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CASE REPORT

A suspected case of diphtheria, pertussis and tetanus vaccine (DPT) induced seizure in a paediatric patient.

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ABSTRACT

A 4-month old male child developed convulsions possibly following diptheria, pertusis (whooping cough), and tetanus (DPT) vaccine used for routine immunization. A diagnosis of vaccine induced seizures was made after ruling out other possible causes for seizures. Pertusis fraction of whole cell DPT vaccine is associated with neurological complications such as seizures and encephalopathy. It is advisable to use acellular DPT vaccine.

Key words: DPT vaccine, seizure, child.

INTRODUCTION:

Immunisation is an important part of child care practice. It is one of the most beneficial and cost effective measure of the prevention of diseases.[1] DTwP vaccine popularly known as triple antigen, is composed of tetanus and diphtheria toxoids as well as killed whole cell pertussis bacilli. Most adverse effects are due to the pertussis component. Minor adverse effects like pain, swelling and redness at the local site, fever, irritability, anorexia and vomiting are reported in almost half the vaccinees after any of the 3 primary doses. Serious adverse effects have been reported with DTwP vaccines but are rare.[2] The frequency of these side effects per 1000 doses are: persistent crying (4 - 8.8), fever (0.2 - 4.4), seizures (0.16 -0.39), hypotonic hyporesponsive episodes (0.06 - 0.8), and encephalopathy (0.007).[2] Here we report a case of DPT induced seizure in a child possibly due to pertusis fraction.

CASE REPORT:

A 4 month old male child weighing 6 kgs was brought to the paediatrics outpatient department of KIMS Hospital with complaint of single episode of generalised clonic tonic seizures within hours following vaccination with 2nd dose of DPT vaccine under routine immunisation program. Child had post ictal drowsiness at admission with other vital parameters being normal. There was no history of seizure after 1st dose of vaccine. There was no history of head injury, trauma, ear discharge or previous history of seizures. Antenatal and peri-natal periods were uneventful. Developmental milestones were appropriate for age. Investigations showed Hemoglobin 9mg/dl, Total leucocyte count- 18,900 cells/cumm, Serum sodium 130 mmol/L, Serum potassium K-4mmol/L, Serum Creatinine-0.7mg/dl, Urea-10mg/dl, Total Bilirubin-0.8 mg/dl, Direct bilirubin-0.4 and Serum calcium-10.6 mg/dl. A suspected case of post vaccination seizures was made. Child was administered midazolam intravenously and no further episodes of convulsions occurred after admission. Lumbar puncture, CT scan or MRI was not done. The patient improved with above treatment, recovered on 2nd day and was discharged on 4th day of admission. Child was followed up in OPD after 3 months and no neurological sequel was found.

On Naranjo's causality assessment scale score was 6 indicating probable reaction.[3] On Modified Hartwig and Seigel's scale it is Level 4 (b) indicating moderately severe reaction.[4] According to Modified Schumock and Thornton's preventability scale, this reaction was not preventable.[5] Adverse event following immunisation shows it to be consistent causal association vaccine product related reaction.

DISCUSSION:

A successful immunization program is of particular relevance to India, as the country contributes to one-fourth of global under five mortality with a significant number of deaths attributable to vaccine preventable diseases.[1] There is no doubt that substantial progress has been achieved in India with wider use of vaccines, resulting in prevention of several diseases. An adverse event following immunization (AEFI) or vaccine associated adverse event (VAE) is defined as an untoward (temporally associated) event following immunization that might or might not be caused by the vaccine or the immunization process. These events may be recognized

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during clinical trials or during post marketing surveillance. Most parenteral vaccines induce some degree of local reactions including pain, erythema and induration. Fever is the most common systemic reactions. Reactions are more common with whole cell pertussis vaccines and aluminium adjuvanted vaccines (DTPw, DTaP, DT, Td, etc). Anaphylaxis or anaphylactoid occur rarely at a frequency of 1 per 10,00,000 vaccinees.[2] It is extremely important to distinguish vaccine reactions that are causally related to the vaccine (adverse vaccine reactions) from other adverse events so that compliance to vaccines does not drop. Pertusis component of DPT vaccine is mainly responsible for neurological reactions. It causes neurological damage: by affecting cellular signalling, catecholaminergic and GABAergic systems and defect in blood brain barrier due to endotoxin-mediated endothelial damage.[6] Whole cell pertusis vaccine induces IL-ß production in the hippocampus and hypothalamus of vaccinated animals. This leads to decrease in release of the inhibitory neurotransmitters GABA and adenosine in the hippocampus and induce convulsive activity. Acellular type does not induce the IL-1β production.[6] Concern over minor, serious and "devastating" adverse effects of the pertussis component of the whole cell vaccines led to development of the acellular pertussis vaccines in Japan in 1981.These were licensed in the US in 1996 and have now replaced the whole cell vaccines in many developed countries. Absolute contraindications to any pertussis vaccination (including DTwP vaccine) are history of anaphylaxis or development of encephalopathy within 7 days following previous DTwP vaccination. The efficacy and duration of protection with DTaP vaccines against diphtheria/ tetanus and pertussis is similar to that afforded by the whole cell vaccines. DTaP vaccines are not more efficacious than DTwP vaccines, they have fewer adverse effects. According to WHO, local and nonserious systemic reactogenicity are more commonly associated with whole-cell pertussis containing vaccines. However, acellular pertussis containing vaccines are unlikely to be currently affordable in most developing countries and there is insufficient marginal benefit to consider changing from wholecell pertussis-containing vaccine to acellular pertussis-containing vaccine. By 2009, 1 of the 49 least developed countries and 13 of 88 developing countries have adopted acellular pertussis vaccine into their national immunization programs.[7] The Indian Association of Pediatrics Committee on Immunisation also unequivocally endorses the continued use of DTwP vaccine in EPI because of its proven efficacy and safety.[2] The use of DTaP vaccine in office practice should be following one to one discussion with parents. The DTaP vaccines may be preferred to DTwP vaccines in those children with history of severe adverse effects following DTwP vaccines or children with neurologic disorders, if resources permit. The schedule is same as with DTwP vaccines.[2]

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