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D Desinguraja

Veterinary Assistant Surgeon,
Veterinary Dispensary,
Aragalur, Salem District,
Tamil Nadu, India

Kalaiselvan

PhD Scholar, Division of
Surgery, ICAR-IVRI,
Uttar Pradesh, India

Emamectin benzoate poisoning and its management in crossbred cow: A case report

D Desinguraja and Kalaiselvan

Abstract

Olden day's toxic principle is only either from plant or animal sources. In recent decades chemical poisoning is more common in animals and humans due to anthropological activities. Emamectin benzoate is one of the insecticide drawn attentions from cotton cultivators of black soil. Hence emamectin accidental poisoning of livestock and its treatment has significance. This paper describes a case of acute poisoning with emamectin treated with atropine sulphate, fluid therapy and oral drenching of activated charcoal.

Keywords: Emamectin benzoate, poisoning, crossbred cow

Introduction

Agriculture is a backbone of our country. To increase the productivity, maintain sustainability and avoid losses from pests pesticide is an inevitable integral part of modern agriculture in developing countries like India^[1-2]. There are many kinds of pesticides available in markets. Depends on crop and pest activity use of pesticides also differs. Livestock are integrated activity along with agriculture. Therefore, animals are victims of various kinds pesticide poisoning. In this current report we communicate Emamectin Benzoate poisoning and its management in crossbred Cow. Emamectin benzoate is a semi-synthetic macrocyclic lactone bio-insecticide. It's activity broad spectrum, ultra-high efficiency, low toxicity, residue and environmental pollution, and improved thermal stability increases its use. Compared with avermectin, the insecticidal activity is increased by 1–3 orders of magnitude^[3]. It is extremely active to the lepidoptera insect larvae and many other pests and mites. At the same time, it is reported not harmful to the beneficial insects and benefits the comprehensive control of pests, its toxicity on non-targeted species not so far^[4]. Exposure of emamectin benzoate causes wide oxidative damage to the cells and recent *in vivo* study on mice reported that it causes liver toxicity^[5] and highly harmful to environmental organisms like honey bee, quail, tadpole and fish^[6].

Case History and Clinical observation

In an adult female cross bred Holstein Friesian cattle presented with the problem of frenzy behaviour, sialorrhoea, nasal discharge, hyperthermia, total body muscle fasciculation and twitching of eyelid. With detailed anamnesis 5% effective concentration emamectin benzoate accidentally kept for drinking of cows by worker. They misunderstood it as groundnut oil cake water by appearance. Immediately we confirmed it as acute intoxication of emamectin benzoate by smell of feeding bucket and smell of oral cavity of an animal.

Treatment and Discussion

The animal treated with Activated charcoal – 0.5 gram per kg body weight per orally on first day, eleven sachets of (500ml) normal saline (I/V) and atropine sulphate @ 0.5 mg / kg body weight (half dose intravenously and half the dose given via sub-cutaneously) along with inj. Tribivet – 20ml (I/M), inj. Chlorphenamine malate – 20ml (I/M) and fluid therapy was carried out SID for 3 days. The animal showed improvement in behaviour, posture and gait immediately after 4 hours of treatment. After 10 days of follow up we confirmed that animal recovered uneventfully without any complication of the poisoning.

Insecticide use in agriculture contributes more than 50% of pesticide^[7]. An insecticide Emamectin is (the 4'-deoxy 4'-methylamino derivative of abamectin,) used for crop protection

Corresponding Author:

D Desinguraja

Veterinary Assistant Surgeon,
Veterinary Dispensary,
Aragalur, Salem District,
Tamil Nadu, India

And use of integrated pest management in agriculture. It is a 16-membered macrocyclic lactone produced from soil actinomycete *Streptomyces avermitilis*. In insects, emamectin has high-affinity to GABA receptors. Hence it in turn increases chloride ion permeability in cell membrane. On the other hand mammalian species are much less sensitive due to lower GABA receptor affinities and effective blood-brain barrier. An interestingly mammals have GABA receptor only on CNS, not in Peripheral nervous system [8]. But when quantity increases it may leads fatal outcomes in non-targeted species. Due to increased permeability of chloride, animal shows exaggerated neuronal activity exhibited as central nervous system depression, aspiration pneumonia and gastritis [9]. In our study we found an unwanted firing of neuronal symptoms like muscle fasciculation and eyelid twitching. There is no known antidote for emamectin toxicity. We advocate following treatment strategies: Avoidance of further access of poison, promote the excretion or dilution of poison and symptomatic therapy along with vital parameter monitoring.

Conclusion

In conclusion emamectin toxicity can be managed symptomatically. But toxicity may cause both wanes of depressive and over reactive seizure like activity. Treatment with either CNS depressive or stimulant agent is still anecdotal. As our work in field with single animal, further detailed research may helpful in the treatment of emamectin benzoate in non-targeted animal species.

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