

Free history of present condition report sample

[Technology](#), [Development](#)



A forty-three year old male with cases of irritated eyes and increasingly blurry vision. The man also reports cases of skin irritation which are at certain instances severe and cases of difficulty in breathing.

His skin irritation and difficulty in breathing started six months ago. At the onset these complications were mild and isolated in their frequency but gradually they are becoming more persistent. Irritation of the eyes started three months ago and his vision started to get blurry a month ago.

Past medical history

Noncontributory.

Family history

His wife, parents, and two sisters are all perfectly healthy. His three daughters are also in good health.

Social history

The man is conservative and neither drinks alcohol nor smokes cigarettes. He claims to have never smoked a cigarette nor tasted alcohol in his entire life.

Physical examination

Vital signs: temperature 37.4 degrees Celsius; pulse 60; respiration 10; BP 118/66

Head, eyes, nose, throat, and ears not within normal range.

His respiratory system displayed abnormalities as air has difficulty moving into and out of the man's lungs.

Initial check questions

- What laboratory tests are necessary to truly determine what is wrong with

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this patient?

- A 36 hour urine collection shows traces of ethylene oxide in the man's urine
- Is the man suffering from ethylene oxide exposure?

What is ethylene oxide?

Ethylene oxide is also known as oxirane and is an organic compound. It has the chemical formula C_2H_4O . It is an ether of a cyclic nature. This means that it consists mainly of an alkaline and an atom of oxygen bonded to two carbon atoms, which belong to the alkaline. Therefore, this forms a ring hence the term cyclic alkaline. At room temperature ethylene oxide appears in gaseous form, and it is colorless and highly flammable. It also has a very sweet and appealing odor, which makes it a very attractive gas indeed.

Ethylene oxide is indeed the simplest oxide occurring in nature. It consists primarily of a ring with three basic members, which are two carbon atoms and one oxygen atom (Keith, 2009). The molecular structure of ethylene oxide is special and unique, and this makes it indeed very easy for ethylene oxide to take part in addition reactions. It is very easy for ethylene oxide to open its ring thus making it easy for it to polymerize. ethylene oxide is also highly soluble in water and alcohol.

How is ethylene oxide useful and where is it found?

Ethylene oxide has a wide range of industrial applications thus making it a very essential raw material in the production. Due to its vast application in the industry and health, ethylene oxide is the 14th most produced chemical of an organic nature while ethylene remains the most produced chemical of

an organic nature. In chemical production ethylene, oxide remains the most significant raw material and is applied on a very large scale. Most of the ethylene oxide produced is used in the synthesis of ethylene glycols. This is perhaps the largest scale use of ethylene oxide on the planet accounting for seventy-five percent of the total consumption of ethylene oxide all over the globe (Keith, 2009).

Ethylene oxide is highly applicable in the production of ethylene glycol. Ethylene glycol is widely applied as an antifreeze agent in the mass production of polythene terephthalate. it is also widely applied as an antifreeze agent in large-scale production of polyester. These two happen to be the key raw materials widely applied in the production and manufacture of plastic bottles. Ethylene glycol is also widely applied in solvents and liquid coolants.

Ethylene oxide is widely applied in the agricultural sector as an agrichemical. It is used to as a pesticide to kill pests, which may be harmful for certain stored crops. It is also used in the weakening and eventual elimination of weeds and other undesired plant forms from farms. In the right concentrations, ethylene oxide serves as a very important pesticide, which eliminates pests and apparently has minimal effects on the crops it is used on in terms of contamination and other complications that occur as the result of the use of regular pesticides (environment Canada, 2001).

Ethylene oxide has a non-damaging effect on delicate devices and instruments. This makes it the ideal substance for sterilization in healthcare facilities. It is very compatible with a wide range of materials and causes little or no damage at all. It is thus widely applied in sterilization of a wide

variety of instruments, which primarily are composed of components which are intolerant of heat or which can be damaged or altered by prolonged exposure to heat or exposure to large amounts of heat energy (Liteplo, 2003). It is also used as the main sterilization agent in instruments, which contain abrasive chemicals or various forms of moisture or liquid for example thermometers.

Ethylene oxide is also widely applied in the field of agriculture. Prolonged exposure of tobacco leaves to ethylene oxide has an accelerator effect on the rate at which the tobacco leaves mature. This speeds up the rate at which the tobacco leaves reach full maturity and can thus be plucked and applied in industrial use. In addition, it increases the production capability of a tobacco farm and enables the farm to produce a higher quantity of tobacco leaves compared to other farms, which do not apply ethylene oxide and rely on regular methods for the production of these tobacco leaves (Liteplo, 2003).

Ethylene oxide rarely occurs freely in nature. This greatly reduces the risks and chances of the average person getting exposed to ethylene oxide. Studies have shown minimal or absolutely no amounts of ethylene oxide in air. There has also been minimal discovery of ethylene oxide in water and in soil even near contaminated areas and areas where waste products have been accumulated (environment Canada, 2001). This makes it rather hard for the average person to come in contact with ethylene oxide especially the more concentrated amounts that are harmful to human health and in certain cases may even prove to be lethal.

Who is most likely to be exposed to ethylene oxide and the means of exposure

People who are at the highest risk of exposure to ethylene oxide are people who work in plants where it is produced and people who work in places where large doses of the substance are applied on a large scale. A good example is medical practitioners who work at a medical facility where ethylene oxide is used in sterilization of instruments. These people are at a higher risk of exposure to ethylene oxide because of the concentration in which ethylene oxide is used in their work environment and the elongated period of time in which the gas is actively used. Farm owners and farm workers who use ethylene oxide as a pesticide are also at a very high risk of exposure to the substance because of their proximity to the area in which it is applied and also due to the vastness of the area in which it is applied in terms of mileage. This greatly increases their chance of exposure to the substance.

The average person is also not exempted when it comes to ethylene oxide exposure. Since ethylene oxide is widely used as a pesticide, it is highly likely that traces of the substance can be found on crops it was used on. This exposes the average consumer to levels of ethylene oxide, which may be minimal or even concentrated depending on the amounts, and concentration of the substance used on the crops during production and preservation. This is one way in which this toxic substance can find its way into the table of the unsuspecting average consumer and cause diverse health effects and complications on the person.

Legislation and standards concerning ethylene oxide

Ethylene oxide is toxic to human beings and other living organisms especially when inhaled directly. Exposure to ethylene oxide should therefore be as limited as possible and within time duration tending to zero and verging on the minimum time possible. The maximum acceptable concentration level over an elongated period of about eight hours or even more is 1ppm. the maximum acceptable exposure concentration of ethylene oxide over a short period of about and definitely not more than fifteen minutes is 5ppm. At concentrations, ranging to two hundred ppm or more ethylene oxide is highly toxic and can have diverse health effects on its inhalants (environment Canada, 2001).

Metabolic pathways for ethylene oxide

Ethylene oxides also very soluble in blood. This increases the chances and rates of ethylene oxide making its way throughout the body and to the major organs where it can cause maximum damage in terms of health and functionality of the organs. Due to its high rate of solubility ethylene oxide is usually distributed throughout the body tissues at a very rapid rate. Once it has made its way into the body ethylene oxide undergoes biotransformation, which primarily involves two pathways (Liteplo, 2003). The first path involves conjugation of the absorbed ethylene oxide with glutathione. The second path involves hydrolysis of the absorbed ethylene oxide to ethylene glycol. Once the ethylene oxide has been absorbed, it causes instances of radioactivity in the lungs, the kidneys, and the liver. Small amounts of radioactivity can also be detected in the brain, the spleen and the testes, and all these are attributed to the intake of ethylene oxide. The highest

amounts of radioactivity attributed to the intake of ethylene oxide can primarily be detected in the adrenal glands, the liver, and the urinary bladder and in blood cells, which are packed. The lowest levels of radioactivity caused by exposure to harmful doses of ethylene oxide can be detected in body fat especially in areas of the body where fat has a tendency of accumulating.

Ethylene oxide happens to be an electrophilic substance that in most instances tends to alkylate nucleophilic clusters and groups that occur in biological macromolecules for example proteins and DNA. A good example is haemoglobin. In hemoglobin adducts are in most cases formed at cysteine residues. In nature ethylene oxide is formed because of the metabolism of ethylene. Ethylene also occurs in the body naturally. Sources of ethylene oxide and ethylene whether they are exogenous or whether they are endogenous play a large part and offer a great contribution to the alkylation of body proteins for example albumin and hemoglobin and even to proteins as basic to life as DNA.

The two pathways which ethylene oxide takes after it gets into the body, which are mentioned above, are more helpful to the body than they are harmful. They serve as detoxification procedures and tend to eliminate ethylene oxide from the body and prevent the ethylene oxide from causing any serious damage or any further damage to the human body. Once the ethylene oxide is cleared from the body tissues, it leaves the body by means of excretion either through faeces or through urine. Some of the ethylene oxide is expelled from the human body by breathing out the toxic gas through the lungs. The expulsion of ethylene oxide from the body is a

process that takes place very rapidly (Liteplo, 2003). The estimated time for complete expulsion of ethylene oxide from the human body ranges between two days and three days after which the person who had ethylene oxide in their system can be considered clean and clear of the toxic gas.

Health effects resulting from exposure to ethylene oxide

Individuals at a high risk of exposure to ethylene oxide stand a higher chance of exposure through inhalation. Inhalation of ethylene oxide causes an irritation effect on the mucus membrane of the inhalant. The most severely affected mucus membranes are the mucus membranes, which are associated with the respiratory system of the inhalant primarily because this serves as ground zero for ethylene oxide exposure and subsequent contamination. Prolonged respiratory exposure to high concentrations of ethylene oxide has diverse and damaging effects on the human body. Respiratory exposure to high concentration of ethylene oxide even for a very short period can result in the inhalant developing bronchitis. Pulmonary edema can also be caused by exposure to high concentration of ethylene oxide even for an extremely short duration of time. Due to the sweet smell of ethylene oxide, it is hard for persons exposed to realize that this substance is indeed toxic and harmful to their health. The gas also causes a sweet taste in the mouths of those who inhale it and thus prolonged exposure to the gas can be very appealing and soothing, the perfect mask for the grave health effects that result from prolonged exposure to high concentrations of the gas (Liteplo, 2003). Due to the pleasant atmosphere created by the gas people who inhale it do so without knowledge or even suspicion of its toxic nature and find themselves inclined by their natural senses to continue inhaling the

gas. This leads to intake of the gas at higher volumes thus increasing the chances and rate at which the gas affects the body and causes damage to the body.

Prolonged exposure to ethylene oxide has diverse effects on the eyes.

Primarily this exposure causes the eyes to be itchy and highly irritated.

Further prolonged exposure causes further damage to the eyes even to very severe levels. This exposure can cause development of cataracts to the exposed persons (environment Canada, 2001). This can adversely affect eyesight leading to blurry vision, and in extreme cases; the exposed person might require visual aids to perform tasks as basic as reading or even watching a movie.

Exposure to ethylene oxide can also result in acute poisoning. This acute poisoning has a wide variety of symptoms the most common of which is slight heartbeat. The acute poisoning also causes muscles to twitch, and this causes general discomfort throughout the body. This acute poisoning has a very harmful effect on the ears. It causes blurred hearing and causes the ability to hear to diminish, but this rarely proceeds to complete deafness even in cases of severe exposure to very high concentration. The acute poisoning also causes headaches and migraines. This can be attributed to effect the poisoning has on the heartbeat, which greatly affects transportation of oxygen to vital organs and cells that need it desperately for their effective functioning. This acute poisoning also affects the general mobility of exposed persons. An exposed person who has developed acute poisoning will have trouble in walking and general difficulty in finding their balance. Speech patterns will also be affected with the infected person

experiencing extreme levels of difficulty in organizing their speech patterns as they are accustomed to or even saying a sentence that makes sense. This acute poisoning also makes it virtually impossible for the exposed person to get prolonged or even the regular hours of sleep. It causes constant sleep disturbance and regular interruption of sleep at a very high frequency. This acute poisoning is perhaps felt most by the liver. It causes inflammation of the liver and renders the liver completely incapable of performing its various antitoxic functions (environment Canada, 2001). This means that the body is rendered incapable of getting rid of waste products and toxic products, which are indeed harmful to the body. This poses an even greater risk of further poisoning of the body by various toxins, which it is now, rendered incapable of excreting.

Ethylene oxide is also highly carcinogenic. Studies have shown that it is a causative agent for lymphatic cancer, and it has been noted as one of the key contributors in the development of hematopoietic cancer. Studies have also shown that people who are exposed to ethylene oxide over an elongated period are at a very high risk of developing leukemia with ethylene oxide serving as the main causative agent. Cancer of the pancreas and cancer of the stomach have also been proven prevalent in people who are exposed to ethylene oxide over an extensive period. Ethylene oxide is indeed one of the best-known carcinogens in the world and is pivotal to the development of various forms of cancer (Keith, 2009). This makes it a very substance dangerous substance to be around and is detrimental to the health of people to whom it is exposed. Ethylene oxide exposure has also been linked to the development of brain tumors and even the development

of breast cancer in both men and women.

Exposure of pregnant women to ethylene oxide can also cause miscarriages. This puts women who work in environments containing ethylene oxide at especially high risks of losing their unborn child in the case of a pregnancy or other pregnancy related complications that might affect the health of the unborn child as well as the health of the pregnant mother (Keith, 2009). The mother might not even know that the ethylene oxide is affecting her pregnancy until it is too late and she ultimately loses her baby.

Prolonged inhalation of high concentrations of ethylene oxide can also cause partial collapse of the lungs. This might render the exposed person incapable of inhaling quantities of oxygen that are necessary for the body to perform its basic functions.

References

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