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Case Report

NPK Biofertilizer Poisoning and its Management: A Case Report

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ABSTRACT
NPK Biofertilizer are used for agricultural purpose to increase the crop yield. If swallowed in small amount they are poisonous and harmful to human health. Containing certain macronutrients such nitrogen, phosphorous and potassium can cause severely ill effects in the body and lead to life threating conditions. A 22-year-old female patient came to emergency ward with the complaints of abdominal pain with burning sensation, nausea, dizziness and giddiness. poisonous intoxication was removed out by gastric lavage. Patient was treated with includes inj. Ceftriaxone (1g) IV 12 hourly used as infection prophylaxis, Inj NS. 0.9%+ 3 ampule optineuron IV 12 hourly for rehydration, Inj. Pantoprazole (40) IV 12 hourly as antacid, Inj Emset 4cc IV 12 hourly as anti-emetic and Inj. Atropine 1 ampule as an antidote. Here there is case report of NPK Biofertilizer poisoning describing the severity and timely related treatment intoxication with poisonous substance.
Keywords: NPK Poisoning, Biofertilizer, Fertilizer, Poisonous intoxication.

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INTRODUCTION

Fertilizers are used worldwide for cultivating crops and one such type is NPK Biofertilizer (Nitrogen, phosphorous and potassium). It is used in the solid, liquid and powder form. Liquid form is known as NPK liquid biofertilizer. These are easily available in the market and are the choice of fertilizer for crops. Its easy access aids as the poisoning agent if taken in more amount.[1] For the good growth of the plant macro and micro nutrients both are needed. Macro-nutrients are nitrogen, phosphorous and potassium which is required for plant growth and development. It is use by plants in various process like uptake, stimulation, translocation and aging. Phosphorous is used for development, propagation and growth of plant. It is essential for signaling pathway in plant. Nitrogen, phosphorous and potassium are most importantly added as fertilizer.[2] Synthetic fertilizers use is increasing all over the world which has effect on fast growth of plant leaving the soil not fruitful and in capturing harmful chemicals in them. Their main composition includes Nitrogen, phosphorous and potassium used by farmer called 'UREA' which are available in all forms. Their easy availability makes them an easy option for suicidal intentions.[1] Nitrogen poisoning containing nitrates has very severe ill effects such as methemoglobinemia, which causes cyanosis. Usually, the signs and symptoms depend upon methemoglobin levels. The individual develops abdominal pain, headache, weakness, light-headness, tachycardia, anxiety, fatigue, dizziness and tachypnoea resulting in ECG variations. Supportive care of airway control, fluids, gastric emptying and activated charcoal is necessary.[3] Acute phosphorous poisoning effect is usually seen after ingestion, it has an irritating effect on gastrointestinal tract and can cause severe gastroenteritis causing abdominal pain, nausea, vomiting, shock and diarrhea. If taken in large amount it can lead to renal damage and cardiac ischemia.[4] Potassium has a high potential to cause severe ill effect causing depolarization of muscle potential and causing sudden cardiac contraction.[5] Urea is present in high amount in herbicides.it has serious poisoning effect after ingestion like nausea, vomiting, dizziness and abdominal pain. It mainly effects Hemoglobin converting into methemoglobin which causes cyanosis. This again depends upon concentration of methemoglobin in concentration more than 60%.[6]

CASE REPORT

A 22-year-old female came in emergency ward as a case of acute poisoning. The patient was asked if she had intake of any poisonous substance. On counselling it was found the poisonous intake was taken about One and half hours ago before arriving the hospital. On general examination the patient was conscious and partially oriented. Temperature was afebrile, Blood pressure was 110/70 and 100% SPo2. Pulse rate was higher than normal i.e., 130/min. Patient came with the complaints of nausea, giddiness, abdominal pain with burning sensation. On physical examination, pupil was dilated. Biochemistry report showed normal values. On arrival of the patient in the emergency ward, patient was kept to undergone gastric lavage. Advice was given to checkup Blood pressure every 2 hourly, Strict I-O charting was done, W/F sensorium, and W/F Saturation. On USG abdomen and pelvis, urinary bladder was found empty. The sample of gastric lavage and blood sample was submitted for the chemical analysis for the detection of the poisonous agent. Following were the treatment chart included which includes inj. Ceftriaxone (1g) IV 12 hourly used as infection prophylaxis, Inj NS. 0.9%+ 3 ampule optineuron IV 12 hourly for rehydration, Inj. Pantoprazole (40) IV 12 hourly as antacid, Inj Emset 4cc IV 12 hourly as anti-emetic and Inj. Atropine 1 ampule as an antidote. On asking family members and through chemical analysis report the patient was diagnosed with NPK bio-fertilizer poisoning. In case of poisoning with fertilizer if the patient is present within for 1-hr gastric lavage should be carried out to cleanse out the stomach contents. Th patient was kept under watch for 3 days and discharged. Dilated pupils and abdominal pain were resolved after 2 days. Patient was called up for follow-up after 15 days.

DISCUSSION

NPK (Nitrogen, phosphorous and potassium) are used for agricultural purpose to increase the crop yield. If same ingested by person intentionally or unintentionally it can be hazardous to health. Ingestion of this causes really toxic traits which are harmful and can cause severe ill effects on human health. It contains macronutrients such as nitrate, potassium, phosphorous, sulfur, magnesium and calcium. Micronutrient constituents such as boron, copper, iron, zinc, chloride, manganese and molybdenum. Ratio of 10:10:10 of ratio was found on the labelled bottle shown by her family members. Lab parameters came to normal itself on day 2 itself. Patient came to emergency ward conscious and partially oriented. Treatment was decided according to the time duration when the patient ingested the fluid. If the fluid is ingested in 1 hr of hospital admission, then activated charcoal can be used for the removal of drugs and toxins and bind to it and helps get rid of unwanted substances with the help of orogastric tube in small volume. The following precautions were stated to the patient that if any remaining particles are left in the mouth which can be toxic, washing with gargle are advised. If any remaining substance is splashed on the clothes or skin, remove the contaminated cloth and perform cold shower. Complaints include the patient include abdominal pain, nausea, burning sensation and giddiness. Pupil were dilated and patient was partially oriented. Antidotes are the mainly preferred to reverse the effect. Atropine works by blocking the acetylcholine receptors. Sedatives are preferred if person is agitated. ventilation is preferred if breathing problem occurs. Anti-epileptic are used for the seizure. In this case no need of sedative, ventilator and anti-epileptic was needed. The diagnosis was done on the basis of sample of gastric lavage and blood sample. The patient was only counselled and asked for which fluid intake was swallowed and its proportion. Patients and their relative's consent were taken to present the case for educational purpose.

CONCLUSION

NPK Biofertilizer poisoning ingested can lead to severe harmful effects. This describes the case where timely management and monitoring of the patient leads to wellbeing of the patient. The main role is here is of clinical pharmacist where the counselling and monitoring of the patient is most important. This also implies wide role of clinical pharmacist which is needed for therapeutic evaluation.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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