An Accidental Emamectin Benzoate Poisoning In Child: A Case Report

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Research Article

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Abstract

Background: Emamectin Benzoate has high GABA (Gamma Amino Butyric Acid) receptor affinity and increase chloride membrane permeability. It is the 4'-deoxy-4'-epi-methyl-amino benzoate salt of avermectin B1 (abamectin), obtained from natural fermentation products of Streptomyces Avermitilis.

Report: This case report describes the accidental poisoning of Emamectin Benzoate 5% w/ws in a female child. The child was brought to the emergency department(ED) with complaints of nausea, vomiting and abdominal pain. She consumed a packet of *"LURA"* (5% w/w Soluble Granule (SG) Emamectin Benzoate) supposing it as a packet of *"JALJEERA"* (a commonly used beverage) since there was no proper labelling. The patient was hemodynamically stable and underwent vigorous gastric lavage with normal saline, activated charcoal and coconut oil. Her blood report was normal for serum electrolytes and renal function. She was admitted in medical ward for symptomatic management and observation. She was given antiemetics, IV fluids and antacids and discharged in 2 days. In follow up after 1 week, she did not have any complain, her gastrointestinal symptoms had completely resolved and she was doing very well.

Conclusion: In absence of specific antidote, vigorous gastric lavage with both activated charcoal and coconut oil improves the outcome in Emamectin Benzoate poisoning.

Introduction

Emamectin Benzoate (MK-0244) is the 4'-deoxy-4'-epi-methyl-amino benzoate salt of avermectin B1 (avermectin family of 16-membered macrocylic lactones), which is similar structurally to natural fermentation products of *Streptomyces Avermitilis*(1, 2). *Streptomyces Avermitilis* is a naturally occurring soil actinomycete(3). This Emamectin stimulates high-affinity GABA (Gamma Amino Butyric Acid) receptors and a consequently increase in membrane chloride ion permeability(1, 2). It has been used as insecticides and pesticides. It is potent against many organisms like armyworm species, diamondback moth (*Plutella xylostella*), cabbage looper (*Trichoplusia ni* (Hubner)), beet armyworm (*Spodoptera exigua* (Hubner), etc.(2). Various brands of this product in Nepal are sold it in a packet of 5 gram which looks similar to a packet of "*JALJEERA"* (a powder form of cumin used in beverage). So someone might ingest this poison mistakenly if not labeled and stored safely.

Case Report

A six-years-old girl was brought to the Emergency Department (ED) of Kalaiya District Hospital, Bara, Nepal after ingestion of 5 gram of LURA (brand name of Emamectin Benzoate 5.00% w/w Soluble Granule SG) with complaints of nausea, vomiting and abdominal pain.

She has mistaken LURA for "*JALJEERA"* (powder form of cumin used in beverage) and ingested a packet of it (5 gram packet) by mixing with water. When she started having repeated bouts of nausea, vomiting for 3 episodes and abdominal pain, she was brought to ED by her parents. Later at ED, on asking her if she had eaten anything, she told that she had taken "*JALJEERA"* which she took out of her pocket then.

But it was found to be a packet of *"LURA"* instead. The packaging was similar to a packet of "*JALJEERA"*. So, the child was easily confused. A provisional diagnosis of Emamectin Benzoate Poisoning was made.

On examination, she was oriented to time, place and person. She was awake and alert but mildly confused and irritable. Her pulse rate was 94 beats per minute and regular. Her respiratory rate was 22 per min., axillary body temperature was 98.4 ▯ F and SpO_2 was 98%. Pupils were isocoric with normal light reflex. On respiratory examination, breath sounds were clear bilaterally. On cardiovascular examination, first and second heart sounds were audible with no murmur or added sounds. The abdomen was soft, flat and without tenderness or rebound tenderness.

Limited investigations were done. The laboratory findings were as follows: hemoglobin 13.8 mg/dl, white blood cells count 7700/mm^3, platelet 170000 /mm^3, Na^+ 136 mEq/L, K^+ 4.2 mEq/l, Serum Urea 26 mg/dl, Creatinine 0.9 mg/dl, RBS 82 mg/dl, Urinalysis normal. The Chest X-ray was normal.

Patient was then started gastric lavage with 2L normal saline, 60 gm. activated charcoal and 500 ml coconut oil. She was given Injection Pantoprazole 20 mg IV, Injection Ketorolac 15 mg slow IV, Injection Ondansetron 2mg IV & Injection Hydrocortisone 50 mg slow IV for symptoms management. After 30 minutes of gastric lavage, she was shifted to general medical ward for observation for 24 hours with nasogastric tube in situ. She was kept nil per oral (NPO) till 24 hours and given IV hydration. Vitals and systemic examination were assessed 4 hourly in ward, which were found to be normal. After 24 hours, her symptoms were improved and she was more alert & playful. So, oral sips were allowed followed by liquid, which was gradually advance to semisolid and solid diet. After 48 hours of total hospital stay, she was discharged with proper counseling on some oral medications (Tab. Pantoprazole + Domperidone & Oral Rehydration Solution) to use as needed & advised for follow up after 1 week in clinic.

In follow up after 1 week, she did not have any presenting complaints. Vitals and systemic examinations were in normal limit.

Discussion

In this case, the patient (weight 20 kilogram, BMI: 15.66 kg/m^2) ingested a packet of "*LURA"* (1 packet = 5 gram Emamectin Benzoate 5% w/w) i.e. 250 mg/kg of emamectin benzoate. Clinical manifestations were limited to mild disturbance of consciousness and gastrointestinal distress.

The clinical presentations of Emamectin Benzoate poisoning involve central nervous system dysfunction and gastrointestinal upset. Mammalian species are less sensitive to it due to lower GABA affinity and relative impermeability of blood-brain barrier(1, 2). In animals, there is substantial evidence of behavioral effects like changes in motor activity (tremors, incoordination, ataxia, and lethargy) and neuronal changes in the form of degeneration and vacuolation of the neuronal cytoplasm. The cytoplasmic vacuoles are associated with cellular debris, macrophages, and pyknotic nuclei(4, 5). A fatal case report in human has been reported after consumption of 500 gm of Emamectin Benzoate 5% SG due to pulseless ventricular tachycadia(6).

As Emamectin Benzoate has no specific antidote, the management of this poisoning is always supportive and symptomatic. As Emamectin Benzoate poses GABA mimetic activity, the drugs that enhance GABA activity like benzodiazepines, barbiturates and valproic acid should be avoided(1). In this case, vigorous gastric lavage with both activated charcoal and coconut oil was done and symptomatic and supportive management was provided. This was a mild case of poisoning in which patient improved quickly. It is important to label and store chemicals like this safely to minimize harm by accidental ingestion.

Conclusion

In case of Emamectin Benzoate poisoning, vigorous gastric lavage with both activated charcoal and coconut oil can improve the outcome of the patient. Rest of the treatment is symptomatic and supportive. There is no specific antidote for this poisoning.

Abbreviations

ED: Emergency Department

GABA: Gamma Amino Butyric Acid

IV: Intravenous

SG: Soluble Granule

Declarations

Ethical approval and consent to participate: Not applicable

Consent for publication: Written informed consent was obtained from the parent for publication of this manuscript. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Availability of data and materials: Not applicable

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Authors' contributions: Dr. Gopal Kumar Yadav was involved in management of patient and in the conception of the report, literature review, manuscript preparation, editing and submission. Dr. Krishna Mandal and Dr. Ashok Raj Devkota were involved in the manuscript critique and review. All authors have read and approved the final manuscript.

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