รายงานผู้ป่วย

Insecticides optic neuritis

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Ubolsing S, Insecticides optic neuritis. Chula Med J 1991 Nov; 35(11) : 745-749

Insecticides are very important in developing countries. There are many kinds of toxic effects and may involve many systems if used with insufficient attention. This paper describes 2 cases of visual symptoms involvement that occured in 2 men who had been using a certain insecticide preparation for treating farmworm. The exact formulation of the insecticide is unknown, but it contained organo-phosphate compounds. One case presented the symptom of contracted visual field but the other presented with severe visual loss. History of exposure to the insecticide spray, followed by the visual symptoms, is therefore, considered to be the cause of the condition.

Key words : Optic neuritis.

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Received for publication. November 15, 1991.

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ศิริพัช อุบลสิงห์. ประสาทตาอักเสบจากยาฆ่าแมลง. จุฬาลงกรณ์เวชสาร 2534 พฤศจิกายน; 35(11) : 745-749

ยาฆ่าแมลงเป็นสิ่งสำคัญและจำเป็นต้องใช้ในประเทศที่กำลังพัฒนา แต่มันก็เป็นสารพิษที่มีพิษภัยต่อร่างกายมนุษย์อย่างมากมายถ้าใช้อย่างไม่ระมัดระวัง มีผลเสียต่อหลาย ๆ ระบบในร่างกาย เช่น ระบบทางเดินอาหาร, ระบบการหายใจ และระบบประสาท เป็นต้น ผู้เขียนได้รายงานผู้ป่วยชาย 2 ราย ที่มีอาการทางประสาทตาภายหลังจากที่ใช้ยาฆ่าแมลงฉีดพ่นในนา ซึ่งยาฆ่าแมลงที่ใช้นี้อยู่ในกลุ่มของอินทรีย์สารของพวกฟอสฟอรัส รายหนึ่งมาด้วยอาการของลานสานตาแคบลงอย่างมาก ระดับสายตาลดลงเล็กน้อย แต่อีกรายหนึ่งมาด้วยอาการของระดับสายตาลดลงอย่างมาก

Insecticides are very useful and very important to national economy. Their uses are : destroying farmworm, woodworm and some kinds of insects that may be carrier in some diseases. Most of the insecticides are synthesized. These toxic substances are very dangerous to human too if handled carelessly. There are 4 groups of insecticides, according to chemical ingredients.[1]

1. *Organo-phosphate compounds*
   eg. parathion, malathion, trithion etc.
   This group of insecticide is used for treating farmworm, widely used in agriculture.
2. *Chlorinated-hydrocarbon compounds*
   eg. D.D.T, dieldrin, endrin, aldrin, heptachlor etc.
   This group of insecticide is used for treating woodworm, insects in the houses and carrier insects.
3. *Organo-nitrogen compounds*
   eg. methomyl
4. *Miscellaneous*
   eg. carbamate, rotenone, organic sulphur, organic mercury, calcium cyanide etc.

The insecticides in group 1 and 2 are well known and widely used, but group 3 and 4 are less used. It can be transfered into the human body in 3 ways,[2] through skin, by ingestion and by inhalation. Toxic effects of these insecticides may present as skin diseases such as rash, itching, urticaria and dermatitis, digestive system such as nausea, vomiting, abdominal pain, diarrhea etc., eye symptoms such as lacrimation, conjunctivitis, blurred vision etc., respiratory symptoms such as running nose, dyspnea, chest pain etc. and neurological symptoms such as dizziness, headache, fatigue, peripheral neuritis, tremor, ataxia, motor weakness, confusion, sleeping, convulsion and coma. Bronchial spasm and respiratory failure are the causes of death. In experimental animals, prolonged exposure to insecticides in group 2 will cause liver and kidney damage.[3] Prolonged exposure to D.D.T can accumulate and cause anemia, leukemia, liver necrosis and CA liver[4]

Dr. Phoon (1975)[5] reported that during 1966-1970 at Dumnernsaduoc, Rajaburi, Thailand, there were 320 patients who presented many symptoms of toxic effects from insecticides and among these patients, 24 were dead.

In this paper, 2 farmers with ophthalmological symptoms have been described after exposure to a proprietary insecticide which contained organophosphated compounds. Prolonged exposure and in large quantity without protection and sufficient attention, caused eye-symptoms, that is contracted visual field and decreased visual acuity.

Case report

Case 1

A Thai farmer, aged 25 years, attended the eye clinic at Chulalongkorn Hospital on January 9, 1985, with a history of headaches, dizziness and his eyes had been deteriorating for 1 month. He sprayed a certain insecticide in his farm 5 times in the previous 4 months in the area of 10 rai. He noticed that every time he sprayed the insecticide, he had the symptoms of dizziness and headache. One month before he came to the hospital he had experiened the symptoms of eyepain, tearing, poor vision, severe headache and narrowing of the field that he had ever seen.

He was a healthy man, non-smoker, non-drinker and had no history of hypertension, diabetes mellitus, asthma, T.B. or hypersensitivity to any kind of substance. One of his younger brothers was blind both eyes at 14 year of age with a history of headache, eye pain and gradual loss of vision until he became absolutely blind without any treatment.

Examination revealed no abnormality in the chest, heart, abdomen or central nervous system. His blood pressure was 100/70 mmHg; pulse rate and respiratory rate were normal. Chest and skull X-rays were normal.

Eye-examination revealed visual acuity = 20/40 both eyes, not improved with pinhole. General inspection revealed no squint, full eye movement in all directions, no injected conjunctiva, clear cornea, normal anterior chamber, pupils 4 mm diameter both-sides, no lens opacity, clear vitreous. Both optic discs showed slight congestion, blurred disc margins, dilated and engorged retinal blood vessels, positive venous pulsation in both eyes. Macula were normal. The visual field of each eye was narrowing, left with only central vision about 8° both eyes. Ocular tension was 17 mmHg in the right eye, and 15 mmHg in the left eye. The diagnosis of this patient was bilateral optic neuritis-toxic amblyopia due to insecticides.

Lab investigation : CBC and urine analysis showed no abnormality, blood serum cholinesterase = 128 units (normal 85-135 units). The patient was sent to be checked up for carbamate level but he was lost. The progression of the disease could not be determined.

Case 2.

A Thai farmer, aged 23 years, came in the

eye clinic Chulalongkorn Hospital on April 30, 1987 with the symptoms of eyepain and poor vision about 1 month. The vision was gradually lost, little by little, with a previous history of dizziness and headache every time he sprayed a certain insecticide in his farm.

Physical examination revealed no abnormality, pulse rate, respiratory rate and blood pressure within normal limit.

Eye examination: his visual acuity was found to be: right-finger count at 1 foot, left-finger count at 4 feet, not improved with pin-hole. General eye inspection was normal with positive Marcus-Gunn pupils. Eye-Grounds showed slight congestion of the optic discs, blurred disc-margins, dilated and engorged retinal blood vessels, positive venous pulsation. The visual field was not performed due to poor visual acuity. These findings suggested a diagnosis of bilateral optic neuritis from insecticide.

Because of very poor vision in this patient, I tried to admit him, but unfortunately, no space for in-patient anymore on that day. So I started oral prednisolone therapy 60 mg/per day combined with vitamin B1-6-12. I sent the patient for investigation of insecticide blood level but he disappeared.

Discussion

These 2 patients were diagnosed as toxic amblyopia, bilateral optic neuritis due to insecticide. It occured in 2 farmer who had been using a certain insecticide preparation for treating farmworm. The exact formulation of the insecticide is unknown, but it does contain parathion (diethylnitrophenyl thiophosphate), and malathion (dicarbothoxyethyl dimethyl phosphorodithioate) which is in the group of organophosphate compounds. One case presented symptom with contracted peripheral field, slight visual loss, but another case presented with severe visual loss. History of exposure to the insecticide spray, followed by the visual symptoms, is therefore considered to be the cause of the condition.

In 1952, Campbell[6] described 3 cases of monocular retrobulbar neuritis that occured in a man and two women who had been using an insecticide preparation for treating woodworm in their houses. The exact formulation is unknown but which contains ortho - and para-dichlorobenzene, D.D.T and pentachlorophenol which are in the group of chorinated hydrocarbon compounds. In each patient the left eye was affected, vision was decreased and in all of them the eye-sight recovered in 1 1/2 - 3 months after treatment. All cases were diagnosed by history of exposure to insecticide spray, even though the laboratory investigations were normal.

In 1968, Jindal[7] described one case of retrobulbar neuritis that occured in a man who had sprayed an insecticide preparation against woodworm in his house for 12 years, at intervals of 6 months. On the last occasion he sprayed it for 4 days continually. He did not use a face-mask. A week later he noticed his eyesight deteriorate and it became quite bad in the 2 weeks. All laboratory investigations were normal. All the usual causes of retrobulbar neuritis have been excluded. The only positive finding is a history of exposure to the insecticide spray. The exact chemical ingredients of the insecticide preparations are unknown but it does contain dieldrin and pentachlorophenol which is in the group of chorinated hydrocarbon compounds. Oral prednisolone therapy was started and continued for 10 days, recovery of both eyes has not taken place. Six weeks later, there was no visual improvement and the optic discs showed temporal pallor.

From this paper and the paper of Campbell and Jindal, all the patients had normal laboratory investigations. It showed that even blood level of the toxic substances in the insecticide was not high enough to be detected, but it could do toxic to the visual apparatus. If the toxic substance in blood level is high enough to be detected, the patients must have severe toxic symptoms of other systems such as digestive system, respiratory system and nervous system.

Summary

Two cases of bilateral optic neuritis, toxic amblyopia have been described. It happened after exposure to a proprietory insecticide which contains in the group of organo-phosphate compounds. One case presented symptoms with severe contracted peripheral visual field but another case presented symptom with severe visual loss.

The object of this paper is to record a toxic effect of insecticides preparation. Ophthalmologists should be aware of insecticide toxicity in patients with optic neuritis if all the usual causes have been excluded. In the point of insecticide users, for treating farmworm or even woodworm in the houses must be aware of its toxic effects, use it with sufficient attention and follow to the maker's recommendations. If there are choices, one ought to choose the less toxic to men, easy and quickly degradation, not use in high concentration, don't spray during strong wind and don't

stand in the direction of wind during spraying, protect themselves by face-mask, after finish the job, they should be clean their hands, showering and change the new clothes.

Acknowledgement

I should like to thank Mrs. Maria Maggio, Wilmer Eye Institute's librarian, Johns Hopskins Hospital, U.S.A. for some references that I could not found in Thailand.

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