CASE REPORT

Echoviruses diagnosed in two Children presenting with Acute Flaccid Paralysis (AFP): An Illustration of the Evolving role of the Zambian AFP Surveillance Programme in the Absence of Polio

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ABSTRACT

Background: The Enteric Cytopathic Human Orphan virus commonly referred to by the acronym ECHO virus has been known to cause acute flaccid paralysis (AFP). Zambia has since 1993 run a national AFP surveillance program to primarily detect and confirm poliomyelitis cases. Through this program other enteroviruses have been confirmed to be associated to the non-polio cases. We describe two patients with acute flaccid paralysis presenting like poliomyelitis and yet are non-polio cases associated with ECHO virus.

Case reports: In March 1995, a 2 year old male from Misisi compound, presented at the UTH with muscle weakness and paralysis of sudden onset. Aside from the acute flaccid paralysis presenting in both legs and arms, the child had no other signs of symptoms of significance. Laboratory investigations using the WHO polio laboratory network standard protocols revealed the presence of ECHO 7 virus.

In April 1995, a 4 year old girl from Kamwala South in Lusaka presented at the UTH with symptoms and signs of AFP of asymmetrical presentation affecting the Left upper and lower limbs, fever and sore throat. Two stool specimens collected for laboratory analysis revealed the presence of Echovirus untyped.

Discussion: AFP is a neurological condition primarily suspected as a poliomyelitis commonly seen in children below 15 years defined by sudden onset of weakness and floppiness affecting usually one or more limbs. Laboratory analysis has revealed other viruses including the Echovirus being associated with acute flaccid paralysis. This case series reveals Echovirus 7 and Echovirus untyped as being associated with AFP cases that presented to the UTH initially suspected to be poliomyelitis.

Conclusion: The clinical manifestations and laboratory results provide evidence of ECHO virus causing acute flaccid paralysis similar to that caused by polio virus. The last wild polio cases circulating in Zambia were in 2001. It is important that Zambia continues to investigate other causes of AFP for clinical decision making, scientific documentation and policy guidance.

INTRODUCTION

Polio virus is the most common of many enteroviruses causing Acute Flaccid Paralysis (AFP), especially among children. They heterogeneous neurologic condition of sudden onset

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of weakness and floppiness of any muscle in a child under 15 years of age or paralysis in a person of any age suspected to have poliomyelitis.[1] The Enteric Cytopathic Human Orphan virus, commonly referred to by the acronym ECHO virus, usually causes mild and nonspecific illnesses with low fever has been found to be commonly associated with AFP.[2,3]

Echoviruses are members of the Enterovirus genus in the picornaviridae family.[4] They consist of 32 serotypes with different temporal patterns of circulation and clinical manifestation. The most commonly reported enterovirus in the USA between 1970 and 2005 was ECHO 9 accounting for 11% of all reports with known serotypes.[5] Grimwood *et al* reported a case of acute flaccid paralysis associated with Echovirus type 33 in a 4 year old boy, while Mehar *et al* reported that 55% of AFP cases among children in Pakistan associated with non-polio enteroviruses were attributed to Echo19.[2,6] Echoviruses circulate worldwide and infection rates vary with season, geography, age and socioeconomic factors of a population. They are known to cause infection throughout the year in the tropics and sub-tropics. In populations of low socioeconomic status, infection is attributed to overcrowded living conditions and poor hygiene.[7]

In 1993, the Ministry of Health working with the World Health Organisation introduced AFP surveillance in Zambia. Although the laboratory system used to support AFP surveillance is primarily designed for the detection and confirmation of wild poliovirus, it also diagnoses other enteroviruses present in the stool the primary specimen collected from cases of AFP. The virology laboratory at the University Teaching Hospital (UTH) in Lusaka, where AFP surveillance cases are tested, processes all stool samples from AFP cases using virus culture techniques. Up until 2003, all non-polio enteroviruses isolated were tested using neutralization assays. Beyond 2003, the AFP surveillance laboratory protocols in Zambia do not include typing of non-polio enteroviruses and so are reported as non-polio enteroviruses.

This paper reports on two patients presenting with AFP that had typical poliomyelitis-like symptoms, but on laboratory analysis were found to be associated with one of the non-polio enteroviruses, the Echovirus. Both patients were from high density residential areas in Lusaka.

CASE REPORTS

Case 1

In March 1995, a 2 year old male from Misisi compound, one of Lusaka's overcrowded high density areas presented at the UTH with muscle weakness and paralysis of sudden onset. Aside from the acute flaccid paralysis presenting in both legs and arms, the child had no other signs of symptoms of significance. Two stool specimen collected for laboratory analysis using viral culture (on human rhabdomyosarcoma (RD) derived cell-line and mouse lymphoma cell-line (L20B) expressing the human poliovirus receptor) and neutralization techniques using the WHO polio laboratory network standard protocols revealed the presence of ECHO 7 virus.[8]

Case 2

In April 1995, a 4 year old girl from a high density residential area in Lusaka presented at the UTH with symptoms and signs of AFP of asymmetrical presentation affecting the left upper and lower limbs. The child had received three doses of tOPV. On admission, she was found to have a fever, sore throat and muscle weakness. Further examination revealed no history of coryza, stiff neck, or vomiting. Two stool specimens collected for laboratory analysis revealed the presence of Echovirus untyped.

DISCUSSION

AFP is a neurological condition commonly seen in children below 15 years defined by sudden onset of weakness and floppiness affecting usually one or more limbs. This condition in the AFP surveillance protocol is primarily suspected as a poliomyelitis.[2,5] Laboratory analyses in other studies on non-polio

isolates has revealed other viruses including the Echovirus being associated with acute flaccid paralysis.[2,5] This case series reveals Echovirus 7 and Echovirus untyped as being associated with AFP cases that presented to the UTH initially suspected to be poliomyelitis. Both children met the case definition of acute flaccid paralysis, with sudden onset of weakness in all 4 limbs in case 1 and one leg and one arm in case 2. Both children come from highly crowded residential areas.

Although polio virus has been found to be the predominant cause of AFP, a number of enteroviruses including echovirus have been reported to cause many neurological disorders including AFP[6]. Enteroviruses, including the Echovirus, are capable of infecting any cell in the body. These viruses are highly infectious. They can spread through the air to other hosts 1–3 weeks after infection and can spread causing human infection through faecal-oral route as does polio virus.[8]

Zambia like many countries with limited resources have conveniently investigated acute flaccid paralysis to determine presence or absence of polio virus without further characterising the non-polio enteroviruses found to be associated with AFP.[6,9] As the global eradication of polio virus approaches, an expected increase in the proportion of non-polio enteroviruses mimicking poliomyelitis will emerge. Echo virus has been found to be one of the top 20 non-polio enteroviruses associated with AFP.[4] Echo virus has been documented to cause AFP and in certain circumstance outbreaks of AFP. The last case of wild poliovirus in Zambia was reported in 2001 and thus is important to further characterize the other causes of AFP whenever they occur.

CONCLUSION

The clinical manifestations and laboratory results provide evidence of ECHO virus causing acute flaccid paralysis with symptoms similar to those caused by polio virus. As we approach global eradication of Polio, clear evidence of the polio virus must be verified and documented so as to provide information for decision making for public health practitioners and health care providers.

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