Short Communication

Transplacental Transfer of an Organophosphorus Compound

Hemanth Kumar R Godekar

ABSTRACT

The incidence of organophosphorus compound (OPC) poisoning is very high in India, since these compounds are used extensively as insecticides in agriculture and households. Poisoning by ingestion and through skin contact is quite common with these agents.

We report a case of transplacental transfer of dichlorvos, an organophosphorus compound, as a result of suicidal ingestion by a woman in her 24th week of pregnancy, which resulted in the death of both the mother as well as the foetus, highlighting the ease with which OPCs can cross the transplacental barrier, and the need for aggressive treatment measures in such cases.

Key Words: Insecticide; Organophosphorus compound; OPC; Dichlorvos; Transplacental barrier

Introduction

Poisoning with organophosphorus compounds (OPCs) is an important cause of morbidity and mortality in all parts of the world, especially developing coutries such as India.¹ Organophosphorus compounds are used extensively as insecticides in agricultural and domestic settings.² Because of wide usage and easy availability of these compounds, there is a substantial incidence of fatal poisonings in developing countries.³

Exposure of pregnant women to organophosphorus compounds is an important clinical entity because of its effects on two organisms, mother and the foetus.⁴ In this paper we report such a case of intoxication from dichlorvos, an organophosphorus compound resulting in death of the mother and foetus. This case highlights the ease with each OPCs can cross the transplacental barrier and cause serious harm to the foetus.

The Case: A 27 year-old pregnant woman, working in a poultry farm, was brought to the emergency department of our hospital with history of consumption of an organo-phosphorus insecticide (dichlorvos), which was used for pest control in the farm. On arrival, she along with her foetus were declared dead, and the body was subjected to medicolegal autopsy.

Externally, froth was observed around the oral cavity and nasal orifices. An enlarged uterus was felt at the level of the umbilicus. No external injuries were present over the body. Internally, stomach contents comprised 1.4 litres of green colored fluid admixed with rice particles (**Fig 1**). Mucosa of the stomach was congested. Uterus was enlarged measuring 28cm x 20cm, and weighed 1290 grams (**Fig 2**). On opening the uterus, the foetus was found in the vertex presentation (**Fig 3**). The foetus weighed 540 grams; crown-heel length was 30 cm. Scalp hair and eyelashes were present along with the centre for calcaneum, which was observed on further dissection.

Postmortem samples of blood, stomach contents, liver and kidney from the mother, along with foetal liver were sent for toxicological analysis, which revealed the presence of organophosphorus compound (consistent with dichlorvos).

Dept of Forensic Medicine and Toxicology, SDM College of Medical Sciences and Hospital, Sattur, Dharwad-580009, Karnataka.

E-mail: drhemanthkumarrg@yahoo.co.in



Fig 1 Greenish Stomach Contents



Fig 2 Enlarged Uterus in the Pelvis



Fig 3 Foetus in the Uterus

Discussion

Suicides by pregnant women are commonly accomplished by overdosing on prescribed medications, alcohol and illicit drugs.^{5–11} Pesticides are also commonly used.^{12–16} Organophosphorous compounds on account of their easy availability are among the frequently used pesticides.¹⁷ In the present case, the deceased had consumed dichlorvos, an organophosphorus compound, resulting in her death along with that of the six month-old foetus. Poisons (including pesticides) ingested by the mother can cross the placenta and accumulate in the foetal organs, and as a consequence damage the foetus at various stages of gestational development.

There are very few case reports in literature about foetal toxicity of organophosphorus compounds due to tansplacental transfer. On reviewing the literature, it could be ascertained that any chemical with molecular weight less than 1000 can cross the placenta. As most organophosphorus compounds have molecular weight less than 500, they are capable of overcoming the placental barrier and cause overt signs and symptoms in the foetus, or can lead to deleterious effects such as malformations, low birth weight, and may even result in still birth and foetal death.^{18,19} The transfer of pesticides across the placenta from mother to foetus depends on mother's serum concentration, surface area of the placenta, and thickness of the membrane barrier.

Apart from acute intoxication, chronic exposure of pregnant women can also cause foetal morbidity with CNS disorders twelve times higher than the general population.²⁰ Organophosphorus compounds are also secreted into breast milk, where the concentration is often higher than the maternal serum because of the tendency of these compounds to concentrate in fatty tissues.

Conclusion

Transplacental transfer of organophosphorus compounds is not uncommon as revealed in this case. Early and timely delivery of the foetus during the phase of acute intoxication in the mother may save the life of the foetus, or prevent serious morbidity.

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