

(61)

## Report of the investigation of Adverse Event Following Immunization - Thiruvananthapuram District

### 1 Introduction

Government of Kerala introduced a pentavalent *DwPT HepB HiB* vaccine in the routine immunization schedule on 14 December 2011 to replace the DPT and Hepatitis B vaccines. On 15 December a death of a 58 days old child was reported which has temporal relationship with pentavalent vaccination on 14 December. The CHC Vithura District Health office Trivendrum and State Health department initiated investigation of this incident on 15 December. Ministry of Health, government of India set a team to assist state government to investigate this incident on 16 December. The team consisted of Dr. N. K Arora, Executive Director of INCLIN and Chairman, National AEFI Committee and Dr Jayantha Liyanage, IVD/SEARO/WHO. This report presents activities undertaken by the investigation team, findings of the case investigation, vaccine management and injection safety practices at CHC Vithura, findings of the post mortem and community investigation of the other children vaccinated from the same vial. The report concludes with analysis of available information and further suggestions to complete the investigation.

### 2 Activities Undertaken during the visit of the team from national level.

- On 15 and 16 December Principal Secretary of Health, State MCH director and State EPI focal point briefed the team about the initial findings of the investigation. Based on that the joint team agreed on a protocol for the investigations.
- The protocol included the following:
  - Discussions with parents of the children who died and other children who were vaccinated from the same vial
  - Discussions with the Medical Officer In-charge of CHC Vithura
  - Review of the injection safety and vaccine management of the CHC Vithura where the child was vaccinated; and
  - Review of the findings of the post mortem report
  - Review of the similar illness in the area and background infant mortality rates of Kerala

### 3 Findings

#### 3.1 Case history

Name: [REDACTED]

Baby of [REDACTED]/Father's name- [REDACTED]

Date of Birth: 18/10/2011

Sex: Female: Birth weight- 2.5kg

#### HPI:

History was obtained by two sources.

1. On 15 December the Dr G Niju, Medical Officer In-charge CHC Vithura and Dr Peethambaran District medical Officer Thiruvananthapuram district and Dr Unikrishnan, District Programme Manager NRHM have obtained the information about sequence of events after vaccination from the grand mother of the child. Accordingly the child was vaccinated around 11.00 A.M on 14 December. Child got fever in the night but temperature was not measured. Child was breast fed time to time and was sucking well. Until around 12.00 mid night child as kept in

15

the cradle. Child was given 2 ml of syrup paracetamol around 12.00 mid night. After that child was kept in mother's bed. Time to time child was breast fed. Around 5.00 A.M mother saw that child was sleeping. Then she has gone out. Around 8.00 A.M when mother has come back she noticed blood coming from nostril. Child could not be awakened but was warm. Then they have called for emergency ambulance. Since the ambulance was delayed grand mother and grand father brought the child in a private vehicle around 9.00 A.M. They met the ambulance near to the hospital and child was put in the ambulance and brought to CHC Vithura.

2. On 17 December Dr N.K Arora obtained the history from the mother of the child with the assistance of Dr G Niju for the translation. According to the mother, she took the child for vaccination and child was vaccinated on 14 December 2011 around 11.00 A.M. Around 5.00 P.M mother felt child is having fever but temperature was not measured. Child was given 2 m.l of syrup Paracetamol After that fever subsided. Again child got fever around 12.00 mid night and another dose of paracetamole was given. Up to 12.00 mid night child was kept in the cradle. After that child was with the mother on the bed. Child woke up several times and was crying. This is the usual behavior of the child during the latter half of the night since birth. Then by 8.00 A.M child slept after a breast feed. Through out the night child was sucking normally. Mother kept the child on the bed and attended the older child who is two years old. When she came back around 8.30 A.M there was bleeding from the nose of the child. Mother noticed patch of blood around 3 cms diameters on the bed cover. She tried to wake up the child but was not successful. Then other members of the family came and started making arrangement to take the child to hospital. No history of symptoms indicating hypotonic hyporesponsive syndrome

According to Dr Niju who examined the baby, the child was dead when brought to the CHC at 9.30 A.M. Except the injection mark, there was no skin rash or any other external injury or bite marks. There was bloody froth at left nostril and pallor. There were no other visible signs.

**PMH:**

The mother of the baby completed ANC visits at KTCT hospital. Baby was delivered by normal vaginal birth at KTCT hospital Alamcode on 18/10/11 at 36 weeks of gestation with birth weight of 2.5kg. Child had physiological jaundice (Serum bilirubin 12mg/dl) and was kept in the hospital for 2 days. On 20<sup>th</sup> October child was given B.C.G, OPV and HBV and discharged. After that there was no other illness or hospitalization. On the day of vaccination weight was 4.00 K.G

**Family/Social History:**

The baby lived with mother, elder sister and maternal grand parents in maternal home. Father is working in Qatar and reached home after the death of the baby. The baby was exclusively breast fed without any supplemental food or water. No consanguinity. Elder child is two years old and was also examined by Dr N K Arora. She did not have any other apparent illness except for allergy due to mosquito bites.

None of the other family members or the person who looked after the child had any illness recently. No increased incidence of febrile illness reported in the area

### 3.2 Postmortem report

Postmortem examination was done by Dr K. Sasikala, professor of Forensic medicine and Dr Sharifa Assistant Professor of Forensic medicine, Medical College, Thiruvananthapuram. Finds of the preliminary report was shared by the Secretary of Health to the investigation team. According to the report

"Body was that of a moderately nourished female infant of length 55 cm. Head shaven. Eyes closed. Conjunctivae pale. Corneae clear. Pupils dilated and equal on both sides. Blood stained frothy fluid coming through the left nostril. Hymen intact and admitted tip of little finger with difficulty. Faecal discharge present around anus. Other external body orifices were normal. Lips and finger nails were blue. Injection mark was seen on the front of left thigh 5cm above knee with oedema and infiltration around involving the muscles and subcutaneous tissue over an area of 9.8x7.9x4.7 cm.

Rigor mortis fully established and retained all over the body. Postmortem staining was on the back; not fixed. There was no sign of decomposition. Body was not refrigerated.

No injury was seen on the body.

Glottis was oedematous. Brain soft, congested and oedematous. Air passages congested and contained blood stained froth. Lungs (right 55gm; left 44gm) showed a mottled appearance and congestion. Petechiae present on the surface of lung. Heart (22gm) showed petechiae on the surface. Myocardium was pale. Kidneys (right 16gm; left 14gm) were lobular and congested. Bilateral adrenal bleeding present. Stomach contained a few ml of curd like milk having no unusual smell. Mucosa congested. Uterus infantile. Mesenteric lymphnodes were prominent. Urinary bladder empty. Mucosa was normal. All other internal organs were congested otherwise normal.

Viscera and sample of blood tissues from the site of injection were collected and sent for chemical analysis. Tissue bits preserved and sent for histopathological examination.

#### OPINION AS TO CAUSE OF DEATH

Postmortem findings are consistent with death due to hypersensitivity reaction. Final opinion is reserved pending the report of laboratory investigations"

### 3.3 Vaccines used for the immunization

The child was give pentavalent vaccine (Manufactured by Serum Institute of India batch number 124L1028A) and OPV (manufactured by Haffkine BPCL batch number PV 1109044). Pentavalent vaccine vial was a 10 dose vial. Seven other children have been vaccinated from the same vial

### 3.4 Epidemiological investigation of the other children

Staff of CHC Vithura has followed up all children. Until 18 December none of the other children had any illness. Dr Arora examined two of those children at CHC Vithura and two children in their homes. All four of these children were normal. There was mild

54

induration at the injection site. But there was no redness at the site. According to the mothers of all four children each child had fever on the date of vaccination. None of the mothers had measured the temperature. However all of them had been given two doses of paracetamol syrup. One mother told she gave first dose of paracetamol to her child to prevent child getting fever.

More than 10,000 children have been vaccinated with pentavalent vaccine in Kerala up to 18 December. No other severe event temporally associated to the pentavalent vaccination was reported.

### 3.5 Observations on injection safety and cold chain management

Team observed injection practices in the Vithura CHC. There was no vaccination on the day of the visit. However the team questioned the nurses about injection practices including drawing of the vaccines, injecting the vaccine, maintaining aseptic conditions, and disposing of AD syringes. All five nursing staff seem to have correct knowledge about them. Hence it can be assumed that injection safety practices were good in the CHC Vithura clinics visited.

All vaccines are kept in an ILR. The pentavalent vaccine and all other vaccines were in VVM stage one. Temperature monitoring was properly done. The general condition of the vaccines was excellent. There was no co-storage of vaccines and non-vaccine products in the same refrigerator.

The pentavalent vaccine vial used to vaccinate the child who died has been kept in the refrigerator. VVM was in stage one. Color of the vaccine was as of unopened vials.

Multi dose vial policy is adapted to pentavalent vaccine and vaccines remained after immunization session is kept for 28 days or four sessions, whichever ever the earlier.

There is a practice in CHC to keep all partially used vaccine vials for one week after the vaccination.

### 3.6 Background data on infant mortality and other febrile illness

The population of Kerala is 33387677 according to the 2011 mid year estimates. The estimated number of births per year is 490798. Since infant mortality rate is 12 per 1000 live births around 16 infants are likely to die in Kerala each day. Similarly around 1-2 infants are likely to die in Trivendrum district

Dr Niju mentioned there is no usual illness in the area currently. The incidence of febrile illness has not increased

## 4 Discussion

Child got Penta1/OPV1 at 8 weeks. Child was last observed by the mother 30 minutes before the death. At that time child seemed to be normal. Child has died 20 hour after vaccination. The reported events preceding to the death are very rapid and nobody has observed that. The mother's observation and Dr Niju's observation and postmortem finding of blood in the respiratory track and left nostril tally each other. This sort of finding has never previously been reported related to any any component of pentavalent vaccine. Postmortem report shows evidence of asphyxia. However the Forensic

58 2

pathologist is awaiting histopathology report to provide the cause of death. All other children who have been vaccinated from the same vial are normal. Cold chain and injection safety seems to be good at the health facility.

Considering the above situation the death is unlikely to be a programme error or due to vaccine associated to the vaccination.

All the children seem to be getting paracetamol after vaccination. Some of them may not require the medicine. It would be beneficial to find any reported allergies due to paracetamol.

Although the vaccine is unlikely the cause of death, since the remaining part of the vaccine is available that could be tested in a appropriate laboratory based on the advice of toxicologist considering the postmortem and the sudden bleeding of the nose.

Based on available clinical history, examination findings when diseased child was brought to the CHC and detailed post mortem findings a toxicologist may advise for further investigation of postmortem blood samples and other viscera or any particulars points of interest during histological examination.

To avoid any doubts in the future it would be beneficial to share the this report with members of national AEFI committee and if necessary ask the opinion of WHO's global expert panel on AEFI.

5 Documents enclosed with the report

1. First information report of AEFI
2. Birth record of the child
3. Medical officer in-charge's notes when diseased child was brought to hospital
4. District wise Estimated infant death In Kerala