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Case Report

Child with diphtheria pertussis and tetanus induced afebrile seizures

Vijay B. Sonawane, V. Kotrashetti, Kapil Bainade, Shweta Nair, Samarth Gupta*

Department of Pediatrics, D. Y. Patil Medical College, Mumbai, Maharashtra, India

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***Correspondence:**
Dr. Samarth Gupta,
E-mail: samarthfrancis@gmail.com

ABSTRACT

Current childhood vaccines are safe and effective but diphtheria pertussis and tetanus vaccine (DPT) has been considered to be one of the most reactogenic. The adverse reactions after immunization with adsorbed DPT vaccine have been widely debated and publicized. The conventional whole cell pertussis vaccines expected to give certain minor and local reactions as it contains lipopolysaccharide and active pertussis toxin (PT). Reactions occurring after DPT vaccine have been described mostly to the pertussis component of the vaccine. Vaccination with diphtheria and tetanus toxoids and whole cell pertussis, DPT vaccine was associated with a risk of seizures and encephalopathy.
We report a case of sixteen month old male patient presented with atypical presentation of afebrile seizure after DPT vaccine.

Keywords: DPT vaccine, Adverse reactions, Pertussis, Seizures, Immunization

INTRODUCTION

Vaccination against pertussis was first linked to adverse neurologic events in 1933.[2] One study found that with an elevated risk of seizures and encephalopathy (relative risk 3.3) also in another study, receipt of diphtheria pertussis and tetanus (DPT) vaccine was associated with an increased risk of febrile seizures within three days after vaccination (relative risk 3.7), but not of afebrile seizures noted.[1,3]

However, two other studies found no significant increase in the risk of febrile or non-febrile seizures after immunization with DPT vaccine.[4,5] A meta-analysis of these studies estimated that receipt of DPT vaccine was associated with a relative risk of febrile seizures of 1.8 (95 percent confidence interval, 1.2 to 2.7) but was not associated with an increased risk of non-febrile seizures.[6]

We report a case of sixteen month old male patient presented with atypical presentation of afebrile seizure on the same day after vaccination with DPT vaccine.

CASE REPORT

A 16-month-old male, developmentally normal, fully immunized child was presented to the outpatient department (OPD) with afebrile convulsion. Patient had vaccination of DPT on the same day at 2:30 pm from a hospital after which child started convulsion. Then the child had a single episode of seizure lasting for 2-3 minutes, approximately seven hours after vaccination. It was a generalized tonic-clonic seizure associated with up-rolling of eyeball and was associated with post ictal drowsiness lasting for about ten minutes but not associated with bowel and bladder incontinence. There was no significant family history of seizures. There was no history of fever at all associated with seizures. Antenatal, intranatal and postnatal history was uneventful. There was no history of fall or trauma or head injury.

On examination patient was conscious, alert and oriented and vitals parameters being normal. On anthropometric evaluation, child comes as normally built and well nourished. General physical and systemic examination including central nervous system (CNS) were normal

along with normal cranial nerve examination and no signs of cerebellar involvement and meningeal irritation. For evaluation of etiology of seizures, complete blood count, serum electrolytes, serum calcium, serum magnesium, serum phosphatase, urine routine, erythrocyte sedimentation rate and C-reactive protein were done. Serum magnesium was raised as 4.0 mg/dl, also serum phosphorous was mildly raised as 5.8 mg/dl and alkaline phosphatase was 334.4 IU/l (normal=30-140 IU/l) which were idiopathic incidental findings but except this, all other investigations were normal. Electroencephalography (EEG) and magnetic resonance imaging (MRI) brain were also normal. Child was recovered fully with symptomatic management.

DISCUSSION

This child presented with single episode of afebrile seizures immediately on day of receipt of DPT vaccination. Differentials of various common etiologies of seizures like metabolic disorders like (e.g. hypocalcaemia, hypoglycaemia, hyponatremia, hypernatremia, hypokalaemia, hyperkalaemia, hypomagnesia, etc.), infectious and structural were considered and detail work up was done. Serum magnesium, alkaline phosphatase and serum phosphorous were slightly higher than normal range incidently but rest all reports were showing values within normal range. EEG and MRI brain were also normal. A significant association between time of immunization with DPT vaccine and the occurrence of afebrile seizures was observed in present case. Whole cell pertussis vaccine induces the interleukin, IL-1β production in the hippocampus and hypothalamus of vaccinated animals. This leads to decrease in release of the inhibitory neurotransmitters gamma-aminobutyric acid (GABA) and adenosine in the hippocampus and induce convulsive activity. Acellular type did not induce the IL-1β production.[7] Subsequently, Farrington et al found that the risk of febrile seizures was elevated during the first three days after the ad- ministration of DPT vaccine (relative risk 3.0; 95 per- cent confidence interval 1.6 to 5.5), though only in association with the third dose of vaccine.[8] Whole-cell pertussis vaccine has also been associated with serious neurological illnesses characterized by sodium channel gene mutations.[1,2]

A study from the United Kingdom found a 2-fold higher risk of seizures on the day of the diphtheria- tetanus toxoids-acellular pertussis– inactivated poliovirus–haemophilus influenzae type b (DTaP-IPV-Hib) vaccination.[9,10] It is suggested that acellular pertussis vaccine should be used instead of whole cell vaccine because it is associated with lower frequency of neurological complications, such as seizures, encephalopathy, and hypotensive episodes.

However, acellular pertussis-containing vaccines are currently not as popular as expensive in most developing countries. Indian academy of paediatrics also endorses the continued use of whole cell pertussis vaccine.[11,12]

CONCLUSION

Receipt of DPT vaccine was associated with increased risk of febrile seizures on the day of vaccination. Since all whole cell pertussis vaccines contain endotoxin, fever can be expected to be common; consequently, febrile convulsions would also be expected to occur. But in present case, a significant association between time of immunization and the occurrence of afebrile seizures was observed atypically .There are significant risk of febrile seizures post DPT vaccination but not commonly associated with afebrile seizures as reported in this case but these risks do not appear to be associated with any long term adverse consequences.

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