A Year of Surveillance of Acute Flaccid Paralysis in the Children Welfare Teaching Hospital

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Abstract

Background: Acute flaccid paralysis (AFP) is a clinical syndrome characterized by rapid onset weakness, that many times includes respiratory and bulbar weakness. AFP is a broad clinical entity with many diagnostic possibilities. An accurate and early diagnosis of the cause has important bearing on the management and prognosis. **Aims of the Study:** Find out the frequency, causes, clinical presentation, and the outcome of AFP in children ≤ 15 years of age. **Patients and Methods:** A prospective study was performed at the Children Welfare Teaching Hospital from January to December - 2015. The studied patients were ≤15 years of age, and were collected from hospitalized children only from the pediatric neurology ward, emergency unit, and intensive care unit.The data was collected through a questionnaire asked directly to the parents. According to the AFP definition, together with the data collected from the questionnaire with the physical examination findings and the specific investigations, the patients were decided who will meet the case definition or not. **Results:** The number of AFP cases admitted during the year of the study from January to December 2015 in our pediatric neurology ward was 61 cases out of total 13610 cases, leading to an incidence of 0.45% for AFP cases. Guillain-Barré Syndrome was the most common cause of AFP which was reported in 32 cases (52%), followed by meningitis/encephalitis (24.6%). The highest incidence was reported in those patients aged ≤ 5 years (73.8%). The incidence was more in males (57.4%) than females ,The incidence had been peaked during the Autumn and Winter months. Higher incidence was reported in patients from rural areas (60.7%) than in patients from urban areas (39.3%). A history of upper respiratory tract infection or gastroenteritis (62.3 and 26.2) % respectively was reported to proceed the majority of cases of AFP. Sites of paralysis were different in patients with involvement of both lower and upper limbs in most of patients (80.3%). The majority of cases had an ascending pattern of weakness (63.9%). The paralysis was symmetrical in most of cases (80.3%).Vaccination against poliomyelitis found in (85.2%).**Conclusions:** There are variety of causes of AFP that could be fatal or leaving a residual body disability, with an overall increased incidence in children ≤ 5 years old, males, living in rural areas, and in Autumn and Winter months ; GBS and meningitis/ encephalitis are the most common causes of AFP in children ≤ 15 years of age.so the mode of presentation and the outcome of patients with AFP is decided according to the underlying cause of AFP.

Keywords: *surveillance; Acute flaccid paralysis (AFP); children; welfare teaching hospital.*

Introduction

Acute flaccid paralysis (AFP) is a clinical syndrome characterized by rapid onset weakness, that many times includes respiratory and bulbar weakness. AFP is a broad clinical entity with an array of diagnostic possibilities. An accurate and early diagnosis of the cause has important bearing on the management and prognosis. The immediate priorities in a child who presents with acute progressive weakness are; to detect and manage respiratory muscle weakness, to detect and manage bulbar weakness, evaluate for cardiovascular instability, detect and manage electrolytes imbalance or septicemia, and to detect and manage a spinal compression (traumatic, intraspinal collections). [1]

Causes of Acute flaccid paralysis is broad and may vary by age and geographic region. The etiologies of AFP are often associated with specific pathophysiologic mechanisms or anatomic-morphologic changes, which

may help in establishing the correct clinical diagnosis. [2]

In broad terms, the site (or level) of dysfunction can be considered in the following terms: Supraspinal lesions ; Spinal cord lesions; Peripheral neuropathies ; Disorders of neuromuscular transmission and Muscle disorders[2] , Once the most likely site of the lesion is determined by the history and physical exam findings, it is necessary to consider the possible pathologic processes. Each process will suggest specific diagnoses for the site/level concerned; by ordering the most appropriate tests and investigations, the search for a specific diagnosis can be narrowed. Broadly, the main categories to consider are Vascular causes ; Infection ; Autoimmune/inflammatory ; Metabolic ;Trauma/Compression and Other[2]

Patients and Methods

A prospective study was performed at the Children Welfare Teaching Hospital from the 1st of January to the 31st of December of the year 2015.The studied patients were ≤15 years of age, and were collected from hospitalized children only from the pediatric neurology ward, emergency unit, and intensive care unit (out patients were excluded from the study because they can not be followed up closely).

AFP case according to WHO is defined as (an acute, flaccid paralysis in a child aged ≤15 years; or any paralytic illness in a person of any age in whom the physician suspect polio). According to the WHO recommendations, two stool specimens are collected from each suspected case with an interval of 24-48 hours between collections, given that no more than two months have elapsed since the onset of paralysis. Every case of AFP was notified to a special AFP surveillance team who order the collection of stool samples.

The inclusion and the exclusion criteria for an AFP case was decided by the AFP definition together with the following collected data through a questionnaire asked directly to the parents, All the patients were followed up clinically (1-2 weeks of admission and with scheduled follow up in a 2 weeks period for at least another 60 days) until they discharged home with improving weakness or with some residual disability with one patient unfortunately died. The collected data was analyzed and adjusted using the SPSS version 18 statistical program.

Results

The number of AFP cases admitted during the period of study from the 1st of January to the 31st of December 2015 in the Pediatric Neurology ward in the Children Welfare Teaching Hospital was 61 cases out of 13610 total admitted cases (for all causes in all wards) which gave an incidence of 0.45% for the AFP cases from total admitted cases.

Many underlying causes or disease processes can present with AFP. In our study GBS was the most common cause which was reported in 32 cases (52%), followed by meningitis/encephalitis (15 cases / 24.6%). Non-specific cause (no definite diagnosis) was decided in 2 cases (3.3%) after the finding of normal all available investigations. Details are shown in table [1].

Table (1): Reported causes of AFP.

Cause	No.	Percentage %
GBS	32	52.5
Meningitis/Encephalitis	15	24.6
ADEM	4	6.6
Vascular Stroke	3	4.9
Transverse Myelitis	2	3.3
Non-Specific cause	2	3.3
Myasthenia gravis (in crises)	1	1.6
Organophosphorus poisoning	1	1.6
Scorpion bite	1	1.6
Total	61	100

AFP cases were reported in all age groups classified in this study in patients ≤ 15 years old, with 5 cases (8.2%) were ≤ 1 year of age with the lowest reported age was 4 months and the largest age was 14.5 years. The highest incidence found in those 1-3 years old (21 cases / 45.9%). The vast majority of cases was in those patients aged ≤ 5 years (45 cases / 73.8%). The median age of patients was 3.6 years. Theses are all shown in table [2].

Table (2): Distribution of the sample according to the age groups.

Age group	No.	Percentage %	Cumulative %	
1 day - 6 months	2	3.3	3.3	in ≤ 6 months
> 6 m – 1 years	5	8.2	11.5	in ≤ 1 yr
> 1 Years – 3 Years	21	34.4	45.9	in ≤ 3 Years
> 3 Years – 5 Years	17	27.9	73.8	in ≤ 5 Years
> 5 Years – 15 Years	16	26.2	100	in ≤ 15 Years
Total	61	100		

The incidence of AFP was more in males (35 cases / 57.4%) than females (26 cases / 42.6%) with a male : female ratio of (1.3:1).

The incidence had been peaked during the Autumn and Winter months in this country namely September, October, and January (7 cases / 11.5% in each of these months), and November, December, and February (6 cases / 9.8% in each of these months). However, there was a reported increment of cases in July also (5 cases / 8.2%).

Higher incidence was reported in patients from rural areas (37 cases / 60.7%) than in patients from urban areas (24 cases / 39.3%).

A history of URTI or gastroenteritis was reported to proceed the onset of AFP by variable period of time ranging from 1-2 weeks in the vast majority of cases (38 cases / 62.3%, and 16 cases / 26.2% respectively), with only4 cases (6.6%) had a non-specific proceeding history.

Sites of paralysis were different in patients with involvement of both lower and upper limbs in more than 75% of cases (49 cases / 80.3%). Lower limbs only paralysis was seen in 4 cases (6.6%), and a more generalized body involvement in 8 cases (13.1%). Table [3].

Table (3): Sites of paralysis of the AFP cases.

Site	No.	Percentage %
Both lower and upper limbs	49	80.3
Lower limbs only	4	6.6
Generalized body weakness	8	13.1
Total	61	100

The majority of cases had an ascending pattern of weakness (39 cases / 63.9%), and all body involvement at the same time (21 cases / 34.4%), with only one case (1.6%) had a non-specific pattern of weakness which was a case of myasthenia gravis. All this is shown in table [4].

Table (4): Reported Pattern of weakness of the AFP cases.

Pattern of weakness	No.	Percentage %
Ascending	39	63.9
All body at same time	21	34.4
Non-specific	1	1.6
Total	61	100

The AFP was symmetrical in most of cases (49 cases / 80.3%), and asymmetrical pattern of weakness in the rest of cases (12 cases / 19.7%).

Stool samples for polio virus culture were collected from all patients reported with AFP in our study which were all negative for wild polio virus. However a significant number of patients had provided only one sample (26 cases / 42.6%) due to constipation, or the patient had left the hospital on the relative's responsibility.

Vaccination against poliomyelitis with ≥ 3 doses of oral polio vaccine (the least acceptable role by WHO program for eradication of poliomyelitis), was reported in 52 cases (85.2%), with the remaining 9 cases (14.8%) were non fully vaccinated or non-vaccinated at all. Figure [1].

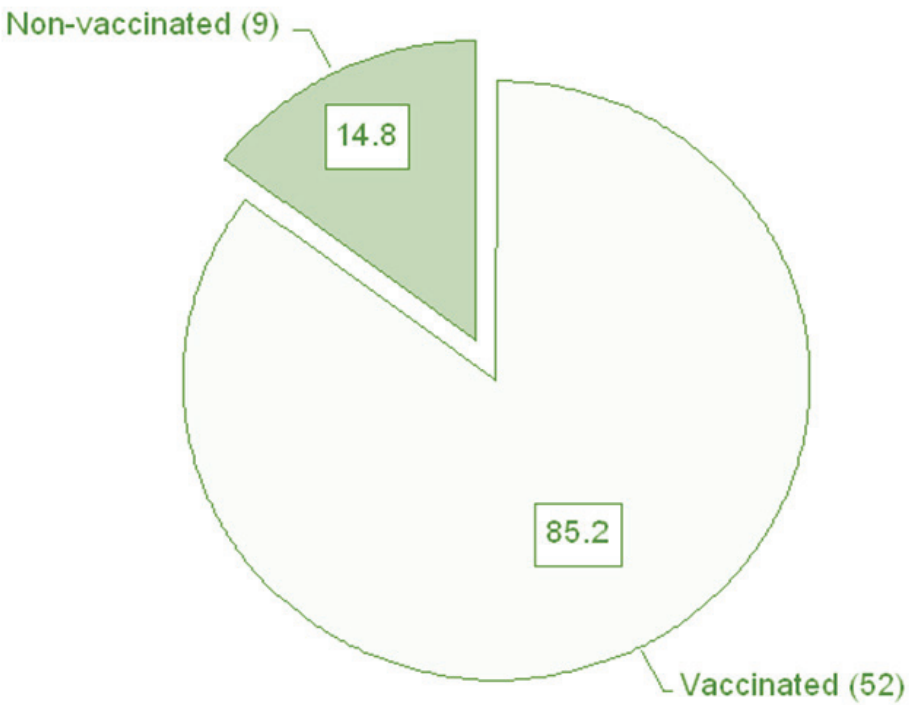

Figure [1] Distribution of the sample according to the vaccination status.

Discussion

The number of AFP cases admitted during the year of the study in our pediatric neurology ward was 61 cases out of total 13610 cases, leading to an incidence of 0.45% for AFP cases. Laura *etal.,* study in Lombardy, Northern Italy, 1997 to 2011found an incidence of 0.7% with a mean incidence of 0.3-1.1%. [3] so in Bangladesh 2002 reported 34 cases of AFP out of total 4826 admitted cases over 2 years which gave an incidence of 0.7% for the AFP cases.[4]

In this study two main causes had accounted for more than 75% of the cases of AFP, which were GBS as the most come (32 cases / 52.5%), followed by meningitis/ encephalitis (15 cases / 24.6%). Non-specific cause (no definite diagnosis) was found in 2 cases (3.3%). GBS and meningitis/encephalitis were also found to be the 2 main causes of AFP (40%, 13% respectively) by Laura *etal.,* [3] and also Rasul *etal.,*study (in Bangladesh 2002) (47%, 26% respectively) [4], while a study in Kurdistan Province, Iran 2000-2010) put GBS as the 1st cause (56.8%) followed by transverse myelitis (5.1%). [5]

So Laura *etal.,* study found no definite diagnosis in 17.3% [3] **,** in Iraq 1997-2011) reported unknown cause in 11.4% of cases. [6] Regardless of the cause of AFP, more than 73% of cases were aged ≤ 5 years with a median age of 3.6 years.The results were 50% in Egypt 2011 [7], 40% in Iran 2002-2009) [8], and 85.5% in Nigeria 2004-2009 [9]

So in Baghdad 2002-2004 found that 59.6% of GBS children were ≤ 4 years of age. [10]

Male cases were reported to be more in this study (57.4%) with a male: female ratio of 1.3: 1. So Jafar *etal.,* study in Kurdistan Province, Iran 2000-2010, also found a higher incidence in males (55%) [32], as also found in Bangladesh 2002 with an incidence of 55.8%. [4]A study by Jagar *et al.,* study (in Iraq 1997-2011) found nearly the same male: female ratio of 1.35: 1. [6]So, in Baghdad 2000-2002 found a close male: female ratio of 1.4: 1 in GBS patients. [11]

January, September, and October months had taken the peaks of incidence of AFP (11.5% for each). This could be attributed to higher incidence of URTI and GE in those months in our country.in Lombardy, Northern Italy, 1997 to 2011claimed the peak was in November, January, and March. [3]**,** whilst in Kurdistan Province, Iran 2000-2010) found the peaks in March, June, and October [5],As was as in Iraq 1997-2011 reported a non-significant seasonal variation [6] ,More cases were reported from rural area (60.7%) in this study and this could be explained by the higher rates of exposure to infectious agents causing the AFP in rural areas due to the more unsanitary conditions of living.

In Egypt 2011 the incidence was 54% from rural areas. [7], while in Kurdistan Province, Iran 2000-2010) put the incidence as 60% but from urban areas [5], while study in Iraq 1997- 2011the incidence was higher from outside the capital city of province of more rural social characteristics. [6]A proceeding history of URTI was an important antecedent for the AFP cases (62.3%) followed by GE, and certainly this can explain the largest No. of AFP cases caused by GBS and meningitis/encephalitis, due to the direct link between the proceeding history and those two mains causes.in Egypt 2011 the URTI as the commonest proceeding history (24%) followed by GE (8%) [31], while in Republic of Korea 2002-2011 found the most common proceeding history was GE especially in Summer months. [12], so in Baghdad 2002-2004) had found the closest results to our study as (63.5%) for URTI followed by (19.3%) for the gastroenteritis as the antecedents for GBS.[10] The most common sites of paralysis were both the lower and upper limbs (49 cases / 80.3%) according to the underlying causes of AFP. in Egypt 2011reported a 4 limbs involvement in 92% of cases [31], while in Bangladesh 2002 found that only lower limbs weakness was the dominant in their study. [4] so in Baghdad 2000-2002) reported weakness in both upper and lower limbs in 60%, and lower limbs only involvement in 40% of GBS cases. [11]

Ascending pattern of weakness was the dominant presentation in the majority of cases (63.9%). But in Egypt, 2011 found an ascending pattern of weakness in 96% of cases. [7] in Bangladesh 2002) said the majority of cases had ascending pattern of weakness reaching 58.8%.[34]**,** Saeed *et al.,* study in Pakistan 2003 mentioned that more than 75% of the cases were presented with ascending paralysis. [13] in Baghdad 2000-2002) reported ascending paralysis in 95% of GBS cases. [11]

More than 80% of cases had presented to medical attention with symmetrical pattern of weakness in the

involved sites. in Egypt, 2011 found symmetry in 92% of cases in the from of 4 limbs involvement. [7]

Whilst in Iran 2002-2009 gave an incidence of 24.7% of asymmetric paralysis [33], and Saeed M; Zaidi SZ; Naeem A; et al, study (in Pakistan 2003) found symmetry in 67% of cases. [13] Although all the stool samples were collected for all the patients for polio virus culture which were negative, yet only 57.4% of patients had provided the two required samples for polio search due to different causes like constipation or patients had left the hospital on parents responsibility. in Hong Kong 1997-2002 the requirement for adequate stool investigations was the single indicator that had not satisfied the WHO requirements. [14]

With the variety of causes of non-vaccination from forced immigration to familial distrust of the safety of vaccines, nearly 15% of cases were reported to be not fully vaccinated (received < 3 doses of oral polio vaccine) to non- vaccinated at all. in Bangladesh 2002 reported 29% of cases were not fully vaccinated. [4] Results of Bassey *etal.,* showed many cases were non-vaccinated at all with gradual increase in the rates of vaccination during the years of study. [9] Another study done in Nigeria 2012 found that most of the polio cases were in the non-vaccinated patients indicating the presence of a percentage of non-vaccinated patients without mentioning that percentage. [15]

Conclusions

There are variety of causes of AFP that could be fatal or leaving a residual body disability, with an overall increased incidence in children ≤ 5 years old, males, living in rural areas, and in Autumn and Winter months.so GBS and meningitis/encephalitis are the most common causes of AFP in children ≤ 15 years of age.The site, pattern, and the symmetry of paralysis is decided by the cause of AFP.

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Conflict of Interest: None

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