

An Analytical Study of Acute Flaccid Paralysis in a Tertiary Care Centre.

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Abstract:

Objective: To analyze the incidence, etiology, clinical features, management and short term outcome of Acute Flaccid Paralysis.

Design: Prospective observational cross sectional descriptive study.

Setting: All the patients diagnosed as Acute Flaccid Paralysis admitted in pediatric wards and ICU of Institute for Women and Child Health, Niloufer Hospital, Osmania Medical College, Hyderabad were taken for the study for a period of 1 year (from Jan 2011 to Dec 2011).

Participants: Over a period of 12 months, 32 cases of Acute Flaccid Paralysis from the age of 6 months to 12 years who were admitted in pediatric wards and ICU were included in the study. Those who suffered with diarrhea and improved with electrolyte correction were excluded from the study.

Methods: Clinical data was collected with the prescribed proforma. All cases with acute illness with Flaccidness were taken. ENMG, CSF analysis and 2 stool sample analysis were done for all AFP cases.

Results: In this study of 32 AFP cases, 14 are GBS, 13 are Non Polio AFP and 5 are transversemyelitis. The M:F ratio in GBS was 1.3:1. In Non Polio AFP M:F ratio was 1.13:1 and in transversemyelitis the M:F ratio was 1:1.5. In this study the respiratory involvement was seen in 7 cases out of 14 cases of GBS. The p value is 0.03 suggests that respiratory failure is most significant and serious complication. In 5 cases of transversemyelitis, the bowel and bladder involvement was noted. The p value was 0.001 for bladder involvement in transversemyelitis.

Conclusion: Male patients were more affected than female patients and most cases were reported during April to September months.

Key words: AFP¹, GBS², Transversemyelitis³, non Polio AFP, respiratory paralysis.

I. Introduction

Acute Flaccid Paralysis¹ (AFP) is a syndrome characterized by rapid onset of weakness of an individual's extremities, often including weakness of the muscles of respiration and swallowing, progressing to maximum severity within 1-10 days. The term "flaccid" indicates the absence of spasticity or other signs of disordered central nervous system (CNS) motor tracts such as hyper reflexia, clonus or extensor plantar responses.

Causes of AFP

AFP occurs in the course of:

1. Acute anterior Poliomyelitis caused by Poliovirus, other neurotropic viruses e.g. Coxsackie virus, Echo viruses and Enteroviruses 70 and 71.
2. Acute myelopathy, space occupying lesion, spinal block, e.g. due to paraspinal abscess, tumor or hematoma and/or idiopathic acute transverse myelopathy
3. Peripheral neuropathy, Guillian - Barre syndrome, Acute Demyelinating Encephalomyelitis (ADEM), Multiple Sclerosis, Transversemyelitis, Acute axonal neuropathy, Post Rabies vaccine neuropathy
4. Systemic diseases, Acute intermittent porphyria, Critical illness neuropathy
5. Disorders of neuromuscular transmission due to Myasthenia gravis, snake bite, Botulism, Insecticide intoxication, Tick paralysis
6. Disorder of muscles, Idiopathic inflammatory myopathy, Trichinosis, Hypokalemic and Hyperkalemic familial periodic paralysis.
7. Asthmatic Amyotrophy (Hopkin's Syndrome)

Up to 2000 A.D. Poliomyelitis is the leading cause of AFP. Later GBS cases became the leading cause after Polio cases declined to zero status.

II. Patients And Methods

A prospective observational descriptive study was designed to analyze the incidence of AFP cases, etiology, clinical features, management and short term outcome of AFP cases. This is a hospital based prospective observational study conducted over a period of 12 months, from January 2011 to December 2011 at Institute of Women and Child Health, Niloufer Hospital, Osmania Medical College, Hyderabad. All the children from 6 months to <12 years old with acute flaccid paralysis in one or more limbs with absent or diminished reflexes without upper motor signs were included in the study. Informed consent was taken from the parents/guardians of the patients. The approval of the ethical committee of Osmania Medical College, Hyderabad, was taken for the study.

Inclusion criteria:

Children from 6 months to <12 years old with acute flaccid paralysis in one or more limbs with absent or diminished reflexes without upper motor signs were included.

Exclusion criteria:

Children with diarrhea with dyselectrolytemia with acute flaccid weakness who recovered following electrolyte abnormalities were excluded from the study.

The following proforma was followed for entering all the Acute Flaccid Paralysis cases. For each and every case of Acute Flaccid Paralysis detailed history and meticulous clinical examination was done and all cases were subjected to ENMG. In all cases CSF was drawn and also under mentioned tests were performed as per case requirement. Two stool samples were sent for analysis in coordination with AFP Surveillance Medical officer. Statistical analysis was performed applying MICROSOFT EXCEL 2007.EPI. INFO.3.5.3.

Proforma:

Name: IP No:
Age: Sex:
Address:
Date of illness:
History of present illness:
Weakness: onset: Progression:
H/O of Intramuscular injections prior to the onset of weakness:
H/O fever on day or prior to onset of paralysis:
Sensory symptoms:
Cranial nerve involvement:
Sphincter involvement:
Unsteady gait:
Breathlessness:
Miscellaneous:
Past history:
H/O antecedent illness: Y/N H/O vaccination: Y/N
H/O similar complaints in the past: Y/N H/O surgery: Y/N
Family history:
Antenatal history:
Postnatal history:
Developmental History:
Immunization History: BCG, OPV, DPT, Measles and other vaccinations
Feeding history:
Examination:
General Examination:
Anemia, Jaundice, Cyanosis, Clubbing, Pedal edema, Lymphadenopathy
Anthropometry:
Weight: Height:
Head circumference: chest circumference:
Vital data:
Temperature: Pulse Rate:
Blood Pressure: Respiratory Rate:
CNS Examination:
Higher mental functions:
Abnormal Behavior: Consciousness:

Orientation: Memory:
 Speech: Hallucinations:
 Cranial nerves:
 Motor system: Right Left
 UL UL
 LL LL
 Bulk/ Nutrition: Tone:
 Power: Proximal Distal Trunk Neck
 Reflexes:
 Deep Superficial
 Sphincters:
 Sensory system:
 Co-ordination:
 Autonomic function tests;
 Resting heart rate: Resting Blood Pressure:
 Involuntary movements:
 Gait:
 Spine & Cranium:
 Other systems:
 Provisional diagnosis:
 Investigations:
 CBP - Hb% TC DC
 ESR RFT
 Serum Electrolytes
 RBS HIV & Hepatitis B
 CSF - proteins, cell count, sugar
 CXR, ECG, ENMG, MRI brain and spine were performed as per the need and availability.

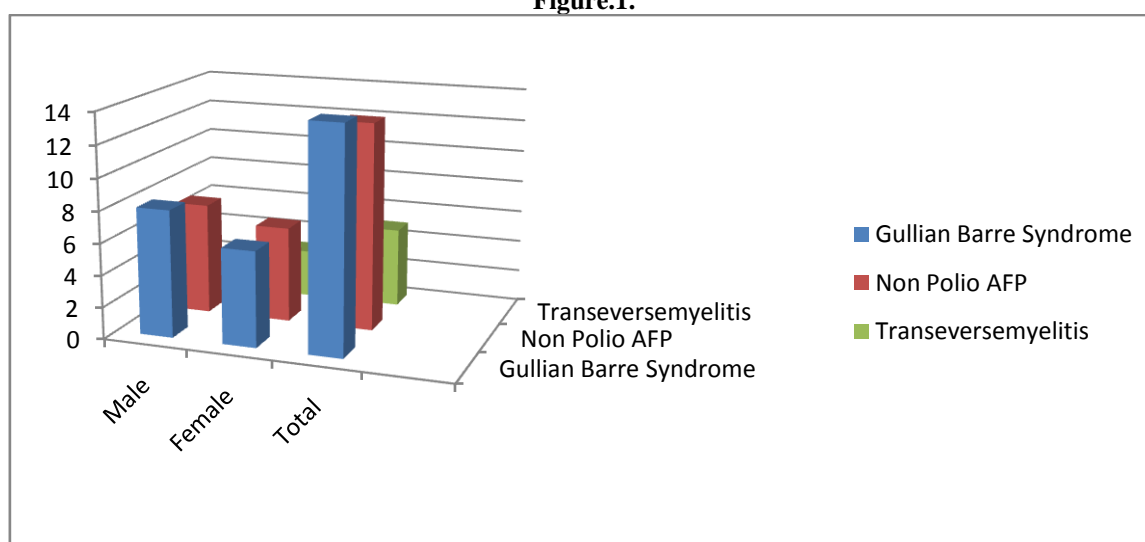
III. Observations And Results

This study comprised of 32 children, out of which 17(53.10%) were male and 15(46.90%) were female. The M: F ratio was 1.13:1. Majority of children belonged to the age group between 1-8 years. Out of 32 patients 22 were less than 8 years of age. This is 71.875% of total cases.

Table.1. Age and Sex distribution:

Sex	Age<5 years	5-8 years	9-12 years	Total
Male	5(15.70%)	6(18.70%)	6(18.70%)	17(53.10%)
Female	6(18.80%)	5(15.57%)	4(12.53%)	15(46.90%)
Total	11(34.375%)	11(34.375%)	10(31.25%)	32(100%)

Figure.1.

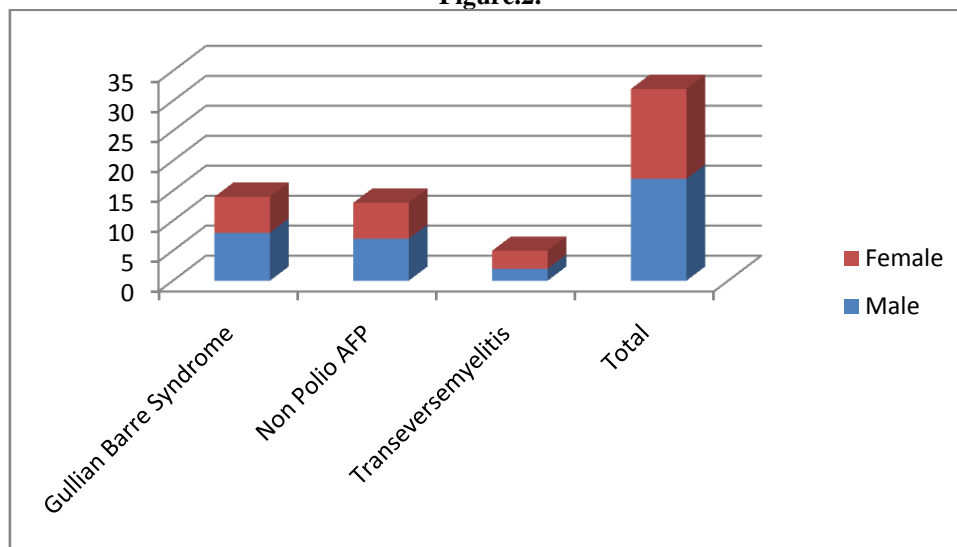


In our study the male to female ratio in Gullian Barre Syndrome is 1.3:1, in non Polio AFP 1.13:1 and in transversemyelitis the ratio is 1:1.5 respectively.

Table.2. Sex Distribution:

Cases	Male	Female	Total
Gullian Barre Syndrome	8(25%)	6(18.75%)	14(47.75%)
Non Polio AFP	7(21.875%)	6(18.75%)	13(40.675%)
Transversemyelitis	2(6.25%)	3(9.375%)	5(15.625%)
Total	17(53%)	15(47%)	32(100%)

Figure.2.



In 14 cases of Gullian Barre Syndrome 8 were male and 6 were female. The male to female ratio is 1.3:1.

Preceding illness:

Out of 32cases of AFP, 24 (75%) had some antecedent event prior to the development of Acute Flaccid Paralysis. In GBS, illness prior to weakness was noted in 10(78.6%) cases out of 14 GBS cases. In Non Polio AFP 10(76.9%) out of 13 and in Transverse myelitis 80% of the cases suffered from prodromal symptoms.

Table.3. Flaccid Paralysis following illness:

Clinical Illness	Number of cases	Total
GBS	10 (76.92%)	14
Non Polio AFP	10(71.42%)	13
Transversemyelitis	4 (80%)	5

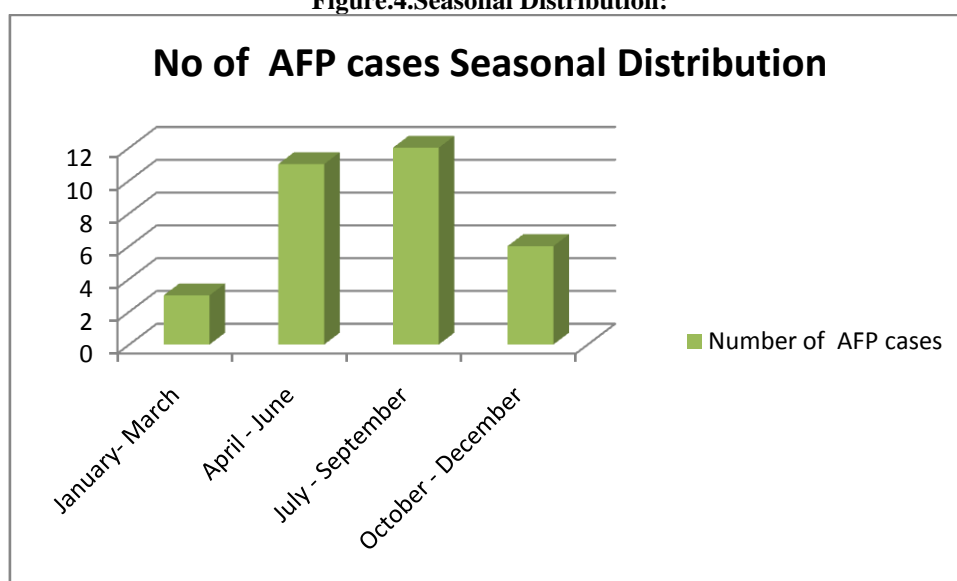
Seasonal Distribution:

It was observed that, 23 cases of AFP were reported between April to September. There were more incidences of cases in the autumn and rainy season than winter.

Table.4. Seasonal Distribution:

Months	Number of AFP cases
January- March	3
April - June	11
July - September	12
October - December	6

Figure.4.Seasonal Distribution:



In the present study, out of 14 cases of GBS, 7(50%) cases presented with respiratory failure and were ventilated. In our study the cranial nerve involvement like bulbar palsy and facial weakness was observed in 7(50%) cases. In non Polio AFP there was no involvement of cranial nerves, bladder and sensory system. In this study no case presented with respiratory paralysis in non polio AFP and transversemyelitis.

Table.5. Respiratory involvement in the present study:
Diagnosis Respiratory Cross tabulation

			Respiratory		Total
			Involved	Not involved	
Diagnosis	Gullian Barre Syndrome	Count	7	7	14
		% within diagnosis	50.00%	50.00%	100%
		% within respiratory	100%	28.00%	43.80%
		% of Total	21.90%	21.90%	43.80%
	Non Polio AFP	Count	0	13	13
		% within diagnosis	0%	100%	100%
		% within respiratory	0%	52.0%	40.6%
		% of Total	0%	40.6%	40.6%
	Transversemyelitis	Count	0	5	5
		% within diagnosis	0%	100.0%	100.0%
		% within respiratory	0%	20.0%	15.6%
		% of Total	0%	15.6%	15.6%
TOTAL		Count	7	25	32
		% within diagnosis	21.9%	78.1%	100.0%
		% within respiratory	100.0%	100.0%	100.0%
		% of Total	21.9%	78.1%	100.0%

Table.6.Chi - square Tests

	Value	df	Asymptomatic Sig.(2-sided)
Pearson Chi- Square	11.520	2	0.003
Likelihood Ratio	14.212	2	0.001
Linear by linear Association	8.713	1	0.003
No of valid cases	32		

In the present study, seven (7) patients presented with cranial nerve involvement and seven (7) presented with respiratory involvement. For cranial and respiratory involvement the p values are 0.003 and it is significant. It shows that who suffer from Gullian Barre Syndrome are more prone for respiratory involvement and cranial nerve involvement.

Out of 14 Gullian Barre Syndrome cases, in 3 cases had bowel and bladder involvement. All transversemyelitis (5) cases had bowel and bladder involvement. The p-value for bladder involvement in transversemyelitis is 0.001. It indicates that bladder is significantly involved in all transversemyelitis.

**Table.7.Bladder involvement in the study:
Diagnosis * Bladder Cross tabulation**

		Bladder		Total	
		Involved	Not involved		
Diagnosis	Gullian Barre Syndrome	Count	3	11	14
		% within diagnosis	21.40%	78.60%	100%
		% within Bladder	42.90%	44.00%	43.80%
		% of Total	9.40%	34.90%	43.80%
	Non Polio AFP	Count	0	13	13
		% within diagnosis	0%	100%	100%
		% within Bladder	0%	52.00%	40.60%
		% of Total	0%	40.60%	40.60%
	Transversemyelitis	Count	5	0	5
		% within diagnosis	100.0%	0%	100.0%
		% within Bladder	57.10%	4.00%	15.60%
		% of Total	12.50%	3.10%	15.60%
TOTAL		Count	7	25	32
		% within diagnosis	21.90%	78.10%	100.0%
		% within Bladder	100.0%	100.0%	100.0%
		% of Total	21.90%	78.10%	100.0%

Table.8.Chi - square Tests

	Value	df	Asymptomatic Sig.(2-sided)
Pearson Chi- Square	13.526	2	0.001
Likelihood Ratio	14.068	2	0.001
Linear by linear Association	3.034	1	0.082
No of valid cases	32		

Table.9.Comparison between Non Polio AFP, GBS and Transversemyelitis

	Non Polio AFP	GBS	Transversemyelitis
Sex M:F	1.16:1	1.3:1	1:1.5
Mean age	5.38 years	6.25 years	6.01 years
April - September	10(13)	10(14)	4(5)
Fever	71.42%	76.92%	80%
Doses of OPV received	≥4	≥4	≥4
CSF Protein level (gr)	77.14±11.45	73.92±13.49	69.20±18.58

IV. Discussion

A total of 32 patients were included in this prospective observational descriptive study. The maximum numbers of patients were less than 8 years of age. In our study, 15.6% (43.6%) of patients were below 5 years in Gullian Barre Syndrome, and in Non Polio AFP it was 21.9% (40.6%).

In 32 cases of AFP, 14 (43.75%) cases were reported as Gullian Barre Syndrome. Morris et al⁴ and Whitfield K, Kelly H et al⁵ reviewed 143 cases and 40 cases respectively and from that Gullian Barre Syndrome is the most common cause. But, Parry O⁶, in his study reported only 6% of Gullian Barre Syndrome cases.

In our study, out of 14 patients 8 were male. Slightly male preponderance (53%) was noticed in our study which is in conformity with the report by Rasul CH, Das et al⁷. In this study 25 males and 23 female patients are reported out of 48 patients. Robert M.et al⁸ also showed slight male preponderance in his study. The study conducted by Aladro Benito et al⁹ also showed that in Gullian Barre Syndrome, the male incidence is higher. However, Peter C.Dowling¹⁰ study of 176 patients showed equal incidence in male and female.

In our study, 75% of patients had a definite antecedent event prior to the onset of illness. Ertem M. et al¹¹ reported that 64.3% patients experienced symptoms of viral infections. Winter et al¹² reported that over half of patients experienced symptoms of viral, respiratory and gastro intestinal infections. Ropper et al¹³ also reported a high incidence (32%) of symptoms of viral, respiratory and gastro intestinal infections.

In our study, most of the cases (23/32) (71.875%) were reported between April to September. This study is in conformity with Kaur et al¹⁴, which also reported increased incidence in summer and autumn. Peter C.Dowling¹⁰ study also noted an increased incidence in summer.

In Gullian Barre Syndrome, 50% of patients experienced some sensory symptoms, mainly in the form of pain in the lower limbs during the course of illness. Allan H. Ropper¹⁵ in his meta-analysis, he reported that 85% of cases presented with paraesthesia. In Non Polio AFP no patient suffered from the sensory symptoms. In a study by Winer et al,¹² 75% of patients had paraesthesia. Robert et al⁸ described that 83% of patients suffered from paraesthesia. So both these studies indicate that paraesthesia is the most common presentation. In our study, 7(50%) cases of Gullian Barre Syndrome suffered with respiratory failure. The P value is <0.003 which is

significant and it indicates that respiratory weakness is most serious complication of Gullian Barre Syndrome. Allan H. Ropper¹⁵ in his meta analysis showed that 10% of patients had respiratory failure. Barry gw et al¹⁶ noted 23% incidence of respiratory failure. In the study conducted by Ortiz Corredor P. et al¹⁷, more number of Gullian Barre Syndrome patients suffered from respiratory failure with long duration. The duration of mechanical ventilation in our patients was 7.43 ± 2.709 days. In our study no Non Polio AFP suffered from respiratory paralysis. In transversemyelitis also there was no respiratory involvement. In the year 1998, a study conducted by Tabarki B et al,¹⁸ showed that higher number of polio cases were below 5 years. The mean age is 3.44 years for Polio cases and the mean age in our study for Non Polio AFP is 5.4 ± 0.86 years. In another study conducted by Molinero et al¹⁹ which reported that Gullian Barre Syndrome incidence is higher in the age group between 1 - 4 years. In his study, he reported that Gullian Barre Syndrome was 15.8% in 38.7% of total number of cases. The reason for this difference is not known and is yet to be evaluated. No Vaccine Associated Paralytic Polio (VAPP) case was reported during the study. No wild polio virus was isolated during the study period.

Literacy, portable water, good hygiene, sanitation, effective vaccination, proper cold chain maintenance, effective immunization coverage, Acute Flaccid Paralysis surveillance, National Immunization Days (NIDs), and political will made the state polio free environment.

V. Conclusions

1. Acute Flaccid Paralysis cases were reported in all age groups but incidence in <8years is more.
2. Male patients were more affected than female patients.
3. Most cases were reported during April to September months.
4. All most all GBS patients showed increased levels of CSF proteins than other AFP patients.
5. GBS was the leading cause of Acute Flaccid Paralysis.
6. In GBS cases only cranial nerves were involved.

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