively by the AMSAN form (Acute Motor Sensory Axonal Neuropathy). The series of Saeed et al. [21] in Pakistan also reported in 2019 similar proportions with a frequency of 40% of demyelinating forms, 40% of AMAN forms, 13.3% of AMSAN forms and 6.7% of Miller Fisher syndrome; wondering about the probable role of anti-ganglioside antibodies, no link has been found to explain these proportions which nevertheless deviate from the data of the European literature. This is how the series of Rozé et al. [20] in 2017 in Martinique reported 95% of demyelinating forms and 5% of unexcitable forms.

Authors describe geographical variabilities of ENMG pattern predominance [22]. Thus, in North America and Europe the AIDP form is largely predominant and axonal forms represent only 5% of cases while in Asian countries (China, Japan, Korea), and in South America, many studies report that axonal forms constitute 30 to 47% of cases [5, 22]. Thus, the results of our series are approaching the proportions of Asia and South America.

Conclusion

In our series, GBS had a low hospital frequency as reported by many authors around the world. It was found mainly in the young population and a predominance of women was noted. On the paraclinical level, we found the classic albumino-cytological dissociation. Electrophysiological patterns were close to those found in the Asian population with a predominance of demyelinating form followed by the axonal form.

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