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Research Article

CLINICAL AND ETIOLOGICAL PROFILE OF ACUTE FLACCID PARALYSIS IN CHILDREN

VIJAY AGARWAL[1], PANKAJ KUMAR JAIN[1]*, BALKISHAN JAIN[2]

[1]Department of Paediatric Medicine, Sawai Man Singh Medical College, Jaipur, Rajasthan, India. [2]Department of Pediatric Medicine, Satellite Hospital, Shahpura, Bhilwara, Rajasthan, India. Email: pankaj18us2001@yahoo.com

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ABSTRACT

Objective: This study was conducted to determine the clinical characteristics and differential diagnosis of individual cases of acute flaccid paralysis (AFP) reporting to tertiary care teaching hospital of Jaipur.

Methods: This prospective observational study was conducted among patients attending outdoor, indoor, and neurology clinics with provisional diagnosis of AFP. The diagnosis was based on the available clinical data, vaccination status, and laboratory results (stool examination, arterial blood gas analysis, thyroid profile, serum electrolytes, electrophysiological studies, cerebrospinal fluid analysis, urinary pH, and imaging).

Results: A total of 60 patients were evaluated over a study duration of 1 year. About 81.7% were male. Most common presenting complaint was lower-limb weakness (100%). None of the cases were identified as acute poliomyelitis or polio-compatible. Guillain–Barré syndrome (GBS) was the most common cause of non-poliovirus AFP (75%). Most common nerve conduction velocity findings in our study were bilateral motor axonal affection of common peroneal nerve (55%).

Conclusion: The most common cause of AFP was GBS in all age groups. No case was diagnosed as poliomyelitis. All of the patients of GBS had progressive muscle weakness in a roughly symmetrical distribution, with areflexia of lower limbs.

Keywords: Acute flaccid paralysis, Guillain-Barré syndrome, Nerve conduction velocity.

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INTRODUCTION

Acute flaccid paralysis (AFP) is characterized by onset of weakness in individual's extremities, associated with weakness of the muscles of swallowing and respiration, rapidly progressing to maximum within 1–10 days. Flaccidity is absence of spasticity, hyperreflexia, clonus, or extensor plantar reflexes [1]. Annually, large number of children around the world develop AFP resulting in considerable morbidity and mortality.

AFP represents a syndrome with multiple causes. It has broad spectrum of potential etiologies with possible illness due to infection of the anterior horn cells of the spinal cord (poliomyelitis, vaccine-associated poliomyelitis, non-polio enterovirus), Guillain–Barré syndrome (GBS), neurotropic viruses (rabies virus, Japanese encephalitis virus, etc.), acute traumatic sciatic neuritis (intramuscular gluteal injections), acute transverse myelitis (TM), neuropathies (*corynebacterium diphtheria* toxin, clostridium botulinum toxin, tick-bite paralysis, etc.), neuromuscular junction disorders (Myasthenia gravis, etc.), disorders of muscle (viral myositis, polymyositis, etc.), and metabolic disorders (hypokalemic periodic paralysis), etc. [2].

Under the Global Polio Eradication Initiative, AFP surveillance is an important public health measure led by the WHO in 1988. The criteria for surveillance are the observation of flaccid paralysis of rapid onset in children <15 years and also any suspected case of poliomyelitis in a person of any age, with virological testing to prove or deny poliovirus infection [3].

With the WHO's multiple initiatives, poliomyelitis is close to its eradication but simultaneously other causes of AFP have gained dramatic importance [4]. AFP continues to be a major health problem worldwide, in spite of significant reduction in number of AFP cases from poliovirus.

Clinical conditions that fall under the spectrum of AFP vary from one country to other. The most common causes of AFP in Malaysia are GBS, TM, and central nervous system infection [5]. Along with GBS and TM that were the most common, AFP in Australia includes acute disseminated encephalomyelitis, tick-bite paralysis, and infant botulism [6]. Traumatic sciatic nerve palsy, neuropathy, acute polyneuritis, and acute poliomyelitis fall under diagnosis of AFP in South West Nigeria [7]. In Iraq, GBS represents more than half of the AFP cases, followed by traumatic neuritis and other CNS infections [8].

AFP can have varied presentation depending on the underlying cause. Furthermore, the outcome depends on the underlying cause and severity at presentation. Hence, all the differentials of AFP need to be evaluated. Hence, this study was done to study the etiological profile and clinical features of AFP in children.

METHODS

It was a hospital-based prospective observational study conducted in Sir Padampat Mother and Child Health Institute, Jaipur, a tertiary level pediatric hospital attached to a government medical college of northwest India. Prior ethics permission from the institutional ethical committee was obtained. Children attending outdoor, indoor, and neurology clinics with provisional diagnosis of AFP were enrolled after obtaining informed written consent from their parents over a period of 1 year.

Inclusion criteria

All AFP patients aged within 15 years of age.

Exclusion criteria

AFP patients above 15 years of age; parents refusing for consent; all cases of traumatic, spastic, chronic flaccid paralysis, or sudden onset of weakness as in cerebrovascular accident.

Data collection

The cases were selected based on clinical presentation. In addition to routine baseline investigations, two stool samples were collected at least 24 h apart, both within 14 days of paralysis onset and send to the laboratory with maintenance of cold chain. Serum electrolytes, lactate dehydrogenase, creatine kinase, arterial blood gas analysis, urinary pH, thyroid profile, electrophysiologic studies (nerve conduction studies, electromyography, etc.), cerebrospinal fluid examination, and imaging of the spine and brain (radiography, computed tomography, or magnetic resonance imaging) were carried out in relevant cases. The final diagnosis was based on the available clinical data, vaccination history, and laboratory results.

RESULTS

A total of 60 cases of AFP were enrolled over a period of 1 year, out of which 30 patients (50%) belonged to the age group of 1–5 years, 18 patients (30%) belonged to the age group of 6–10 years, and remaining 12 patients (20%) belonged to 11–15 years. The mean age at diagnosis was 6.4±3.7 years with 81.7% male and 18.3% female in our study.

As shown in Table 1, lower-limb weakness was most common presenting complaint (100%), followed by upper-limb weakness (33.3%), fever (26.6%), bulbar involvement with respiratory involvement (16.7%), unable to pass urine and stool (15%), and bulbar involvement without respiratory involvement (8.3%).

None of the cases were classified as acute poliomyelitis or polio-compatible. A variety of causes were identified. The most common cause of non-poliovirus AFP excluding the causes of pseudoparalysis in our study (Table 2) was GBS (75%) followed by TM (13.3%) and traumatic neuritis (11.7%).

The nerve conduction velocity (NCV) findings in our study are shown in Table 3. Bilateral motor axonal affection of common peroneal nerve was found in 55% AFP cases, 20% cases show bilateral motor demyelinating affection of common peroneal nerve, 6.7% cases had bilateral predominantly demyelinating and motor axonal affection of common peroneal nerve, and 1.7% had motor axonal affection of right median nerve.

Table 1: Presenting complaints in patients

Presenting complaints	No.	Percentage
Lower-limb weakness (distal>proximal)	60	100
Upper-limb weakness (distal>proximal)	20	33.3
Fever	16	26.6
Bulbar involvement	15	25
1. With respiratory involvement	10	16.7
2. Without respiratory involvement	5	8.3
Bladder/bowel involvement	9	15

Table 2: Frequency distribution of cases of acute flaccid paralysis (n=60)

Diagnosis	No.	Percentage
GBS	45	75
Transverse myelitis	8	13.3
Traumatic neuritis	7	11.7

GBS: Guillain–Barré syndrome

Table 3: NCV findings

NCV findings	No.	Percentage
Bilateral motor axonal affection of common peroneal nerve	33	55
Bilateral motor demyelinating affection of common peroneal nerve	12	20
Bilateral predominantly demyelinating and motor axonal affection of common peroneal nerve	4	6.7
Motor axonal affection of right median nerve	1	1.7
Normal	3	5
Not done	7	11.7

NCV: Nerve conduction velocity

DISCUSSION

The mean age of enrolled 60 AFP cases is 6.4±3.7 years. Of those, 49 (81.7%) were males and 11 (18.3%) were females. The median age of our cohort was similar to the California cohort [9] (median age 9 years) and US cohort [10] (median age 7.1 years) but different from the median age identified in a Japanese cohort [11] (median of 4.4 years) and the European cohort by Knoester *et al*. [12] Similar to our findings, male predominance has been reported by other investigators including cases from the California cohort, US cohort, and Japan cohort [9-11]. Study by Ali *et al*. [13] and Shah *et al*. [14] also has male predominance which is in accordance with our study.

Most common presenting complaint in our study was lower-limb weakness (100%) followed by upper-limb weakness (33.3%), fever (26.6%), bulbar involvement with respiratory involvement (16.7%), bladder bowel involvement (15%), and bulbar involvement without respiratory involvement (8.3%).

Similar to our study, Sharma *et al*. [15] also found lower-limb weakness (96%) as the most common clinical feature followed by upper-limb weakness (36%), fever (23%), bulbar involvement with respiratory involvement (20%), bulbar involvement without respiratory involvement (8%), and bladder bowel involvement (2%). Similar results were found in multiple studies [13,16-19].

In our study, out of total 60 AFP cases, 45 patients (75%) were diagnosed having GBS, 13.3% were diagnosed having TM, and 11.7% were diagnosed having traumatic neuritis. The most common cause of non-poliovirus AFP was found to be GBS excluding the causes of pseudoparalysis in previous studies [13,15-18,20,21].

CONCLUSION

GBS still remains the leading cause of AFP. No case of poliomyelitis was found. The most common association of AFP includes quadriparesis, respiratory complications, neurological sequelae, low GCS, and a high mortality. Thus, this study stresses upon the importance of AFP surveillance so that not a single case of AFP gets missed.

CONFLICTS OF INTEREST

None.

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