

Case Report

Gas Geyser a Silent Killer in Bathroom: A Case Report of Carbon Monoxide Poisoning

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Abstract

In the ever changing world with increasing population and limited resources, development of alternate sources to restricted energy assets, which though have made life easier, also has its side effects which may vary from minor consequences to fatality. Heating appliances especially gas geysers, though an efficient means of energy conservation especially during the winter months are no exception to it. Here, we present the case of a 32 year old female with fatal carbon monoxide poisoning from a running gas geyser. The victim had no history of chronic diseases or any other ailment and was in fair health. She was found dead in her bathroom floor. The subsequent autopsy findings, crime scene examination and investigation confirmed the cause and manner of death to be accidental carbon-monoxide poisoning. This case will bring into light, the ongoing trend of using gas geysers instead of traditional electric geysers mainly based on cost effectiveness which has in turn led to an alarming rise in such accidents. We will also suggest the routine precautions which can be followed to prevent such tragic accidents.

Key Words: Accidental, Carbon-monoxide, Fatal air poisoning, Gas geyser

Introduction:

Deaths in the bathroom are not so common. We report a case of death due to leakage of gas geyser while bathing with water collected continuously from a running gas geyser. Gas geyser is mostly used in the winter season for bathing, probably being economic as is claimed by companies who manufacture it.

Carbon monoxide (CO) is emitted from the gas geyser while being used to boil the water for taking bath. Carbon monoxide is one of the leading causes of accidental poisonings.

It is difficult to estimate the incidence of CO poisoning cases, because the symptoms resemble many other common ailments [1, 2]

This is more so in India, where there is improper reporting of morbidity and mortality attributable to suspected CO poisoning.

High index of suspicion, clustering of such cases in winter months and a careful history helps in making the diagnosis. [3]

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Thus, this case assumes importance for reporting the triad of autopsy findings, scene of death examination and laboratory investigations along with suggestion to avoid the causalities in future as CO is one of the gases which pollute the environment and cause the harm to living beings particularly in closed atmosphere like a bathroom.

Case History:

In the month of February during the late winter season, a 32 year old married female staying, in her in-laws house went for bath in the bathroom. However, when she did not come out for a long time, the family members first called her name and tried to open the door when no reply came. They had to call a carpenter as it was locked from inside.

There they found her naked body lying dipped in the water tub. She was immediately taken to private hospital, where she was declared as "Brought Dead". The police papers mentioned a gas geyser being installed in the bathroom that was used as a source of hot water for taking bath.

The gas emitted from that gas geyser was alleged to be cause of death. When the parents of the victims were informed, they were shocked and suspicious and wanted to know the cause and manner of death.

Autopsy Findings:

The dead body was of a young adult female with eyes and mouth closed and the cherry red blood was oozing out from mouth.

Pink-post mortem staining was present on the face, upper part of chest, and both upper limbs. (Fig 1) Rigor mortis had passed off. A reddish contusion of size 3x2cm was present on the vertex region of scalp. On dissection underlying scalp layers were ecchymosed; no bone injury was found present underneath. The brain and membranes were congested and healthy.

The lungs were somewhat edematous and congested; right side of heart contained little blood but left side was empty. Stomach was containing approximately 50 cc of watery material. Small intestine contained semi digested food material. Large intestines contained fecal matter and gases.

Liver, spleen and kidneys were congested and healthy. Bladder was empty. Organs of generation were healthy and uterus was empty. On dissection the blood was cherry red in colour. (Fig 2)

Viscera along with blood were preserved for chemical analysis and histopathological examination. Bones were preserved for diatom detection.

The result revealed no common poison in the viscera; blood showed presence of carbon mono oxide qualitatively but on asking about the quantity of carbon monoxide, the FSL team informed that this quantity was not estimated due to lack of facility. However, the histopathological examination showed oedema and marked congestion in the lungs and other organs were reported as congested.

Discussion:

Carbon monoxide (CO) is a colorless, tasteless, non-irritant gas produced due to incomplete combustion of carbon. Sources include coal gas, smoke from fires, defective heating appliances e.g. furnace, stove, water heater, fire places, burning oil lamps, heating devices burning fuel and snow obstructed exhaust system of motor vehicles. [4]

CO is classified as an air pollutant in the occupational/environmental poison. The average concentration in the atmosphere is about 0.1ppm; and the fatal dose is 0.04% if the victim is in an ill ventilated room. [5]

Cherry-red livor mortis of the skin, mucous membranes, blood, and viscera is a common feature of CO poisoning. [6] This color is attributed to the high affinity of CO for hemoglobin, reportedly 240 times greater than that of oxygen, and its continued bonding to hemoglobin in the absence of fresh oxygen and this renders the hemoglobin incapable of carrying oxygen resulting in tissue anoxia.

The cherry red colour of skin and the mucus membrane is relatively uncommon in clinical practice; but when present indicates a severe degree of poisoning. [7] In a typical case the body is cherry-red which is evident in the skin of the face, shoulders, front of chest, and thighs. The internal solid organs are found to be congested, and pinkish on appearance. [8]

Carbon monoxide poisoning may have to be differentiated from alcoholic intoxication, diabetic/insulin coma, cerebral hemorrhage, head injury, uremia, barbiturate, narcotic poisoning.

The two features which may be confusing are-

- (i) Occasional bullous lesion which may stimulate second degree thermal burns,
- (ii) Tendency of the dying victim to wild, flailing movements with disturbing clothing and furniture to give an impression of a violent quarrel and creating suspicion of homicide. [7]

Putrefaction has very little effect on carboxy Hb, which is extremely stable; and carbon monoxide retards putrefaction, but is not a product of putrefaction, and may be detected in blood several days after death. [7]

The spot examination conducted by the Forensic Lab team reported that the door of the bathroom was locked and it was opened with the help of the carpenter and the body was lying naked with face in water tub. The results of chemical analysis of blood showed presence of carbon monoxide. Test for diatom was negative.

The histopathological examination showed oedema and marked congestion in lungs where as all other organs were reported as congested. These findings indicated accidental death of this female due to carbon monoxide poisoning.

Conclusion:

The medico-legal consequences of not determining the correct and exact manner and cause of such a death may lead to misdirection of the police investigation that may lead to harassment of the innocent people, claims of insurance, medical liability, and disposition of property etc. at large. For survivors, the acceptance, understanding, and grieving of such a death are markedly different in the event of suicide versus accidental or natural death.

Prevention always takes precedence over everything else. The geyser should not be switched on after locking the bathroom from inside, ventilation should be kept open and gap should be maintained between two people

taking bath to avoid increase in the carbon monoxide density.

Gas geyser unit should be placed outside the bathroom with a hose of hot water going inside. Gas geyser switch should ideally be at such a height that it can be switched off easily. These precautions can decrease the incidence, mortality, and morbidity due to accidental CO poisoning. [9]

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Fig. 2: Pinkish PM Staining on Face, Neck and Face



Fig.3: Pinkish PM Staining of Blood and Organs



Fig. 1: The Normal Appearance of Body

