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Original Article

A study of acute flaccid paralysis cases reported from a tertiary care hospital in Delhi

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Abstract

Background: As many countries including India become polio-free, Guillain–Barre syndrome (GBS) becomes the most common cause of the acute flaccid paralysis (AFP). **Objective:** To describe the socio-epidemiology and causes of AFP cases reported from a tertiary care hospital in Delhi. **Materials and Methods:** This was a cross-sectional descriptive study based on record review of the case investigation forms of AFP cases reported from January 2011 to December 2013. **Results:** Total 187 cases of AFP were reported during the study period. Majority (54.01%) of the cases were male. The mean age was 5 years 3 months (range - 1 month to 13 years 8 months). The age group most commonly affected was 5-12 years (43.32%) followed by 2-5 years (32.62%). Most (88.24%) of the cases belonged to low socio-economic status, with 79.68% of the cases from an urban area. Investigations were done within 48 h of the date of notification by medical personnel in 94.65% of cases. Two stool specimens were collected within 7 days of onset of weakness in 94.12% of cases and stool condition was good in all collected specimens. None of the stool samples tested positive for wild polioviruses and vaccine derived poliovirus. Non-polio enterovirus was isolated in 15 cases (8.02%) while results were not mentioned in 12 cases (6.42%). In six cases, vaccine virus was isolated. The most common cause of AFP was GBS (32.08%) followed by isolated facial palsy (8.56%) and viral myalgia (6.95%). **Conclusion:** GBS was most common cause of AFP followed by isolated facial palsy. The slum area and migratory population need more attention as the majority of AFP cases were from low socio-economic status family.

Key words: *Acute flaccid paralysis, Guillain–Barre' syndrome, Poliomyelitis, Surveillance*

The 41st World Health Assembly passed a resolution in May 1988 to eradicate poliomyelitis globally by the year 2000 [1]. The Government of India launched its national poliomyelitis eradication program in co-ordination with WHO and neighboring countries in December 1995 [2]. In India, the last case of wild poliovirus had been identified in January 13th, 2011. India was certified polio-free in March 27th, 2014 along with 10 other countries of the South East Asia Region. However, there is always a high risk of wild poliovirus importation from currently endemic countries such as Pakistan, Afghanistan, and Nigeria due to movement of people between India and these countries. Delhi, being the capital of India and having a huge migratory population, possesses a high risk of importation of wild poliovirus. As poliomyelitis is targeted for eradication and clinically presents as acute flaccid paralysis (AFP), surveillance of AFP is a highly sensitive indicator of wild poliovirus activity [3,4]. The aim of this study was to look for the causes of AFP in current scenario as Guillain–Barre syndrome (GBS) becomes the most common cause of AFP after declining of poliomyelitis as shown by various studies [5,6].

MATERIALS AND METHODS

This cross-sectional descriptive study was conducted in a tertiary care hospital of Delhi from January 2011 to December 2013 by reviewing the case investigation forms (CIF) of AFP cases. These CIF were filled by hospital resident doctor or Surveillance Medical Officer (SMO) of National Polio Surveillance Project (NPSP) and collected by SMO NPSP. CIF of AFP cases was returned to a author after full investigation and final classification by SMO as a routine as the author is working as a nodal officer of poliomyelitis surveillance for the hospital. All the children diagnosed as a case of AFP during active AFP surveillance (as per WHO definition, i.e., any child under 15 years of age with AFP or any person of any age with paralytic illness, if polio is suspected) were included in the study [7].

Details regarding the date of notification, date of investigation by medical personnel, sex, age, socio-economic status (according to modified Kuppuswamy classification), religion, urban/rural background, migration from other places, immunization status, clinical sign and symptoms, travel history (travel of case within 35 days prior to onset of paralysis), details

of stool specimen collection (including date of collection after the onset of disease, condition of specimen, laboratory result), active case search and outbreak response, results of follow-up examination after 60 days, and final classification were noted.

Children were considered as immunized for polio if they had received 3 or more doses of oral polio vaccine (OPV) during routine immunization, partially immunized if they had received 1 or 2 doses and unimmunized if no dose had been received. The condition of the stool specimen was considered as good if two stool samples were received at National Centre for Disease Control, Polio Laboratory under cold chain and there was no leakage in the samples, and the two stool samples were adequate in amount (8-10 g).

Cases were classified based on the clinical and laboratory results. AFP cases with wild poliovirus identified in the stool were classified as "poliomyelitis," while cases were classified as "non-polio" if no poliovirus was identified in two stool samples taken 24 h apart or no stool specimens were collected, and no residual paralysis persist at 60 days. Those cases wherein no stool samples were obtained and paralysis persisted or the child died or lost to follow-up, were reviewed by the expert committee. Cases were classified as "polio-compatible" if the committee could not classify the cases as "non-polio" based on the available information [3].

Data were fed in and analyzed using EPI-Info V2 for Windows. Results were described in frequencies and percentages.

RESULTS

Total 187 cases of AFP were reported over a period of 3-year from January 2011 to December 2013. Of the total cases, 101 (54.01%) were males with male to female ratio of 1.17:1. In the majority of the cases (94.65%), investigation was done within 48 h of the date of notification by medical personnel. The mean age was 5 years 3 months (range - 1 month to 13 years 8 months). The age group most commonly affected was 5-12 years (43.32%) followed by 2-5 years (32.62%) as shown in Table 1.

There were 165 cases (88.24%) from low socio-economic status while 22 cases (11.76%) were from the middle socio-economic group. There were no cases from the high socio-economic status family. 149 cases (79.68%) came from the urban area, 117 cases (62.57%) belong to migratory families while 70 cases (37.43%) were a resident of Delhi/NCR region. In 21 cases (11.23%), travel history was present, i.e., travel within 35 days prior to the onset of paralysis. One case could be labeled as "Hot AFP" case (those AFP cases where the probability of poliomyelitis is very high [>99% chance] according to the reporting doctor). In this type of case, stool specimens of contacts were also collected and sent for testing and outbreak response immunizations was also done as sometimes result of stool testing take time.

Stool was collected within 7 days of onset of weakness in 176 cases (94.12%) while in 3 cases; stool was collected during 8-14 days of onset of weakness. In 8 cases (4.28%), the stool was not collected (due to death of the patients in 7 cases and late notification in one case). Stool condition was good in all collected specimens. None of the stool samples tested positive for wild polioviruses and vaccine derived poliovirus; non-polio enterovirus (NPEV) was isolated in 15 cases (8.02%) while no results were mentioned in 12 cases (6.42%). In six cases, vaccine virus was isolated (P3 in 4 cases, P2 in one case, and P1 in two cases).

OPV doses received during routine immunization were adequate in 78.07% of cases, inadequate in 11.23% of cases while 11.76% of cases were unimmunized. No case of poliomyelitis has been detected during the study period. The most common cause of non-polio AFP was GBS (32.08%) followed by isolated facial palsy (8.56%) and viral myalgia (6.95%). Various causes of the AFP have been presented in Table 2.

DISCUSSION

The incidence of AFP in India and Delhi in 2013 was 12.52/100,000 and 12.54/100,000 children under 15 years of age per annum, respectively, while the expected rate is 1-2/100,000 [8]. India has been certified polio-free by WHO, but there is always a high risk of importation of wild poliovirus from the endemic countries. Hence, there is a need for robust surveillance for AFP cases to detect the wild poliovirus circulation and resurgence of poliomyelitis.

In this study, slight male (54.01%) preponderance was seen which is similar to findings of a study done by D'Souza et al. (61% male cases) and Morris (almost two-thirds male cases) [3,5]. 94.65% of AFP cases were investigated within 48 h of notification by medical personnel that indicate effective surveillance as was seen in a study by Olivé et al. [9]. The mean age of cases was 5 years 3 months in the present study while the median age of AFP cases was 6 years 10 months in a study done by D'Souza et al. [3]. Most of the cases (43.32%) were between 5 and 12 years in our study, and another study also showed same results [3]. However, Memon et al. found most of the cases in a 2-5 years age group in their study [6]. The majority of the AFP cases (88.24%) belonged to the low socio-economic

Table 1: Age and sex distribution of cases

Age group (years)	n=187 (M:F)	Percentage (M:F)
<2	42 (21:21)	22.46 (11.23:11.23)
2-5	61 (28:33)	32.62 (14.97:17.65)
5-12	81 (50:31)	43.32 (26.74:16.58)
>12	03 (02:01)	01.60 (01.08:0.52)

Table 2: Causes of AFP cases

Diagnosis	n=187	Percentage
GBS	60	32.09
Isolated facial palsy	16	08.56
Viral myalgia	13	06.95
Dyselectrolytemia	11	05.88
Todd's palsy	10	05.35
Hemiparesis	10	05.35
Paraplegia	05	02.67
Monoparesis	04	02.14
Post diphtheritic paralysis	04	02.14
Cerebrovascular accident	04	02.14
Traumatic neuritis	03	01.60
Acute transverse myelitis	03	01.60
Meningitis	03	01.60
Meningoencephalitis	03	01.60
Encephalitis	03	01.60
Transient paralysis	03	01.60
Floppy neck	02	01.07
ADEM	02	01.07
Quadriplegia	02	01.07
Septic arthritis	02	01.07
AIDP	02	01.07
Unknown	11	05.88
Others	11	05.88

ADEM: Acute disseminated encephalomyelitis, AIDP: Acute inflammatory demyelinating polyradiculoneuropathy, GBS: Guillain–Barre syndrome, AFP: Acute flaccid paralysis

status family, which indicates a poor hygienic condition in this family. This finding is supported by other studies also [10,11].

79.68% of the AFP cases were reported to form urban Delhi as the majority of the population in Delhi lives in the urban area. The majority of the cases (62.57%) belonged to a migratory family whose parents come from other parts of the India for livelihood purposes, and the most of them live in slums. These areas need more attention during routine immunization and pulse polio immunization. 11.23% of AFP cases have traveled history to outside Delhi within 35 days prior to the onset of paralysis. This might indicate a risk of importation or exportation of polio cases in Delhi.

In 94.12% of cases, two specimens of stool were collected within 7 days of onset of paralysis. Only in one case stool specimen was not collected due to late notification. All the stool specimens were in good conditions. In the present study, NPEV was found in 8.02% of stool specimens while vaccine virus was found in 3.21% cases. However, other Indian studies have reported much higher (20-54%) contribution of NPEV as a cause of AFP; exact cause of which could not be found out [12,13].

In this study, 11.23% of the AFP cases were inadequately immunized, and 11.76% cases were unimmunized with OPV during routine immunization. Oostvogel et al. showed that unvaccinated or inadequately vaccinated children have more risk of acquiring paralytic manifestations [14]. This data shows that more attention is needed during routine immunization as people are giving less attention to routine immunization due to pulse polio immunization.

No case of poliomyelitis due to wild poliovirus is detected in this study that is consistent with the report that no cases of poliomyelitis due to wild poliovirus have been found after January 2011 in India. GBS constitutes 32.08% of non-polio AFP cases followed by an isolated facial palsy in 8.56% of cases and viral myalgia in 6.95% of cases. D'Souza et al. from Australia also found GBS as the most common (51.0% of the cases) cause of non-polio AFP followed by transverse myelitis and trauma in 5% of the cases each [3]. The study done by Memon et al. also found GBS (21%) as the most common cause of non-polio AFP followed by hemiplegia (20.79) and encephalitis/meningitis (7.06%) [6]. A study done by Morris et al. also found GBS (47%) as most common cause of AFP followed by transverse myelitis (19%) [5].

In the present study, vaccine virus was isolated in stool samples of 6 AFP cases (2 cases of hemiparesis, 2 cases of cerebrovascular accident and one case each from post diphtheritic paralysis and septic arthritis) D'Souza et al. showed that two stool samples of one case of transverse myelitis yielded poliovirus Type 3 (Sabin like) [3]. During the acute phase, poliomyelitis may present with isolated facial palsy as found in 18% and 11%, respectively, in two studies [15,16]; therefore, it was also included in the AFP surveillance. In this study, isolated facial palsy constitutes 8.56% of AFP cases while the classification was not done in 5.88% of the cases which could be due to lack of stool sample or results might be pending for review by expert review committee.

CONCLUSION

This study shows that AFP surveillance is good in Delhi, and more emphasis needs to be given on slum dwelling as well as migratory population. Routine immunization coverage with OPV has to increase as this will help prevent the re-introduction of wild poliovirus in the community. GBS was the most common cause of AFP followed by isolated facial palsy. Thus, this study confirms the importance of AFP surveillance in detecting various causes of AFP in children including wild poliovirus.

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