ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 03 | March - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

MYCLOBUTANIL POISONING: A CASE REPORT

Pharmaceutical Science

Dr. Zeenath Unnisa* Assistant Professor, Department of Pharmacy Practice, Deccan School of Pharmacy, Hyderabad – 500001 *Corresponding Author

Mohammed Mudassir Department of Pharmacy Practice, Deccan School of Pharmacy, Hyderabad – 500001

ABSTRACT

Myclobutanil is a broad-spectrum systemic fungicide of the substituted triazole chemical class of compounds used in variety of agricultural crops. The mode of action of myclobutanil is by inhibition of sterol biosynthesis in fungi. It is mostly used in agricultural settings for preventative and curative control of fungal diseases that may appear on grapes, strawberries, and almond crops. Myclobutanil poisoning produce several side effects including eye irritation, itching, nausea, vomiting, headache, mood swing, depression, weight gain, hot flushes, vaginal dryness, bloating, early onset of menopause. Long-term use may result in bone weakness, increased risk of blood clots, gastrointestinal disturbance, and sweats. Myclobutanil ingestion can effect cardiovascular system and symptoms include abnormal heart rhythm, hypovolemia, hypotension, can effect respiratory system and symptoms include pulmonary edema, bronchospasm, and CNS symptoms include seizures. **Case Report:** The authors present a case of 45-year-old patient admitted in hospital with a history of consumption of myclobutanil poison of unknown quantity. Patient care began immediately after being diagnosed. Treatment of patient was firstly secured with dextrose normal saline and ringer lactate solutions for stability later the treatment was started with broad spectrum antibiotics, optineuron, proton pump inhibitors and ondansetron. **Result:** The patient was monitored and treated for 5 days and later was discharged with proper counselling to the patient and care giver with discharge medication plan which included cefixime antibiotic, vitamin supplement, proton pump inhibitors and calcium and vit D3 supplementation. **Conclusion:** Myclobutanil poisoning is quite rare. Replacing of toxic agrochemical compounds by the newer less toxic compounds in areas where the incidence of poisoning is high may help to save a number of precious lives. Though the appropriate and timely management has vital role, the importance of preventive measures and public awareness cannot be ignored in saving precious lives and should be implemented at different levels.

KEYWORDS

Myclobutanil, conazole, fungicide, Poisoning.

INTRODUCTION:

Myclobutanil is a systemic, broad-spectrum fungicide belonging to the chemical group of alternative triazoles. [1] It is used to treat a wide range of ailments in cereals, fruits, and vegetables, such as summer patch, powdery mildew, dollar spot, and rusts. Due to the inhibition of the sterol 14-demethylase enzyme, it has a curative, eradicative, and preventive action.[2] Despite its low acute toxicity, myclobutanil has been shown to affect fertility in laboratory animals.[3] It is moderately toxic if ingested. It is moderately soluble in water and organic solvents and is volatile. Studies seem to indicate that myclobutanil is highly permeable and moderately persistent in soil. Under certain conditions, it can also persist in aquatic systems.[4]

Exposure can occur in workplaces where it is used or manufactured, and the general public can be exposed by ingesting contaminated food. [1] Workers exposed to myclobutanil have reported symptoms such as rash, atopic dermatitis, itching, nausea, headache, diarrhoea, abdominal pain, vomiting, nosebleeds, and eye irritation. [5]

Myclobutanil is not carcinogenic to humans and there was no evidence of neurotoxicity or mutagenicity in the long-term toxicity test. Reproductive and developmental toxicity tests observed only fetal toxicity at doses equal to or greater than the maternally toxic dose. Myclobutanil has not been identified as a potential endocrine disruptor. [6] Accidental eating of the substance could be deadly; animal investigations show that less than 150 gramme could be fatal or seriously affect a person`s health. Skin contact is not regarded to have a negative impact on health (as classified using animal models). However, systemic injury has been linked to animal exposure through at least one other route, and the substance may still injure the body after entering through wounds, lesions, or abrasions. [7]

Case Report:

History of Present illness:

A 45-year-old patient has been admitted to the hospital with a history of consumption of myclobutanil poison of unknown quantity.

Past Medical history:

No complaints of vomiting, level of consciousness, seizures and ENT bleed are reported in the past.

Social History:

History of alcohol consumption and smoking regularly.

Laboratory Test Performed:

The laboratory tests have been performed for the initial three days which are as follows (table:1)

Table:1 Laboratory Tests

Tests Performed on Day 1:

Lab Parameter	Day-1	Normal value
HB	16.7 gms%	13-18 gms%
WBC	7800c/cmm	4000-11000 c/cmm
RBC	35.3 c/cmm	4.3-5.7 c/mcl
DLC=N+L+E+M+B	70+26+03+00+00	
Platelets	2,27000	1.5-4.5 lakhs/cumm

Tests Performed on Day 2:

Lab Parameter	Day-2	Normal value
Sodium	134mmol/l	135-145mmol/l
Potassium	3mmol/l	3.2-5mmol/l
Chloride	106mmol/l	98-107mmol/l
Ionised Calcium	1.17mmol/l	1.15-1.35mmol/l
RBS	132mg/dl	70-140mg/dl
Serum Creatinine	0.9mg/dl	0.9-1.3mg/dl
Blood urea	26mg/dl	7-40 mg/dl

Tests Performed on Day 3:

Lab parameter	Day-3	Normal value
AST	32	0-35U/L
ALT	39	0-38U/L
ALP	90	30-115U/L
Total bilirubin	2	0-1.2mg/dl
Direct bilirubin	0.6	0-0.2mg/dl
Indirect bilirubin	1.4	0-1mg/dl
Total protein	5.9	6.4-8.3g/dl
Albumin	3.4	3.5-5.2g/dl
Globulin	2.5	2.9-3.1g/dl
A/G ratio	1.4	1-2
ECG: Sinus rhythm Left atrial enlargement R-S transition zone in v leads displaced to right Abnormal ECG		
Note: DLC= Differential Leucocyte Count E= Eosinophils N= Neutrophils M= Monocyte L= Lymphocyte B= Basophils		

The Laboratory tests which have been performed is checked and based

on the objective and subjective evidences the final diagnosis for myclobutanil poisoning was initiated.

Treatment:
The main goal of the treatment is to stabilise the patient, elimination of poison completely from the body and to prevent other complications due to poison consumption.

Treatment options:
Non-Pharmacological:
Know where poisons are located around your house. Take precautions to keep small children away from harmful materials. Keep all household chemicals, medications, and cleaning supplies out of children's reach or in cabinets with childproof latches. Learn about the plants in your yard, home, and neighbourhood. Inform your children as well. Take out any dangerous plants. Wild plants, mushrooms, roots, and berries should never be consumed unless you are very familiar with them. Inform kids about the perils of consuming poisonous substances. Each poison has a label.

Even if they are labelled, do not keep home chemicals in food containers. If ingested in significant concentrations, the majority of non-food substances are poisonous. Inform the local health department, the state or federal Environmental Protection Agency of your concerns if you suspect that industrial chemicals may be contaminating the land or water in the area. To cause symptoms and harm, some toxins or environmental exposures may not need high dosages or close contact. To prevent major harm, it is crucial to seek treatment as soon as possible. The result will depend on the kind of poison the individual was exposed to and the care they received to treat it.

Pharmacological:
Depending on the pesticide or class of pesticides that caused the poisoning, specific therapies for acute pesticide poisoning may vary. But there are fundamental care strategies that can be used for the majority of acute poisonings, including as skin decontamination, airway protection, gastrointestinal decontamination, and seizure management.

The skin is cleaned while other life-saving procedures are being carried out. To get rid of chemicals from the skin and hair, the patient is stripped of clothing, given a bath with soap and water, and has their hair shampooed. Water is used to flush the eyes for 10 to 15 minutes. If required, the patient is intubated and given oxygen. Pulmonary breathing may occasionally need to be assisted mechanically in more severe situations. Usually, lorazepam, phenytoin and phenobarbital, or diazepam are used to treat seizures (particularly for organochlorine poisonings).

Gastric lavage is only appropriate when the patient has consumed a potentially fatal dose of poison and presents within 60 minutes after ingestion. It is not advised to be used routinely in the therapy of pesticide poisoning because its clinical benefit has not been proven in controlled investigations. In an effort to get rid of the toxin, an orogastric tube is placed and the stomach is saline flushed. In order to protect the patient's airway if they have neurological impairment, an endotracheal tube with a cuff should be placed first. In studies on toxin recovery at 60 minutes, recovery rates ranged from 8% to 32%. There is evidence, nevertheless, that lavage might push the substance into the small intestine and boost absorption. In the event that a person consumes hydrocarbons, lavage is not advised.

It has been demonstrated that activated charcoal works well with some pesticides, so it is sometimes used. Although there is not enough data to determine whether it is effective if the time from ingestion is prolonged, studies have demonstrated that it can reduce the amount absorbed if given within 60 minutes. Ipecac syrup is no longer recommended for most poisonings caused by pesticides.

Acute poisonings caused by chlorophenoxy herbicides (like 2,4-D, methylchlorophenoxypropionic acid (MCPA), 2,4,5-T, and mecoprop) have been treated with urinary alkalinization. However, there is little evidence to support its use.

Treatment given:
- The Patient was given Intravenous fluids i.e., DNS and RL in a dose of 2 Pint and 1 Pint daily for three days as it is used to give fluids to the body when more fluids and electrolytes are needed.
- Injections such as Pantoprazole in a dose of 40 mg is administered twice through I.V route for five days as it is used to treat certain conditions in which there is too much acid in the stomach.
- The Patient was given with injection ondansetron (dose: 4 mg) twice through I.V route till the 5th day of hospital admission as it helps to prevent nausea and vomiting caused by medicines.
- 1 ml of Injection optineuron in 100 ml NS is administered once daily through I.V route for five days, as it will help in the treatment of nutritional deficiencies and vitamin B12 deficiency.
- Injection Cefoperazone (2g) + Sulbactam (1g) is given twice for Five days through I.V route for the purpose of inhibiting the bacterial protective coating from forming, which is necessary for bacteria to survive. Sulbactam, a beta-lactamase inhibitor, lowers resistance and increases Cefoperazone effectiveness against germs.

Discharge medication:
- The patient was prescribed Tab. Cefixime in a dose of 200 mg twice daily at the time of discharging from hospital as it is used to prevent infections.
- Tab. Pantoprazole was also prescribed in a dose of 40 mg and it should be used once daily to reduce acid production.
- Patient is also prescribed with the Tab. Vit B1+ Vit B6 + Vit B12 and the patient is advised to take one tablet once daily as it will be used as vitamin supplement.
- Tab. Calcium + Vitamin D3 is prescribed in a dose of 500 mg and it is used once daily, it used as calcium and vitamin supplement.

After 5 days of treatment the following goals are successfully achieved:
- Patient was stabilised.
- Poison was eliminated from the body.
- Patient was counselled.

Day wise assessment:
Day 1:
On the day of patient admission the temperature was increased (98.6°F), Blood pressure was found to b 120/90mmHg, Pulse rate was decreased (88 bpm) and Respiratory rate was also gradually decreased (18 bpm). No crepts and pupil are found to be normal. Current vital symptoms of the patient are history of consumption of myclobutanil poison of unknown quantity and alcohol consumption, no history of vomiting, level of consciousness, seizures, ENT bleed. Some lab test was performed to find the actual reason and the several tests includes: Complete blood picture, Random blood sugar, Renal function test, Serum electrolytes, Liver function test, Electrocardiogram and X-Radiation. Based on this test the case of myclobutanil poisoning was found and the treatment was initiated.

Day 2:
After the one day of treatment, the temperature was a febrile means no feverish, Blood pressure was found to 120/80mmHg and pulse rate was slightly decreased (80 bpm). No fresh complaints are found and same treatment was continued.

Day 3:
On the third day of hospitalization, the temperature of the patient was found to be normal and pulse rate was found to be 82 bpm. Stop IVF and same treatment was continued.

Day 4:
On the fourth day of hospitalization, the temperature was found to be normal, blood pressure was found to be 110/80mmHg and pulse rate was gradually decreased (68 bpm). Continue same treatment and no fresh complaints are found.

Day 5:
On the fifth day of hospitalization, the temperature of the patient was found to be normal, Blood pressure was 110/70mmHg and Pulse rate was found to be 70 bpm. Stop Optineuron and same treatment was continued and no fresh complaints are found. The patient was discharge from the hospital.

DISCUSSION:
A fungicide called myclobutanil is mostly used on a variety of food crops. The manufacturer warns that prolonged or repeated skin contact with myclobutanil may cause mild skin irritation and direct contact

with the drug may irritate the eyes. If myclobutanil is ingested or absorbed through the skin, it can be dangerous.[8] Although little is known about the toxicity of this substance in humans, myclobutanil exposure is known to have negative effects on health. Chronic exposure to myclobutanil has been related to cancer, in addition to the acute symptoms of poisoning. Myclobutanil exposure has been linked to an elevated incidence of lung and bladder cancer in studies of employees. Long-term exposure to this chemical may potentially cause liver, renal, and nervous system damage. Human myclobutanil poisoning is a significant health problem that should not be treated lightly. Get medical assistance promptly if you have been exposed to myclobutanil. It is also critical to restrict your exposure to this chemical by following adequate safety practises when handling it.[9,10]

Acute toxicity of myclobutanil is minimal, with the exception of eye discomfort. Based on these risk analyses, Environmental Protection Agency (EPA) comes to the conclusion that there is a reasonable certainty that exposure to myclobutanil residues will not adversely affect the general public or babies and children. [11]

If the product gets in your eyes, wash them out right away with fresh running water. "Flush skin and hair with running water (and soap, if available) if skin or hair comes into contact." In case of inflammation, seek medical attention. Remove yourself from the contaminated area if dust is inhaled." Encourage the patient to blow their nose to ensure a clear airway." Seek medical treatment if discomfort or irritability continue.[7]

CONCLUSION:

In conclusion, myclobutanil poisoning can have devastating effects on humans, animals, and the environment. It is a chemical used in pesticides that can accumulate in plants, soil, and water sources, and can cause a variety of health problems (headaches, nausea, vomiting, and even death) if ingested. It is important to seek medical attention if you believe you have been exposed to myclobutanil. It is also important to practice safe handling and storage of myclobutanil and other chemicals to prevent accidental poisoning. Awareness of the signs and symptoms of myclobutanil poisoning can help to ensure early diagnosis and treatment, which can improve the prognosis for those affected. In our case we managed to eliminate myclobutanil poison from the patients body, along with this the patient has been counselled about the management and prevention of myclobutanil poisoning.

REFERENCES:

1. F. Soler-Rodríguez, A.L. Oropesa Jiménez, Myclobutanil, Editor(s): Philip Wexler, Encyclopedia of Toxicology (Third Edition), Academic Press, 2014, Pages 420–423, ISBN 9780123864550, https://doi.org/10.1016/B978-0-12-386454-3.01195-7
2. Hao, W.; Zhang, Y.; Xie, Y.; Guo, B.; Chang, J.; Li, J.; Xu, P.; Wang, H. Myclobutanil accumulation, transcriptional alteration, and tissue injury in lizards (*Eremias argus*) treated with myclobutanil enantiomers. *Ecotoxicol. Environ. Saf.* **2019**, *171*, 247–255
3. Allen, J.W., et al., 2006. Toxicity profiles in mice treated with hepatotumorigenic and non-hepatotumorigenic triazole conazole fungicides: propiconazole, triadimefon, and myclobutanil. Toxicol. Pathol. 34, 853–862. https://doi.org/10.1080/ 0192623060104 7816.
4. Lewis, K.A., Tzilivakis, J., Warner, D. and Green, A. (2016) An international database for pesticide risk assessments and management. Human and Ecological Risk Assessment: An International Journal, 22(4), 1050-1064. DOI: 10.1080/10807039. 2015.1133242
5. PubChem [Internet]. Bethesda (MD): National Library of Medicine (US), National Center for Biotechnology Information; 2004-. PubChem Compound Summary for CID 6336, Myclobutanil; [cited 2023 Feb. 14]. Available from: https://pubchem.ncbi.nlm.nih.gov/compound/Myclobutanil
6. Myclobutanil Prepared by Thurston County Health Department - 412 Lilly Road NE, Olympia WA 98506 https://www.co.thurston.wa.us/health/ehipm/pdf_fung/ fung_ actives/myclobutanil.pdf
7. Myclobutanil sc-205759 a Material Safety Data Sheet Prepared by Santa Cruz Biotechnology
8. California Department of Health Services SENSOR/EPA Occupational Pesticide Poisoning Prevention Project Field Investigation Report CA 002-99 – October 24, 2000
9. Myclobutanil First draft prepared by M. Yoshida and D. McGregor published by World Health Organization.
10. Wensu, Han & Wang, Yajun & Gao, Jinglin & Wang, Shijie & Zhao, Shan & Liu, Jun Feng & Zhong, Yihai & Zhao, Dongxiang. (2017). Acute toxicity and sublethal effects of myclobutanil on respiration, flight and detoxification enzymes in Apis cerana cerana. Pesticide Biochemistry and Physiology. 147. 10.1016/j.pestbp.2017.11.001.
11. Myclobutanil; Pesticide Tolerance prepared by Office of the Federal Register, National Archives and Records Administration 03/26/2008 73 FR 15930