Guillian –Barre' Syndrome: A frequent cause of Acute Flaccid Paralysis in Diyala Governorate, 2011-2015

Salwa S Abdul-Wahid Al-Kinani
PhD

Abstract

Back ground: Acute flaccid paralysis (AFP) is a clinical syndrome characterized by rapid onset of muscles weakness and less frequently muscles of respiration. Guilliain -Barré syndrome (GBS) is included in the differential diagnosis AFP.

Objectives: To identify the incidence of acute flaccid paralysis (AFP), to determine what proportion of acute flaccid paralysis due to Guillain-Barre syndrome, and to define some demographic and epidemiologic determinants of AFP cases in Diyala Governorate during the years 2011-2015 .

Materials and Methods: This is a retrospective study that reviewed all AFP cases reported during the period years 2011-2015 (no=185) admitted to the pediatric hospitals in Diyala Governorate or AFP cases reported in other governorates referred to Diyala. This study reviewed all available investigation, clinical and virological data including all reports and records of the 60 days Committee, which determined the final classification of all cases fulfilled the criteria for AFP.

Results: Revealed that the incidence rate of AFP in Diyala Governorate was (6.11/100,000 <15 years), the highest incidence rate was (7.07/100,000 <15y) in Baquba-1 district and the least was (3.77 /100,000 <15 y) in Khanakin district. GBS represented (15.7%) of total AFP cases, with incidence rate 1.3/ <15 year. The results also revealed that increased cases at age groups less than 9 years, mainly among males, with highly significant differences. While no significant difference with respect to subject of residency. In addition to that results shows that high significant differences among observed AFP cases at temperate weather, Meningitis, oral polio vaccine (OPV) doses, and with final outcome.

Conclusion: GBS is a frequent cause for AFP, although it is preceded by meningitis. AFP incidence in agreement with results of other studies. This study recommended more emphasis in regard to precision and accuracy in diagnosis of other causes of AFP cases.

Keywords: Acute flaccid Paralysis (AFP); Gillian Barre' Syndrome (GBS); AFP Surveillance; Diyala, 2011-2015.

Introduction:

The term acute flaccid paralysis (AFP), is a clinicalmanifestation characterized by rapid onset of weakness or paralysis and reduced muscle tone (less frequently muscles of respiration), without other obvious cause[1] . It is the most common clinical presentation of acute polio virus infection, occurring in 0.1–1% of infected cases[2]. AFP surveillance has been used world-wide to monitor the control and eradication of circulating wild poliovirus. However, successful elimination of wild-type poliovirus in much of the world has highlighted the importance of other causes of AFP[3].

Highly sensitive surveillance for AFP, cases including immediate case investigation and collection of two stool samples within 14 days of onset of paralysis for virus isolation are critical for the detection of wild poliovirus circulation with the ultimate objective of polio eradication[4]. AFP surveillance is also critical for documenting the absence of poliovirus circulation for polio-free certification. Included in AFP's list are paralytic poliomyelitis, GBS, transverse myelitis, encephalitis, meningitis, traumatic neuritis, tumors, and Reye's syndrome[5].

Guilliain-Barré syndrome(GBS) also known as Acute Inflammatory Demyelinating Polyneuropathy (AIDP) [6,7]. The first symptoms of this disorder include varying degrees of weakness or tingling sensations in the legs. In many instances the symmetrical weakness and abnormal sensations spread to the arms and upper body [8]. These symptoms can increase in intensity until the person is almost totally paralyzed[9]. In these cases the disorder is life threatening interfering with breathing, blood pressure or heart rate. GBS is usually triggered by viral or bacterial infection[10]. Certain proteins or peptides in viruses and bacteria may be the same as those found in myelin, and the generation of antibodies to neutralize the invading viruses or bacteria could trigger the attack on the myelin sheath[2]. As noted previously, neurological scientists, immunologists, virologists, and pharmacologists are all working collaboratively to learn how to prevent this disorder and to make better therapies available when it strikes [1]. Since there is no reference test that would allow for a positive confirmation of the diagnosis of GBS, it has been difficult to establish accurate epidemiologic data. GBS affects between 1 to 3 individuals per 100,000 persons, with males being 1.5 times more likely to be affected [6]. The condition has been reported worldwide in all age groups, with the incidence increasing linearly with age.The peak incidences occur at late adolescence and in the elderly. The annual incidence in patients over age 70 years increases to 8.6 in 100,000 people[1].

Theobjective of this study was to estimate the incidence of acute flaccid paralysis in Diyala Governorate, determine the proportion of GBS and

most frequent causes for AFP cases, and to determine the association between AFP, GBS and some demographic and epidemiologic factors in Diyala for the period 2011 - 2015.

Material and Methods:

A retrospective study that reviewed all notified cases of AFP, in Diyala Governorate during the period from the first of January 2011 to 31st December 2015. The researcher reviewed all available clinical and virological data for included cases in addition to 60- days' examination Committee' records, which determined the final classification of all AFP cases.

Statistical analysis:

Including statistical Tables (Frequencies, and Percentage), Graphical presentation, testing hypotheses based on Chi-Square, Binomial tests, and testing method are based on Contingency Coefficient.

Results:

Table 1: Distribution of Diyala' population and incidence rate of AFP cases according to Diyala' districts for the years 2011-2015.

Districts	Total population	< 15 Y population	AFP cases /District during 5 years	
			No	%
Baqubah-1	339,446	135,778	48	25.9
Baqubah-2	255,320	102,128	30	16.2
Al - Khalis	209,990	83,996	26	14.2
Al-Moqdadia	274,079	109,632	38	20.5
Beladruze	210,560	84,224	26	14.1
Khanakin	132,540	53,016	10	5.4
Al - Mansoria	90,802	36,321	7	3.8
Total	1,512,737	605,095	185	100

Table 2: Acute Flaccid Paralysis incidence rate in Diyala Governorate for the period 2011-2015.

Districts	Incidence rate AFP /100,000 < 15 year	Incidence rate AFP /100,000 total population
Baqubah-1	7.07	2.83
Baqubah-2	5.87	2.35
Al - Khalis	6.19	2.48
Al-Moqdadia	6.93	2.77
Beladruze	6.17	2.47
Khanakin	3.77	1.51
Al - Mansoria	3.85	1.54
Total	6.11	2.45

Table 3: Distribution of the studied sample according to socio-demographic characteristics (SDC) characteristics with comparisons significant

SDC.	Classes	No.	%	C.S. (*)
Age Groups Yrs.	< 1 yr.	60	32.4	χ^2= 86.703 P=0.000 (HS)
	1 _ 4	68	36.8	
	5 _ 9	40	21.6	
	10 _ 14	15	8.1	
	≥ 15 yrs.	2	1.1	
Gender	Male	118	63.8	P=0.000 HS
	Female	67	36.2	
Residency	Urban	89	48.1	P=0.659 NS
	Rural	96	51.9	

Table 4: Distribution of the AFP cases according to studied Parameters

Parameters	Classes	No.	%	C.S. (*)
Date of onset (Season)	Summer	33	17.8	χ^2= 14.589 P=0.002 (HS)
	Autumn	47	25.4	
	Winter	38	20.5	
	Spring	67	36.2	
Diagnosis	GBS*	39	21.1	χ^2= 82.859 P=0.000 (HS)
	Encephalitis	11.4	11.4	
	Meningitis	59	31.2	
	Peripheral Neuritis	14	7.6	
	others	52	28.1	
Number of polio vaccine doses	Non vaccinated	15	8.1	χ^2= 35.103 P=0.000 (HS)
	one time	25	13.5	
	two times	28	15.1	
	three times	53	28.6	
	four times	19	10.3	
	fife times	23	12.4	
	six times and more	22	11.9	
GBS Final outcomes	Recovery	20	68.0	χ^2= 329.27 P=0.000 (HS)
	Residual weakness	5	17.3	
	Death	4	13.7	

***GBS incidence rate 1.3 <15 y & 0.5/ Total population**

Discussion

To my knowledge, this is the second study in Iraq, based on reviewing AFP cases reported during the period from January 2011 to December 2015. The present study was strengthened by the contact with the patients' family depending on the mobile numbers documented in their case investigation forms, to ask about the clinical progression of his condition, with advice to consult a neurologist for those who complain residual weakness. The first nationwide study, Jasemet.al.(2013), found that GBS represented 52.5% of AFP cases reported in Iraq during 15 years, with an incidence of 1.33 case/100,000 population < 15 years/year. There was a higher incidence in the Southern provinces, age group 1-4 years, males, and outside the capital city of province, with no significant seasonal variations (p = .22). While the present study reported (21.1%) for GBS during last 5 years, with agreement to its incidence rate as the present study reported same result (1.3/100,000 <15y) . Regarding seasonality there was disagreement with Jasemet.al study as the present study found high significant difference (P<0.002) between AFP cases and seasonality. Cumulative incidence of residual paralysis for patients living inside the capital city was .21 (95% CI: .18-.24), versus .27 (95% CI: .25-.29) for those living outside (p < .001). While the present study revealed cumulative incidence of residual paralysis for total patients with GBS was 17.3%, with (13.7%) death rate [6].

Halawa et. al, conducted their prospective study of all children with GBS (no = 50) admitted to pediatric Cairo University Hospital / Egypt, between January 2006 and June 2007 (70.42% of all acute flaccid paralysis patients during this period). Upper respiratory infection was the most common preceding event (24%) while only (8%) reported antecedent oral polio vaccine. Forty two percent of patients had poor outcome with 16% deaths. In comparison with the present study GBS proportion was higher in, Halawaet.al.' study, with approximately similar death rate [11]. Anis et.al. revealed that Guillain-Barre Syndrome and enteroviral encephalopathy were the two leading causes of AFP. Children of age groups 12 to 24 months and > 96 months constituted the majority (20% each). Guillain-Barre syndrome was the leading cause of acute flaccid paralysis reported from various parts of Hazara division. There is similarity in regard to age groups affected with GBS with the present study, with disagreement in regard to leading cause of AFP cases [14, 3].

In their observational study conducted from January 2000 to December 2010 at the Kurdistan Center for Disease Control and the Department of Pediatrics, Jafar et al. reported that GBS was the most frequent final diagnosis, followed by Transverse Myelitis and Encephalitis [9]. Viruses were detected in (14.0%) of the AFP cases, with non-polio enteroviruses (NPEV) (60.0%) and adenoviruses (31.4%) accounted for most of the positive detections. Most performance indicators set by the WHO were fulfilled. There is an agreement with the present study in regard to age group, all cases classified as non-polio AFP. Virus detection may be found in cases classified as

encephalitis and meningitis, as the present study emphasis on GBS and rate of other causes for non-polio AFP cases [5]. In an attempt to determine the types of non-polio enteroviruses (NPEVs) in AFP cases in Iran, Shohrehet.al. detected enterovirus 71 (EV71) in an AFP case with residual paralysis for the first time. [13].

To investigate meningitis as a cause for AFP, Tuet.al. detected that 3 of 186 pediatric patients with acute bacterial meningitis presented with acute flaccid paralysis due to myelopathy. The present study reported higher rate for meningitis as a cause for AFP .The high rate of meningitis as a cause for AFP in the present study may be attributed to other causes as the diagnosis not precisely reported 7. James et.al.evaluated AFP that developed in seven patients in the setting of acute West Nile virus (WNV) infection. The researchers reported that WNV infection should be considered in patients with acute flaccid paralysis 8. Krishna et. al.reported that 90% of AFP were diagnosed as GBS, 7.4% diagnosed as transverse myelitis and 3.7% diagnosed as idiopathic neuropathy. The results of the present study revealed less percentage for GBS10. GBS patients face not only physical difficulties, but emotionally painful periods as well. It is often extremely difficult for patients to adjust to sudden paralysis and dependence on others for help with routine daily activities. Patients sometimes need psychological counseling to help them adapt15.

Conclusion:

GBS is a frequent cause for AFP, although it is preceded by meningitis. AFP incidence was in agreement with results of other studies inside and outside Iraq. AFP cases reported more among males and age groups less than 9 years. This study recommended more emphasis on AFP surveillance and emphasis on accurate diagnosis of the causes of AFP cases.

References

1- James J. Sejvar,[*]Kim A. Lindblade, WencesArvelo, Norma Padilla, Kimberly Pringle, Emily Zielinski-Gutierrez, Eileen Farnon, Lawrence B. Schonberger, and Erica Dueger. Clinical Assessment of Self-Reported Acute Flaccid Paralysis in a Population-Based Setting in Guatemala. Am J Trop Med Hyg . 2010 Apr; 82(4): 712–716.

2- KiranPanesar. Guillain-Barré Syndrome. US Pharm. 2014;39(1):35-38. Anis-ur-Rehman, Idris M, Elahi M, Jamshed, Arif A. GuillainBarre Syndrome: the leading cause of acute flaccid paralysis in Hazara division. J Ayub MedColl Abbottabad. 2007 Jan-Mar;19 (1):26-8.

3- Molinero MR, Varon D, Holden KR, Sladky JT, Molina IB, Cleaves F. Epidemiology of childhood Guillain-Barre syndrome as a cause of acute flaccid paralysis in Honduras: 1989-1999.J Child Neurol. 2003 Nov; 18(11):741-7.

4- James P. Alexander Jr., Howard E. Gary Jr. Mark A. Pallansch. Duration of Poliovirus Excretion and Its Implications for Acute Flaccid Paralysis Surveillance: A Review of the Literature. The Journal of Infectious Diseases.1997; 175(issue supplement 1): S176-S182.

5- National Committee for the Certification of Wild Poliovirus Eradication in Hong Kong. Fifteen years of acute flaccid paralysis surveillance in Hong Kong: findings from 1997 to 2011.J Pediatric Child Health. 2014 Jul; 50 (7):545-52.

6- Jasem J, Marof K, Nawar A, Khalaf Y, Aswad S, Hamdani F, Islam M, Kalil A. Guillain-Barre syndrome as a cause of acute flaccid paralysis in Iraqi children: a result of 15 years of nation-wide study.BMC Neurol. 2013 Dec; 10 (13):195.

7- Tu YF, Chang YC, Chen CY, Huang CC. Acute flaccid paralysis due to myelopathy in childhood bacterial meningitis. Acta Paediatr Taiwan. 2004 May-Jun; 45(3):158-62.

8- James J. Sejvar,[;]A. Arturo Leis; Dobrivoje S. Stokic,[;] Jay A. Van Gerpen,[;]Anthony A. Marfin; Risa Webb; Maryam B. Haddad; Bruce C. Tierney; Sally A. Slavinski,[;] Jo Lynn Polk; Victor Dostrow; Michael Winkelmann; and Lyle R. Petersen. Acute Flaccid Paralysis and West Nile Virus Infection. Emerg Infect Dis. 2003 Jul; 9(7): 788–793.

9- Jafar Soltani; Nader Esmailnasab; Daem Roshani; Mohamad Karimi;; Mohamad-Jamil Amjadi. Acute Flaccid Paralysis and Its Differential Diagnosis in Kurdistan Province, Western Iran; an 11-Year Surveillance. Iran J Pediatr. 2014 ; 24(2): 131–139.

10- Krishna Sagarsharma, Rupa Singh, Gauri Shankar Shah. Guillain-Barre Syndrome: Major Cause of Acute Flaccid Paralysis in Children &Adolescents of Nepal. Journal of Nepal Pediatric Society.2011; 31(2):93-97.

11- Eman F. Halawa; Dalia Ahmed ; Mona A.F. Nada. Guillain-Barre syndrome as a prominent cause of childhood acute flaccid paralysis in post-polio eradication era in Egypt. European Journal of Child Neurology. May 2011; Volume 15(3): 241–246.

12- Kiran Panesar, B PharmS (Hons), MR Pharm S, RPh, CPh, MPSK. Guillain-Barre Syndrome. US Pharmacist. 2014; 39(1):35-38.

13- Shohreh Shahmahmoodi; Zahra Mehrabi; Mohammad Reza Eshraghian; Talat Mokhtari Azad; Hamideh Tabatabaie; Maryam Yousefi; KobraFarrokhi; Mohammad Mehdi Gouya; Abolreza Esteghamati; Taha Moosavi; Mohsen Zahraie; Katayoon Samimi Rad; Zahra Shokati;

Rakhshandeh Nategh. First detection of enterovirus 71 from an acute flaccid paralysis case with residual paralysis in Iran. Journal of Clinical Virology. 2008; Volume 42 (4): 409–411.

14- Anis-ur-Rehman, Idris M, Elahi M, Jamshed, Arif A. Gillian Barre Syndrome: the leading cause of acute flaccid paralysis in Hazara division. J Ayub MedColl Abbottabad. 2007 Jan-Mar;19 (1):26-8.

15- Nina Junttila; Nicolas Lévêque; Jean Pierre Kabue; GaëlleCartet; Fidèle Mushiya; Jean-Jacques Muyembe-Tamfum; Aurélien Trompette; Bruno Lina; Lars O. Magnius; Jean-Jacques Chomel.New entero-viruses, EV-93 and EV-94, associated with acute flaccid paralysis in the Democratic Republic of the Congo. Journal of Medical Virology. 2007; 79(4):393-400.

** *Dyiala College of Medicine*