



Children Developing Gastro Intestinal Symptoms after Oral Polio Vaccination - Beware of CMPA



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Abstract

Child hood immunization to prevent infectious diseases was one of the most successful health care steps in the last century. Presently allergy is increasing all over the world. Cow's Milk Protein Allergy is the commonest food protein allergy in infancy, at the highest vaccine receiving age of life. Few children with CMPA showed Gastrointestinal symptoms like diarrhoea, vomiting and screaming episodes following Oral Polio Vaccination. This initiated the following retrospective observational study to see the present relation and pattern of reactions after polio vaccination in children with CMPA and whether this type of reactions can give a hint towards diagnosis of CMPA in undiagnosed or missed CMPA cases.

Keywords: Vaccination; Child hood; Immunization; Infectious diseases; Cow's milk; Protein allergy

Abbreviations: GI: Gastro Intestinal; CMPA: Cow's Milk Protein Allergy; GERD: Gastro Oesophageal Reflux; OPV: Oral Polio Vaccine; MMR: Measles Mumps Rubella; FPIE: Food Protein Induced Enterocolitis; IgE - Immunoglobulin E

Introduction

Allergy especially food allergy is emerging as a major health issue all over the world. India is no exception. In infant's cow's milk protein allergy is the commonest food protein allergy. In a tertiary centre of eastern India it was being observed that many parents of infants with CMPA were giving a history of precipitation of diarrhoea, vomiting or colic like crying episodes after receiving Oral Polio Vaccine (OPV) either as a part of routine vaccination programme or pulse polio vaccination. On the other hand, children receiving Injectable Polio Vaccine (IPV) did not suffer from such exacerbation or initiation of symptoms in relation to their vaccination schedule. So, a retrospective analysis of the case records of the children with CMPA and without CMPA was undertaken to see how frequently such history was found and what would be the relation between these two phenomena.

Methods

A retrospective analysis of case records of children below 2 years diagnosed with CMPA in a tertiary GI centre of Eastern India, from Jan 2017 to July 2018 was undertaken. At the same time similar analysis of case files of children below 2 years who came with GI symptoms but were not suffering from CMPA was also undertaken. Children who had GI with or without skin and/or respiratory manifestation after oral polio vaccination were noted and specifically analyzed to see the time interval

between receiving of vaccine and onset of symptoms, duration of symptoms and measures for the relief of symptoms. CMPA was diagnosed with the removal of milk and milk products for the baby for 1 month and doing a milk challenge after 1 month to see reappearance of symptoms. Children with skin and/or respiratory symptoms also had IgE against cow's milk tested. IgE positivity was diagnostic. Those with negative results but with GI symptoms were diagnosed by omission of milk from diet and re-challenge as mentioned above.

Results

Total of 92 children with CMPA and 50 children who did not have CMPA were analysed. All of them were aged below 2 years. Male were 45 (52%) in the CMPA group. In the control group 30(60%) were male. History of diarrhoea/bloody diarrhoea first time occurring after routine vaccination with oral polio and DPT was obtained in 6 children before diagnosis of CMPA. Worsening of GERD/ vomiting and screaming episodes before diagnosis of CMPA was noted in 5 patients. 8 patients after diagnosis of CMPA developed diarrhoea, 4 developed vomiting and 2 developed respiratory distress after OPV administration. All these symptoms were treated symptomatically in pre-diagnosed CMPA cases and got relieved on an average within 5 days but in those children whose diagnosis were not established before symptoms they remain symptomatic continuously or intermittently for

more duration (months) until CMPA was properly diagnosed. 2 from the control group had GI symptoms after OPV. Rest did not have any relation with vaccination and GI symptoms.

All together 25 (27%) children with CMPA were symptomatically affected after receiving OPV whereas from the non CMPA group only 2 (4%) children were affected. By the application of Fisher's Exact test two-sided mid p was 0.0004 which was statistically significant.

Discussion

Childhood immunisation to prevent infectious diseases was one of the most successful health care steps in the last century. Vaccines contain an antigen and additional components such as additives, adjuvant and traces of other substances. Despite a long-lasting debate, the approach to vaccination in children allergic to additional constituents remains one of ambiguity and concern for most pediatric health care professionals [1]. Ideally before vaccination, parents must be asked whether the child has ever experienced any allergic sign or symptom after a vaccination even if those were not reported or diagnosed to be allergy. But GI symptoms are often ignored while considering adverse events after vaccination. Vaccinator should be trained to recognize when the referred reactions were allergic. Furthermore, in the pre-vaccine anamnesis, all prior adverse reactions must be addressed, including those to additional vaccine components such as: culture media antigens, adjuvants, preservatives, stabilizers, antimicrobial agents, additives [2,3].

Milk proteins are often used as stabilizers or emulsifiers in food derivatives. Some vaccines could contain hidden milk proteins, in order to prevent viruses from degradation [1]. Anaphylactic reactions have been reported in milk and egg-allergic children after MMR vaccination [4]. Parisi et al. [5] demonstrated that patients who showed anaphylactic reactions minutes after vaccination with OPV and MMR were allergic to cow's milk and had raised IgE antibodies specific to cow's milk proteins and OPV5. They also identified the presence of alpha-lactalbumin in OPV, raising the concern that this whey protein might have triggered the allergic reactions following vaccination with OPV. Fortunately, none, in our analysis showed severe reactions like above studies.

Allergy is emerging in India. At this juncture this is the first study to observe the relation of vaccination and symptoms in diagnosed and undiagnosed CMPA patients. What this study adds is that any reactions after vaccination including GI symptoms should not be ignored. These need to be asked to all the patients who are coming to be vaccinated. Pulse polio program administers additional doses of OPV to all the children. This can raise the sensitivity in patients with existing allergy whether diagnosed or

undiagnosed. Although a causal relations of worsening or onset of symptoms after OPV was not established by Skin Prick Test or IgE testing in this study but the fact, of about 25% children with CMPA developing some reactions while only 4% in control group developing GI symptoms (two sided mid p of 0.0004) establishes a relation with vaccination and CMPA.

The estimated risk of severe allergic reactions following vaccination during the 2009 campaign was 1.2 cases/million doses of OPV⁶. Bohlke et al. have reported an overall vaccine-specific risk of 9.2 cases/million doses of OPV [6]. Allergic reactions to vaccines are rare. But Paediatricians dealing with this kind of patients who had persistent GI or skin manifestation after OPV should have high index of suspicion of CMPA and should specifically work this child up for CMPA.

We believe that children should receive OPV because there is no evidence-based recommendation for avoidance [7]. But in children with established diagnosis of CMPA, where IPV administration is feasible, OPV might be omitted to avoid development of GI symptoms and making children unwell. However, providers should be prepared to respond with emergency medications if an anaphylactic reaction occurs. Health workers doing home visits for pulse polio if in doubt should avoid giving additional dose of OPV to CMPA patients who had previous history of anaphylaxis to cow's milk protein or severe FPIE. Though this needs additional training of the health care workers and little bit of more time consumption for history taking but with the emergence of allergy wave this is worth considering.

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