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ABSTRACT

BACKGROUND: Guillain-Barre syndrome (GBS) is a post-infectious, immune-mediated disease that causes a rapidly progressing poly-radiculoneuropathy resulting in weakness and areflexia. It has several variant forms like AIDP, AMAN and AMSAN.

Objective: To determine frequency of finger drop sign in AMAN and AIDP variant of GBS; a diagnostic factor of AMAN variant.

Material and Methods: A Cross sectional study conducted at neurology department of Pakistan Institute of Medical Sciences. After meeting the inclusion criteria 96 patients were enrolled. Clinical assessment was done i.e. power of the patient was checked and recorded according to the MRC sum score, finger drop sign was checked at time of presentation and NCS was done and variant of GBS noted. The data thus collected was entered on a standardized Performa.

Results: The mean age of the patients was 42.04±18.97 years, 66(68.75%) patients were males. At presentation the mean MRC sum score of the patients was 33.91±9.86 while at discharge the mean MRC sum score of the patients was 45.27±13.36. AMAN variant of GBS was noted in 35(36.46%) patients and AIDP variant of GBS was noted in 61(63.54%) patients. Comparison of finger drop with variant of GBS showed significant difference (p-value<0.05).

Conclusion: According to this study approximately one third of the patients had AMAN variant and two third of the patients had AIDP variant of GBS. In AMAN variant the finger drop noted in all patients.

Keywords: Guillain-Barre syndrome, AMAN, AIDP,

INTRODUCTION

Guillain-Barre syndrome (GBS) annually affects one to four per 100,000 of the population globally, [1] approximately 38.50% [2] requiring ventilator support resulted from respiratory failure. Death in 4.11% [2] persistent disability in 20% [3] of population, and persistent fatigue in 67%.[3] Guillain-Barre Syndrome is a rare but serious autoimmune disorder in which immune system attacks healthy nerve cells of peripheral nervous system. This lead to weakness, numbness and tingling that eventually leads to paraparesis or paralysis. GBS is classified into demyelinating and axonal form on a basis of pathology. Axonal GBS has been further classified into acute motor axonal neuropathy (AMAN) and acute motor and sensory axonal neuropathy (AMSAN).[4,5] The Principal clinical method for distinguishing AMAN, AMSAN and acute inflammatory demyelinating polyneuropathy (AIDP) is electro diagnostic, and clear criteria have been formulated. The pathology of AMAN and AMSAN is very similar, and both conditions may preceded by enteritis caused by Campylobacter jejuni. [6] Standard protocol of nerve conduction studies was followed and patients were classified as having AMAN or AIDP based on the electro diagnostic criteria proposed by Hughes and Cornblath recently; i.e. none of the features of AIDP [5] except one demyelinating feature allowed in one nerve if distal compound muscle action potential is less than 10% of lower limit of normal and Sensory action potential amplitudes are normal. Blood cell counts and routine

blood chemistry tests were done at the first neurological examination, cerebrospinal fluid analysis was done to look for cytoalbuminologic dissociation, which is also a supportive evidence of GBS. AMAN variant of GBS shows characteristic pattern of severe distal weakness with varying degree of proximal weakness. This pattern consisted of severe finger extensor weakness (i.e. at the metacarpophalangeal and interphalangeal Joints) in the presence of relatively normal power in finger flexion, wrist flexion and wrist extension-the "finger drop sign". [3] AMAN is distinct subgroup in GBS showing certain distinguishing features, most notable being predominant weakness of finger extensor. Among 84 cases of all variant of GBS AMAN represent 14.2% [3] of cases and AIDP 78.5% [3] of cases. All of the patients presented with weakness in upper and lower limbs, but one of the distinguishing feature between AMAN and AIDP variant was finger drop sign that was seen in 100% of AMAN variant patients and none of AIDP variant had finger drop sign. Hence, the purpose of this study is to assess the frequency of finger drop sign in GBS patients with both variants i.e. AMAN and AIDP variant that will help us to identify the variant of GBS on clinical examination.

MATERIAL AND METHODS:

A Cross sectional study conducted at neurology department of Pakistan Institute of Medical Sciences after approval from ethical committee. After meeting the inclusion criteria 96 patients were enrolled in a period of 2 years from 2018 to 2020. After informed consent, all patients diagnosed as Guillain-Barre syndrome based on the clinical criteria were inquired about history, neurological examination was done and nerve conduction studies were performed. Clinical, NCS finding record included: power of the patient via MRC sum score in AMAN and AIDP variant of GBS, finger drop sign at the time of presentation and abnormality in NCS. Demographic features recorded, include aged and gender. Data was analyzed using SPSS version 23. Frequencies and percentages were calculated for Qualitative variables (gender, preceding infection, 7th cranial nerve palsy, power of muscles (Deltoid, Biceps, Muscles causing wrist extension (including extensor carpi radialis longus (ECRL), extensor carpi radialis brevis (ECRB), extensor digitorum (ED), extensor digiti minimi (EDM), extensor carpi ulnaris (ECU), extensor indices (EI)), Iliopsoas, Quadriceps, Tibialis anterior) recorded as MRC sum score in AMAN and AIDP variant and finger drop sign. While Mean and Standard deviations were calculated for age. Statistical Significance was indicated by p-value < 0.05 using Chi Square test for comparison of finger drop sign between AMAN and AIDP variant.

RESULTS:

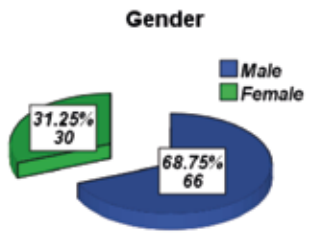
In our study total 96 patients were enrolled. The mean age of the patients was 42.04±18.97 years with minimum age of 15 & maximum age of 83 years (Table 1). In this study 66(68.75%) patients were male while 30(31.25%) patients were females. Male to female ratio of the patients was 2.2:1. (Fig 1). At presentation the mean MRC sum score of the patients was 33.91±9.86 while at discharge the mean MRC sum score of the patients was 45.27±13.36. (Table 2). According to this study AMAN variant of GBS was noted in 35(36.46%) patients and AIDP variant of GBS was noted in 61(63.54%) patients (Fig 2). In our study the cranial nerve palsy was noted in 6(6.3%) patients. (Table 3). In our study the finger drop was found in 35(36.46%) patients (Fig 3). In this study in deltoid, the mean MRC grade of AMAN variant was 2.81±0.91 while the mean MRC grade of AIDP variant of GBS was 3.99±0.81. In biceps, the mean MRC grade of AMAN variant was 2.90±0.86 while the mean MRC grade of AIDP variant of GBS was 4.00±0.86. In wrist, the mean MRC grade of AMAN variant was 2.59±0.81 while the mean MRC grade of AIDP variant of GBS was 4.53±0.32. In iliopsoas, the mean MRC grade of AMAN variant was 2.62±3.84 while the mean MRC grade of AIDP variant of GBS was 3.84±0.97. In quadriceps, the mean MRC grade of AMAN variant was 2.77±0.95 while the mean MRC grade of AIDP variant of GBS was 3.96±0.87. In Tibialis anterior the mean MRC grade of AMAN variant was 2.86±0.91 while the mean MRC grade of AIDP variant of GBS was 4.02±0.94. (Table 4). The study results showed that in GBS variant AMAN the finger drop was found in 35(100%) patients whereas in GBS variant AIDP the finger drop was not found in even a single patient (fig. 4). This difference was statistically significant. I.e. p-value<0.05. (Table 5)

This study showed that among GBS variant AMAN the cranial nerve palsy was observed in 1(2.9%) patients whereas among GBS variant AIDP the cranial nerve palsy was observed in 5(8.2%) patients. This difference was statistically insignificant. I.e. p-value>0.411. (Table 6)

Table 1

Summary statistics of age (years)

Age	
n	96
Mean	42.04
Std. Deviation	18.97
Minimum	15
Maximum	83



Frequency distribution of gender

Table 2
Summary statistics of MRC grade at presentation and at discharge

MRC Grade	At Presentation	At Discharge
N	96	96
Mean	33.91	45.27
Std. Deviation	9.86	13.36
Minimum	8	2
Maximum	52	60

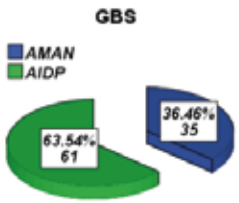


Fig 2
Frequency distribution of GBS findings

Table 3
Frequency distribution of 7th cranial nerve palsy

		Frequency	Percent
7th Cranial nerve palsy	Yes	6	6.3
	No	90	93.8
	Total	96	100.0

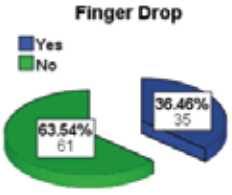


Fig 3
Frequency distribution of finger drop sign

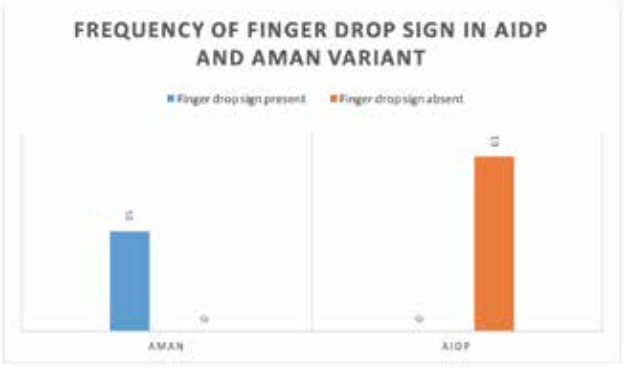


Fig 4
Frequency of finger drop sign in AIDP and AMAN variant

Table 4
Summary statistics of AMAN & AIDP variant of GBS

		Mean	SD	Minimum	Maximum
Deltoid	AMAN	2.81	0.91	0	4
	AIDP	3.99	0.81	2	5
Biceps	AMAN	2.90	0.86	1	4
	AIDP	4.00	0.86	1	5
Muscles causing wrist extension (including extensor carpi radialis longus (ECRL), extensor carpi radialis brevis (ECRB), extensor digitorum (ED), extensor digiti minimi (EDM), extensor carpi ulnaris (ECU), extensor indicis (EI).)	AMAN	2.59	0.81	1	4
	AIDP	4.53	3.32	1	22
Iliopsoas	AMAN	2.62	0.95	0	4
	AIDP	3.84	0.97	1	5
Quadriceps	AMAN	2.77	0.95	1	4
	AIDP	3.96	0.87	2	5
Tibialis anterior	AMAN	2.86	0.91	1	4
	AIDP	4.02	0.94	2	5

Table 5
Comparison of finger drop and GBS variant

		GBS		Total	p-value
		AMAN	AIDP		
Finger drop	Yes	35	0	35	<0.001
		100.0%	0.0%	36.5%	
	No	0	61	61	
		0.0%	100.0%	63.5%	
Total		35	61	96	
		100.0%	100.0%	100.0%	

Table 6
Comparison of GBS variant with cranial nerve palsy

		GBS		Total	p-value
		AMAN	AIDP		
7th Cranial nerve palsy	Yes	1	5	6	0.411
		2.9%	8.2%	6.2%	
	No	34	56	90	
		97.1%	91.8%	93.8%	
Total		35	61	96	
		100.0%	100.0%	100.0%	

DISCUSSION:

GBS is the most common cause of acute or sub-acute generalized paralysis in clinical practice. The Guillain-Barre syndrome (GBS) is a disease of the peripheral nervous system that is characterized by segmental demyelination and infiltration of mononuclear cells in peripheral nerves, nerve roots and deposition of complement with axonal degeneration in severe lesions.[7] The subtypes of GBS have different incidence rates in different parts of the world. In Europe and North America AIDP is dominant contributing to 90% of the cases. In contrast in China and Japan AMAN being the most common subtype. [8] This present cross sectional study was carried out at department of Neurology, PIMS, Islamabad to determine frequency of AMAN and AIDP variant of GBS and to determine frequency of finger drop sign among AMAN and AIDP variant of GBS The picture is intermediate when we look at other population. In Indian series the incidence of AIDP and AMAN are virtually equal although AMAN is more common in younger patients. There seems to be a slight preponderance of AIDP in studies by Gupta et al [9] and by Meena et al (unpublished data from NIMS, Hyderabad).[9] In this study AMAN variant of GBS was noted in 35(36.46%) patients and AIDP variant of GBS was noted in 61(63.54%) patients. The finger drop was found in 35(36.46%) patients.
GBS includes many subtypes such as AIDP, AMAN, FS, Bickerstaff's brain stem encephalitis-GBS, etc. AIDP and AMAN was referred frequently in the previous reports [10-12]. Report from northern China suggest that AMAN accounts for approximately 65% of patients with GBS [13]. In another study, Ye Y, et al reported that AMAN accounts for 33% in northeast China. [12] Muhammad Babar Khan et al [14] done a study on frequency of axonal variants of Guillain-Barre syndrome in Pakistan. The author resulted that variants of Guillain-Barre Syndrome were AIDP in 24(60%) patients followed by AMAN in 12(30%) and AMSAN in 4(10%) patients. Islam et al [15] and Shafqat et al [16] show that in our region the axonal variants of GBS are common. Most experience with the generalized axonal forms of GBS, AMAN and AMSAN, indicates that recovery is prolonged, complete resolution of weakness is uncommon and response to conventional therapy is not very encouraging [17]. As a group, patients with AMAN have a more rapid progression of weakness to an earlier nadir than in AIDP resulting in prolonged paralysis and respiratory failure over a few days. [17] According to this study the in GBS variant AMAN the finger drop was found in 35(100%) patients whereas in GBS variant AIDP the finger drop was not found in even a single patient (p-value<0.05). This study showed that among GBS variant AMAN the cranial nerve palsy was observed in 1(2.9%) patients whereas among GBS variant AIDP the cranial nerve palsy was observed in 5(8.2%) patients. This difference was statistically insignificant. I.e. p-value>0.411 Arun George et al [3] presented in their study that there were 12 cases of AMAN out of a total of 84 cases of GBS. All AMAN patients showed a characteristic pattern of hand weakness predominant weakness of finger extensors with relatively normal power in finger flexors, wrist flexors and extensors. Proximal limb weakness was mild and was present in 85% cases. Among 84 cases of all variant of GBS AMAN represent 14.2% [3] of cases and AIDP 78.5% [3] of cases. 100% of AMAN variant showed finger drop sign and none of AIDP variant has finger drop sign. Studies showed that Patients with AMAN were considered to have greater long-term disability [18] whereas patients with AIDP were generally at high risk for rapid deterioration and need of mechanical ventilation. [19]

CONCLUSION:

According to this study approximately one third of the patients had AMAN variant and two third of the patients had AIDP variant of GBS. Finger drop is peculiar sign, noted in all patients presented with AMAN variant of GBS.

References:

1. Yuki N, Hartung H-P. Guillain–Barré syndrome. New England Journal of Medicine 2012;366(24):2294-304.

2. Sudulagunta SR, Sodalagunta MB, Sepehrar M, Khorram H, Raja SKB, Kothandapani S, et al. Guillain-Barré syndrome: clinical profile and management. GMS German Medical Science 2015;13.

3. George A, Abdurehiman P, James J. " Finger drop sign" in Guillain-Barré syndrome. Neurology India 2009;57(3):282.

4. Kuwabara S, Yuki N. Axonal Guillain-Barré syndrome: concepts and controversies. The Lancet Neurology 2013;12(12):1180-8.

5. Yadegari S, Nafissi S, Kazemi N. Comparison of electrophysiological findings in axonal and demyelinating Guillain-Barre syndrome. Iranian journal of neurology 2014;13(3):138.

6. Brizzi KT, Lyons JL. Peripheral nervous system manifestations of infectious diseases. The Neurohospitalist 2014;4(4):230-40.

7. Balmasova I, Timchenko O, Morozova E, Gul'tyaev M, Yushchuk N. Immunological aspects of pathogenesis of Guillain-Barre syndrome. Immunology 2010;1:38.

8. McKhann G, Cornblath D, Griffin J, Ho T, Li C, Jiang Z, et al. Acute motor axonal neuropathy: a frequent cause of acute flaccid paralysis in China. Annals of neurology 1993;33(4):333-42.

9. Sinha S, Prasad K, Jain D, Pandey C, Jha S, Pradhan S. Preceding infections and anti-ganglioside antibodies in patients with Guillain–Barré syndrome: a single centre prospective case-control study. Clinical microbiology and infection 2007;13(3):334-7.

10. Hadden R, Cornblath D, Hughes R, Zielasek J, Hartung HP, Toyka K, et al. Electrophysiological classification of Guillain-Barré.

11. Omejec G, Podnar S. Retrospective analysis of Slovenian patients with Guillain Barré syndrome. Journal of the peripheral nervous system 2012;17(2):217-9.

12. Hughes R, Newsom-Davis J, Perkin G, Pierce J. Controlled trial of prednisolone in acute polyneuropathy. The Lancet 1978;312(8093):750-3.

13. Jacobs BC, Koga M, van Rijs W, Geleijns K, van Doorn PA, Willison HJ, et al. Subclass IgG to motor gangliosides related to infection and clinical course in Guillain–Barré syndrome. Journal of neuroimmunology 2008;194(1-2):181-90.

14. Khan MB, Muhammad WW, Nawaz KH, Ahmad I, Yousaf MA, Ahmad N, et al. Frequency of axonal variants of Guillain-Barre syndrome in Pakistan. Pakistan Armed Forces Medical Journal 2011;61(3).

15. Islam Z, Jacobs B, van Belkum A, Mohammad Q, Islam MB, Herbrink P, et al. Axonal variant of Guillain-Barre syndrome associated with Campylobacter infection in Bangladesh. Neurology 2010;74(7):581-7.

16. Shafqat S, Khealani B, Awan F, Abedin S. Guillain–Barré syndrome in Pakistan: similarity of demyelinating and axonal variants. European journal of neurology 2006;13(6):662-5.

17. Hiraga A, Mori M, Ogawara K, Hattori T, Kuwabara S. Differences in patterns of progression in demyelinating and axonal Guillain–Barré syndromes. Neurology 2003;61(4):471-4.

18. Hughes R, Hadden R, Rees J, Swan A. The Italian Guillain-Barré Study Group. The prognosis and main prognostic indicators of Guillain-Barré syndrome: a multicentre prospective study of 297 patients. Brain: a journal of neurology 1998;121(4):767-9.

19. Durand M-C, Porcher R, Orlikowski D, Aboab J, Devaux C, Clair B, et al. Clinical and electrophysiological predictors of respiratory failure in Guillain-Barré syndrome: a prospective study. The Lancet Neurology 2006;5(12):1021-8.

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Author's contribution:
Iqra Athar; data collection, data analysis, manuscript writing, manuscript review
Neelam Naz Khattack; data collection, data analysis, manuscript writing, manuscript review
Haris Majid Rajput; concept, data analysis, manuscript writing, manuscript review
Mazhar Badshah; data collection, data analysis, manuscript review
Zukhruf Zayian; data collection, data analysis, manuscript review
Tashfain Shifa; data collection, data analysis, manuscript review