

Aetiology, Clinical Presentation and Outcome of Patients Presenting with Acute Flaccid Paralysis in a Tertiary Care Hospital

Qurat ul Ain Khalid, Khairunnisa Mukhtiar, Fozia Baloch, Nazia Bibi, Shahnaz Ibrahim, Prem Chand

Department of Pediatric Medicine, Aga Khan University Hospital, Karachi Pakistan

ABSTRACT

Objective: To determine the aetiology, clinical presentation and outcome of patients presenting with acute flaccid paralysis.

Study Design: Cross-sectional study.

Place and Duration of Study: Department of Pediatric Medicine, Agha Khan Hospital, Karachi Pakistan, from Jan 2015 to Dec 2019.

Methodology: Medical record of 150 children fulfilling the selection criteria were selected. The clinical presentations of the patient were recorded in terms of the following: fever, cough, vomiting, weakness, difficulty in swallowing, altered sensorium, changes in heart rate and blood pressure and difficulty in breathing. The outcome of children with acute flaccid paralysis, i.e. clinical improvement in symptoms, complete recovery or death during the hospital stay, was noted.

Results: The mean age of patients was 10.13±5.01 years. The most common disease at presentation was Guillain bare syndrome 55(36.7%), followed by viral myositis 37(24.7%). Weakness was noted in all patients (100%), fever and headache in 64(42.7%), vomiting in 25(16.7%), and difficulty in breathing in 19(12.7%). After treatment, some improvement was noted in 104(69.3%) cases, while 27(18.0%) patients had no improvement; residual neurological disability was noted in 19(12.7%) cases, and 3(2.0%) died during follow-up.

Conclusion: Acute Flaccid Paralysis (AFP) in children is a big challenge for physicians, and Guillian Barre Syndrome is the most common cause of acute flaccid paralysis in children. It almost invariably presents with weakness of the body.

Keywords: Acute flaccid paralysis, Aetiology, Clinical presentation, Residual neurological disability.

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INTRODUCTION

Acute flaccid paralysis is the “clinical syndrome characterized by rapid initiation of weakness of both upper and lower motor neuron type, comprising weakness of respiratory and pharyngeal muscles, developing to the maximum severity within several days to weeks.”¹ It is a complex syndrome which has a broad array of probable causes, which may fluctuate abnormally with increasing age.^{2,3} Acute flaccid myelitis is newly defined and a rare syndrome of acute flaccid paralysis, but it is clinically a different idiopathic syndrome with the involvement of spinal motor neurons.^{4,5} During 2014, clusters of the acute flaccid myelitis were detected during a nationwide outbreak of enterovirus D68 in United States.^{6,7}

However, a very strong sequential relationship was observed; enterovirus D68 was identified in 20% of cases of acute flaccid myelitis only, mainly from specimens retrieved from the respiratory tract.^{3,8,9} Non-polio cases of acute flaccid paralysis were more as compared to poliomyelitis. Guillain-Barre syndrome

leads to acute flaccid paralysis among teenagers and adults. Its incidence is 0.34-4/100,000 persons.¹⁰

Literature showed variability in the frequency of different aetiology and clinical presentations of patients with acute flaccid paralysis. This study aimed to look at the most common causes of AFP in children in our population. This will help review and get local estimates of AFP cases and help plan better treatment and preventive strategies for AFP in children in our community.

METHODOLOGY

The cross-sectional study was conducted at the Department of Paediatric Medicine, Aga Khan Hospital, Karachi Pakistan, after getting permission from Ethical Review Board (Ltr no. 2020-4953-11505). The calculated sample size was calculated keeping the percentage of Guillain-Barre syndrome, i.e. 18.88% in children diagnosed with acute flaccid paralysis.¹¹

Inclusion Criteria: Children aged 1-18 years, of either gender presenting with acute flaccid paralysis were included.

Exclusion Criteria: Children with congenital and hereditary myopathy and neuropathies, cerebral palsy,

Correspondence: Dr Qurat ul Ain Khalid, Department of Pediatric Medicine, Aga Khan University Hospital, Karachi Pakistan
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and underlying neuromuscular and neurometabolic diseases were excluded.

The medical record of 150 children who fulfilled the selection criteria was selected from the Department of Paediatric Medicine, Aga Khan Hospital, Karachi. Demographic details were collected through the medical record of the patient. The clinical presentation of the patient was recorded as given in the medical record. Aetiology of acute flaccid paralysis was noted in terms of the following: Guillainbarre' syndrome, hypokalemic paralysis, transverse myelitis, cord compression, polio, acute flaccid myelitis, encephalitis, acute disseminated encephalomyelitis (ADEM), Neuromyelitis optica spectrum disorder and viral myositis. Clinical presentations were assessed in terms of the following: fever, pharyngitis, vomiting, weakness, bulbar involvement, encephalitis, changes in heart rate, blood pressure, difficulty in breathing and bulbar poliomyelitis. The outcome of a child with acute flaccid paralysis, i.e. clinical improvement in symptoms, complete recovery or death during the hospital stay, was noted. All this information was recorded in proforma.

Statistical Package for Social Sciences (SPSS) version 20.0 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages. Chi-square test was applied to explore the inferential statistics. The *p*-value lower than or up to 0.05 was considered as significant.

RESULTS

The total number of patients was 150 were included. The mean age of patients was 10.13±5.01 years. There were 95(63.3%) males and 55(36.7%) females. The most common disease at presentation was Guillain barre syndrome 55(36.7%), followed by viral myositis 37(24.7%), Cord compression 23(15.3%), Transverse myelitis 19 (12.7%) and others. Weakness was noted in all patients (100%), fever and headache in 64(42.7%). At presentation, power was zero in 6(4.0%) patients, power one was noted in 16(10.7%) patients, power 2 in 33(22.0%) patients, 55(36.7%) patients had power three and power four was noted in 40(26.%) patients. After treatment, power was 1 in 9(6.0%) patients, power 2 in 2(1.3%) patients, 15(10%) patients had power 3, 40(26.7%) had power four, and 84(56.0%) had power 5. presentation, the respiratory function was normal in 131(87.3%) cases while disturbed in 19(12.7%) cases, and ventilation was needed, which became normal after treatment in 147(98%) patients while 3(2.0%) died (Table-I).

Table-I: Descriptive Statistics of the Patients (n=150)

| Characteristics | n(%) |
|---|------------|
| Age (years) Mean±SD | 10.13±5.01 |
| Male | 95(63.3%) |
| Female | 55(36.7%) |
| Guillain barre syndrome | 55(36.7%) |
| Viral myositis | 37(24.7%) |
| Cord compression | 23(15.3%) |
| Transvers myelitis | 19(12.7%) |
| Neuromyelitis optical spectrum disorder | 6(4.0%) |
| Acute disseminated encephalomyelitis (ADEM) | 5(3.3%) |
| Hypokalemic paralysis | 5(3.3%) |
| Encephalitis | 3(2.0%) |
| Poliomyelitis | 1(0.7%) |
| Respiratory Function at Presentation | |
| Normal | 131(87.3%) |
| Need ventilation at presentation | 19(12.7%) |
| Respiratory function normal after treatment | 147(98%) |
| Death | 3(2.0%) |

After treatment, clinical improvement was noted in 104(69.3%) cases; while 27(18.0%) patients had no improvement, Residual neurological disability was noted in 19(12.7%) cases during follow-up. In patients aged <5 years, the improvement was significantly better compared to older children, while no impact of gender was noted (*p*-value 0.862). In patients with ADEM, improvement was noted in 100% of cases, while 76.4% of patients with Guillemin barre syndrome were improved (Table -II).

Table-II: Comparison of Outcome with Respect of Age and Gender (n=150)

| Age (years) | Outcome | | | <i>p</i> -value |
|---------------|----------------------------------|---------------------------|---|-----------------|
| | Clinical Improvement 104(69%) | No Improvement 27(18%) | Residual Neurological Disability 19(12%) | |
| 1-5 | 24(16%) | 9(6%) | 1(0.6%) | 0.024 |
| 6-10 | 30(20%) | 10(6.6%) | 3(2%) | |
| 11-18 | 50(33%) | 8(5.3%) | 15(10%) | |
| Gender | | | | 0.862 |
| Male | 67(40%) | 17(11.3%) | 11(7.3%) | |
| Female | 37(24.6%) | 10(6.6%) | 8(5.3%) | |

DISCUSSION

Acute flaccid paralysis is a syndrome characterized by the rapid onset of weakness in children aged <15 years. The exact reason for the development of acute flaccid paralysis in this population is still not apparent and needs proper management.¹¹ All over the world, countries of the South East Asian Region have the highest risk and significant reservoirs of wild polio virus. The three endemic countries, including Afghanistan, Pakistan & Nigeria and few countries of West Africa.¹² Surveillance of acute flaccid paralysis is still the critical component of the global polio eradication campaign by the World Health Organization.¹³ World

Health Organization projected the annual incidence of acute flaccid paralysis as 1 case per 100,000 populations of age <15 years, even when wild poliovirus transmission is absent. The cases of wild polio have been reduced due to thorough oral polio vaccinations and reported in 1.59% (n=6) cases among six different districts of the Punjab.¹⁴ While in our study, we observed only one child of poliomyelitis among children diagnosed with acute flaccid paralysis.

Guillain-Barré syndrome is defined as acute inflammatory polyneuropathy. It is currently considered the most common cause of acute flaccid paralysis in the pediatric population. It is considered one of the most severe neurological emergency.¹⁵ One study observed that in children with acute flaccid paralysis, Guillain-Barre syndrome was the most common comorbid syndrome (18.9%), followed by traumatic neuritis (12.8%), hypokalemic hypotonia (9.3%), infection in the central nervous system (3.5%) and transverse myelitis (1.7%).¹⁶ Bgahat *et al.* conducted the study in 2019. In addition, they observed Guillain-Barre syndrome (93.5%) as the most common symptom of acute flaccid paralysis, followed by sensory symptoms (22.6%), respiratory failure (16.1%) & dysphagia (12.9%).¹⁰ Another study observed the prevalence of paralysis, i.e. 83.33% cases. This value coincides with our study.¹⁷ Another study observed Guillain-Barre' syndrome in 54.7% of cases, followed by hypokalemic paralysis (14.2%), myasthenia gravis (7.5%), thiamine deficiency (7.5%), transverse myelitis (4.7%). Cord compression (1.9%).¹⁸ Surveillance of acute flaccid paralysis is the central policy for monitoring the polio eradication process. It is a sensitive indicator to detect probable poliomyelitis and polio-virus infection cases.¹⁹ The World Health Organization has formulated a set of key performance indicators to confirm that the surveillance of acute flaccid paralysis is appropriately continued. Assessment of this surveillance is based on those key performance indicators.²⁰

CONCLUSION

It has been concluded that more than 50% of patients' acute flaccid paralysis can be improved with treatment. So in the future, we can improve the treatment protocols in >90% of patients. Further studies should be done on treatment strategies to improve the outcome.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

QUAK & KM: Data acquisition, data analysis, critical review, approval of the final version to be published.

FB & NB: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

SI & PC: Concept, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Kaushik R, Kharbanda PS, Bhalla A, Rajan R. Acute Flaccid paralysis in adults: Our experience. *J Emerg Trauma Shock* 2014; 7(3): 149-154. <https://doi.org/10.4103/0974-2700.136847>
2. Messacar K, Schreiner TL, Van Haren K, Yang M, Glaser CA, Tyler KL, et al. Acute flaccid myelitis: a clinical review of US cases 2012-2015. *Ann Neurol* 2016; 80(3): 326-338. <https://doi.org/10.1002/ana.24730>
3. Van Haren K, Ayscue P, Waubant E, Clayton A, Sheriff H, Yagi S, et al. Acute flaccid myelitis of unknown etiology in California, 2012-2015. *JAMA* 2015; 314(24): 2663-2671. <https://doi.org/10.1001/jama.2015.17275>
4. Messacar K, Schreiner TL, Maloney JA, Wallace A, Ludke J, Oberste MS. A cluster of acute flaccid paralysis and cranial nerve dysfunction temporally associated with an outbreak of enterovirus D68 in children in Colorado, USA. *Lancet* 2015; 385(9978): 1662-1671. [https://doi.org/10.1016/s0140-6736\(14\)62457-0](https://doi.org/10.1016/s0140-6736(14)62457-0)
5. Greninger AL, Naccache SN, Messacar K, Clayton A, Yu G, Somasekar S, et al. A novel outbreak enterovirus D68 strain associated with acute flaccid myelitis cases in the USA (2012-14): a retrospective cohort study. *Lancet Infect Dis* 2015; 15(6): 671-682. [https://doi.org/10.1016/s1473-3099\(15\)70093-9](https://doi.org/10.1016/s1473-3099(15)70093-9)
6. Aliabadi N, Messacar K, Pastula DM, Robinson CC, Leshem E, Sejvar JJ, et al. Enterovirus D68 infection in children with acute flaccid myelitis, Colorado, USA, 2014. *Emerg Infect Dis* 2016; 22(8): 1387-1394. <https://doi.org/10.3201%2Fid2208.151949>
7. Nelson GR, Bonkowsky JL, Doll E, Green M, Hedlund GL, Moore KR, et al. Recognition and Management of Acute Flaccid Myelitis in Children. *Pediatr Neurol* 2016; 55(1): 17-21. <https://doi.org/10.1016/j.pediatrneurol.2015.10.007>
8. Sejvar JJ, Lopez AS, Cortese MM, Leshem E, Pastula DM. Acute flaccid myelitis in the United States, August-December 2014: results of nationwide surveillance. *Clin Infect Dis* 2016; 63(6): 737-745. <https://doi.org/10.1093%2Fcid%2Fciw372>
9. Chong PF, Kira R, Mori H, Okumura A. Clinical features of acute flaccid myelitis temporally associated with an enterovirus d68 outbreak: results of a nationwide survey of acute flaccid paralysis in Japan, August-December 2015. *Clin Infect Dis* 2018; 66(5): 653-664. <https://doi.org/10.1093%2Fcid%2Fciw860>
10. Bhagat SK, Sidhant S, Bhatta M, Ghimire A, Shah B. Clinical profile, functional outcome, and mortality of guillain-barre syndrome: A five-year tertiary care experience from Nepal. *Neurol Res Int* 2019; 2019(1): 3867946. <https://doi.org/10.1155/2019/3867946>
11. Saraswathy T, Zahrin HN, Apandi M, Kurup D, Rohani J, Zainah S, et al. Acute flaccid paralysis surveillance: looking beyond the global poliomyelitis eradication initiative. *Southeast Asian J Trop Med Public Health* 2008; 39(6): 1033-1039.
12. Birnbaum LS, Staskal DF. Brominated flame retardants: cause for concern? *Environ Health Perspect* 2004; 112(1): 9-17. <https://doi.org/10.1289/ehp.6559>

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13. Christian KA, Ijaz K, Dowell SF, Chow CC, Chitale RA, Bresee JS, et al. What we are watching—five top global infectious disease threats, 2012: a perspective from cdc's global disease detection operations center. *Emerg Health Threat J* 2013; 6(1): 20632.
 14. Patel JC, Diop OM, Gardner T, Chavan S, Jorba J, Wassilak SG, et al. Surveillance to track progress toward polio eradication—worldwide, 2017–2018. *Morbidity and Mortality Weekly Report* 2019; 68(13): 312-318. <https://doi.org/10.15585/mmwr.mm6813a4>
 15. Ahmad A. One year surveillance data of acute flaccid paralysis at Bahawal Victoria Hospital Baha. *Pak J Med Sci* 2007; 23(3): 308.
 16. Alcala H. The differential diagnosis of poliomyelitis and other acute flaccid paralyses. *Bol Med Hospital Infant Mexico* 1993; 50(2): 136-144.
 17. McGrogan A, Madle GC, Seaman HE, de Vries CS. The epidemiology of Guillain-Barré syndrome worldwide. A systematic literature review. *Neuroepidemiology* 2009; 32(2): 150-163. <https://doi.org/10.1159/000184748>
 18. Ali S, Zia ur Rehman M, Sultan T. Spectrum of acute flaccid paralysis in children. *Pak J Neurol Sci* 2016; 11(4): 8-11.
 19. Yuki N, Hartung H-P. Guillain-Barré syndrome. *N Engl J Med* 2012; 366(24): 2294-2304. <https://doi.org/10.1056/nejra1114525>
 20. Li X, Xiao J, Ding Y, Xu J, Li C, He Y, et al. Clinical and electrophysiological features of post-traumatic Guillain-Barré syndrome. *BMC Neurol* 2017; 17(1): 142. <https://doi.org/10.1186/s12883-017-0919-x>
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