

Methanol poisoning outbreak tragedy: Reason and Treatment

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Abstract - Methanol ingestion in the form of poisoned liquor very often spreads as outbreak offering metabolic disturbances, blindness, permanent neurologic dysfunction and even death. This paper deals with the genesis of this tragedy along with the signs and symptoms of the disorders due to methanol ingestion. A critical observation of pesticide mixing with the already methanol poisoned liquor is also focused with this paper.

Keywords - Methanol, Pesticide, Disorders, Treatment

1. Introduction

Recently there had been several outbreak of liquor poisoning in India. The rememberable mass poisonings by adulterated home-brewed alcohol caused the death of more than 172 people in the southern states of Karnataka and Tamil Nadu in May 2008 and death of more than 43 of July 2009 in the western state of Gujarat. And on December 13, 2011 one of the worst ever liquor tragedy struck West Bengal when 170 people died due to consumption of adulterated liquor. In all the cases victims were mostly from low income group including daily wage earners, farmers, small shop owner, casual laborers, hawkers and rickshaw-pullers etc. Due to their inability to afford branded alcohol, generally they stopped by illegal bars for home-brewed liquor (desi sharab, cholai, bangle mad, tari, toddy, arrack etc.) or bought it from bootleggers. But to make the home-brewed liquor inexpensive the manufacturer or seller often adulterates it by adding water, methanol and pesticide.

2. Genesis of tragedy:

Adulteration of liquor is made to provide a quick 'high' sought by drunks. To better understand the business let's take a view of their business strategy. Production cost of 1.5 liter (near about 70%) alcohol is appx. Rs.70 and is being sold at a cost of Rs. 130-140 after dilution. Then it is sold to the consumers after being transferred hands several times. During the process of this transfer, the liquor is diluted with water thereby reducing the concentration of alcohol. In order to keep the "high nature" of the product, methanol and certain kind of pesticides are being

added. Methanol and pesticides consumption via alcoholic liquor make the consumer fatigued, and he/she experiences such signs and symptoms as giddiness, dizziness, headache etc. These symptoms confuse the consumer about the adulterated drink as a superior one with respect to provide a quick 'high' sought by drunks. As the adulterated 1 liter liquor is sold at a cost Rs.10-12, the consumer can afford this product easily.

Methanol is produced generally via chemical synthesis. Production of ethyl alcohol via fermentation may sometime leads the production of impurities like methyl alcohol, different types of acids, aldehyde, esters, higher alcohol etc in trace amount. These impurities also have some adverse effect on human health. This often happens to country liquor due to unhygienic practices and use of locally available fermenting agent (yeast) and sugar source (molasses) with several microbial contaminations. In industry impurities present with the alcohol are removed by proper distillation method (generally by extractive distillation). But in the country brewed liquor there is no chances to remove the impurities if present in the liquor. This is due to the use of homemade distillation set up with lower efficacy in the rural usages. Besides this illegal trade do not ensure any quality testing procedures. But the devastating adverse effect comes from mixing methanol from outer sources. This is also true for the case of pesticides also.

3. What are methanol and the signs and symptoms of poisoning?

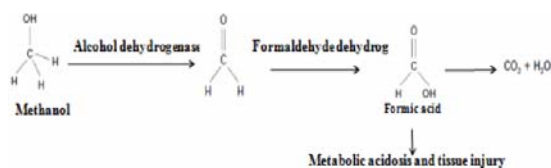
Methanol (CH₃OH), the lowest member of the series of primary saturated aliphatic alcohols is a clear, colorless liquid with boiling point of 65°C. It is

widely used in household products like antifreeze, varnish, paint thinner, paint remover and windshield wiper fluid etc. It costs much less than ethyl alcohol. It is highly toxic substance and acute methanol poisoning results severe metabolic acidosis and serious neurological symptoms, including acute and severe visual impairment, extrapyramidal signs and finally coma. The lethal dose of pure methanol is proposed to be 1-2 mL/kg. But permanent blindness and death have been reported with minute dose (0.1 mL/kg) as compared to lethal dose 1.

4. Metabolism of methanol:

As indicated previously methanol poisoning may cause severe illness or death. The methanol intoxicating effect on human is thought not only to be due to methanol itself, but also to its metabolite, formate. Major portion of the ingested methanol is oxidized to formaldehyde, and then is oxidized to formic acid and finally is either excreted in the urine or further oxidized to carbon dioxide and water.

These metabolites (basically formic acid) cause the metabolic acidosis, blindness, cardiovascular instability, and death attributed to methanol toxicity.²⁻⁵



5. What is pesticide?

Pesticides are chemicals that are used to kill pests. Basic classes of pesticides includes Insecticides-against insect pest (Organochlorines Organophosphates Carbamate Esters Pyrethroids Botanical Insecticides), Herbicides – for killing and controlling weeds (Chlorophenoxy compounds Bipyrindyl derivatives), Rodenticides – against rodent pest (Zinc Phosphide Fluoroacetic acid and derivatives, Anticoagulants), Fungicides- against fungal disease (Hexachlorobenzene Organomercurials Pentachlorophenol Phthalimides Dithiocarbamates), Fumigants- pest control by fumigation (Phosphine Ethylene dibromide Dibromochloropropane). Although there are benefits to the use of pesticides, some also have drawbacks, such as potential toxicity to humans and other animals.

6. Effects of pesticides on human body

Pesticides also have adverse effect on human body. The adverse function depends on the chemical nature of the pesticides. In general to adulterated alcoholic liquor neurotoxic pesticides are used. The mode of action is regarded to inhibit cholinesterase, which produces excessive accumulation of acetylcholine at muscarinic, nicotinic, and central

nervous system receptors. The lethal dose level varies from person to person and depending upon the pesticides. A minute dose can have a deadly effect.

7. Symptoms of poisonous liquor consumption:

The people after adulterated liquor consumption exhibit the symptom of stomach pains, convulsion, vomiting, wracked by cramps dizziness, blurring of vision, nausea or epigastric discomfort and diarrhea etc. The unaware family members waste the precious time keeping the patient in home without rushing to doctor or hospital. This happens due to their unawareness about the fact and inability to relate it with adulterated alcohol consumption.

8. Treatment

8.1. Physical:

The treatment of methanol intoxicated patient is done by standard methods, which included I.V. high dose Bicarbonate, Ethanol and Folic acid⁶. But the quack doctors practicing in the rural areas do not have the adequate knowledge of standard method of methanol intoxication. As a result it is often seen that the methanol intoxicating patients are preliminary wrongly treated or only saline is applied to them as primary treatment. Most of the health centers, rural hospitals are not equipped with the facilities of measurement methanol and ethanol levels in blood, ABG for assessing severity of acidosis and dialysis for severe methanol poisoning. Many patients lose their lives during transit to tertiary care centers with adequate facilities. The method of preliminary treatment of methanol intoxication is mentioned as (1) Gastric lavage with NaHCO₃ (500 ML OF NaHCO₃ retained in the Stomach), (2) Oral 95% ethanol with a dose of 1 ml/kg, mixed with orange juice every 6th hourly, (3) I.V. 7.5% NaHCO₃, 100ml I.V. every 2nd hourly until correction of acidosis (4). Oral folic acid 1 mg/kg every 4th hourly for 1 week⁷ should also be administrated.

8.2. Social

Another rememberable outbreak in of alcoholic liquor poisoning in 1982 in the Vypeen Island off Kochi killed 78 people, blinded 63, crippled 15. The number of increase in death count was ward off by a local social activist Sarvodayam Kurian, who didn't waste time for government action, hired an auto-rickshaw, fixed loud speakers on top of the auto and campaigned through every nook and corner of 21 km long and 3 km wide Vypin Island announcing that victims be given IMFL as first aid. This events proves proper awareness programme about poisonous liquor, its consumption, symptom and first aid treatment programme can lead to stop such out break in near future.

Besides, police, excise, political parties, non-governmental organizations and other all from of social activators should come forward to prevent such social disease. The strict administration along with the awareness campaign driven in all aspect of society may get the fruitful result eliminating this diseases from the society.

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