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Methane gas intoxication causes loss of consciousness or asphyxia

Editorial

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The ultimate source of survival for all living organism on earth is energy. We consume this energy in our daily activities like in automobiles, electrics in building and in our home appliances etc. The main sources of energy are fossil fuel. In United States, these fossils fuel account for 86% energy as coal, petroleum and natural gas.[1] Regardless of this energy needs, fossil fuels provide some deleterious effects on the environment. These effects vary from increasing temperature around the globe to the very habitat that supports life. Modern improvements fronted by several nations with coupling methane gas have proved it a favourable energy source that could surpass the other sources for energy. However, methane is observed a more potent greenhouse gas than carbon dioxide and can be hazardous to store and manage.[2] Methane clathrate, (also called methane hydrate), methane ice, hydromethane, fire ice, or ice that burns, is a solid clathrate compound (methane trapped in water crystals forming a solid looks like an ice). There are significant deposits of methane clathrate found under residues on the ocean floors of our planet.[3] Shallow marine geospheres contain Methane clathrates constituents in their deep sedimentary structures. These structures form crags on the ocean floor. In 2008, studies on Antarctic Vostok and EPIC Dome C ice cores exposed that these are rich in methane clathrates and have high concentrations of atmospheric methane since 800,000 years. Current efforts particularly by Japan have recognized to be productive, as Japan has sedimentary basins of 6 trillion m^3.[4] There is a risk of potential problems in store and utilisation of methane and may lead to global warming, the world fronting today. Methane is extremely igneous, that raises the combustion risk.[3] In addition, methane is found to be (20-30 times) more potent as a greenhouse gas in comparison to carbon dioxide.[5] Therefore, with the imminent increase in temperature around the globe, it is not that hard to visualize a picture when permafrost and methane hydrates will begin to melt, discharging trillions of cubic meters of methane into the environment that will accelerate global warming.

According to the 2006 TSCA Inventory Update Reporting data, more than 1000 people are exposed to methane in the industrial sector in the United States.[6] NOES Survey has estimated more than 65,000 workers statistically possibly exposed to methane in the United States (1). There are chances of occupational exposure to methane through inhalation at the sites where it is produced or used.[7] It is now established that methane gas intoxication causes loss of consciousness or asphyxia. However, there is lack of data about acute pulmonary toxicity from inhalation of methane. Twenty one years old was accessed to a hospital with respiratory discomfort. He was exposed to methane gas for one minute accidentally. Symptoms after presentation were hypoxemia and drowsiness. Patient was immediately provided by mechanical ventilation. Radiographic findings and symptoms of patient were presenting acute pneumonitis. However, he was spontaneously recovered and discharged after a week without any specific treatment. However, his pulmonary function test showed a restrictive ventilatory defect. Consequently, acute pulmonary injury may cause a restrictive ventilator defect even after a short exposure to methane.[8]

It is always recommended that exposure to methane should be restricted because mild to moderate exposure of methane hydrate leads to nausea, headache, decrease in vision at night, rapid respiration rate and pulse. There is also a decrease in oxygen saturation below 90%. On the other hand, severe poison causes somnolence, dizziness, fatigue, euphoria, decreased alertness, loss of memory, cyanosis, loss of consciousness and decrease in visual acuity etc. At this level, oxygen saturation becomes 80% or low. Any exposure to methane hydrate needs immediate first aid. Artificial respiration is started if the patient is not breathing. Cardiopulmonary resuscitation is performed when required. Eyes are flushed with water in case of contamination. Patients are leaned or placed as head-down position to the left, to maintain respiration, in case of emesis. Patient is kept quiet and normal body temperature is maintained.[9] If patient is not responding to immediate first aid, then, advanced treatment is maintained. Orotracheal or nasotracheal intubation for airway control is provided to the unconscious patient having severe pulmonary oedema, or is in severe respiratory distress. Cardiac rhythm is monitored and arrhythmias are treated necessarily. Intravenous administration of D5W, 0.9% N/S or Ringer lactate is provided in hypovolemic signs. However, fluid is administered in hypovolemic patients' cautiously. Seizures are treated with diazepam or lorazepam. Proparacaine hydrochloride is used for washing of eyes.[9]

However, there is need of the time to minimize the amount of energy we use over time. Exposure to methane hydrate can be reduced by implementing four techniques, i.e. removal of free and dissolved water through separators, sieves etc.; maintenance of high temperature and low pressures to prevent hydrate formation; and injection of an inhibitor to avoid formation of hydrates.

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Conflict of interest

The author declares that there is no conflict of interest.

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