Case Report

Inhalation of chlorine gas

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1. Abstract

Humans can come into contact with chlorine gas during short term, high level exposures in gas, paper and pulp, textile, pharmaceutical, cosmetic or other industries, especially when occupational disasters happen

Chlorine has intermediate water solubility with the capability of causing acute damage to the upper and lower respiratory tract. Most incidents of chlorine exposure are through accidental industrial or household exposures. Toxicity to chlorine gas depends on the dose and duration of exposure. Because of its strong odor, chlorine gas can be detected easily acute exposure can result in symptoms of acute airway obstruction including wheezing, cough, chest tightness and dyspnea.

In 2016, the American association of poison control centers reported over 6300 exposures to chlorine, making it the most common inhalation irritant in the United States. About 35% of exposures to chlorine gas were attributed to mixing of household acid with hypochlorite. In addition to household exposures, there have been multiple episodes of incidents involving chlorine gas release.

Chlorine gas is also the most frequent cause of major toxic release incidents internationally. Because of its widespread industrial use, chlorine gas has substantial potential for accidental release.

2. Case presentation

Mr. X young man had suffered from an accidental inhalation of chlorine gas. He reported cough and sputum but no history of vomiting and palpitation. He had no comorbidities

Upon arrival in the emergency department, the patient's SpO2 was 87 on room air, Four liters of oxygen were given and further tests were carried out. The pulmonologist advised a chest X-ray, which was found to be normal. The patient was also noted to have tachypnea, which led to the initiation of high flow nasal oxygen therapy (HFNO) at 60%. Routine investigations were conducted and found to be normal. With the HFNO therapy, the patient's tachypnea slowly settled down.

2.1. Medications

The patient received the following medications during their admission

- Inj. Cort-S 50mg 1-1-1
- Neb. Duolin 1-1-1
- Neb-Foracort 1-0-1
- Syp. Piriton CS 1oml 1-1-1

3. Nursing management

3.1. Hemodynamic monitoring

The patient's vital signs were monitored frequently, initially on an hourly basis and then every 2 hr. This was important to ensure that any changes in the patient's condition were detected promptly.

3.2. Oxygen administration

The patient was started on 4 liters of O2 initially and then HFNO at 60% due to tachypnea. It was important to monitor the patient's oxygen levels to ensure that sufficient oxygen is being delivered and to prevent complications.

3.3. Nutritional support

Regarding nutritional support, the patient had a normal diet and did not require any specific dietary requirements.

3.4. Hemodynamic monitoring

Emotional and psychological support was provided to the patient and their family members. Healthcare providers should aim to provide a supportive and compassionate environment to promote patient well-being and recovery.to the ward. There his vitals were monitored Q4h which was uneventful.

3.5. Personal Hygiene

Patient information was effectively communicated in a language that they can understand. The staff applied the communication tool ISBART for clinical communication and AIDET effectively to improve communication and maintain a good rapport with patients and attendants. At the time of starting shift nurses used to introduce themselves and explain the patient’s general condition, nursing process related to diet, medication, doctor rounds, investigations report etc. to the patient using AIDET tool. Though the doctors were communicating the prognosis to the patient attendants, they insist on the nurses explaining in detail as they were hesitant to ask the doctor.

3.6. PPE- Personal Protective Equipment

Nurses and other healthcare members were educated about the importance of wearing appropriate PPE. Such education and training can also improve awareness about how to handle emergency situations, enabling healthcare providers to respond effectively in cases of any accidental exposure of chlorine gas or other gases..

3.7. First Aid

There is no specific antidote for acute chlorine gas exposure. When a person is exposed to chlorine gas, it is important to immediately remove them from the source of exposure. Decontamination is important, such as flushing the eyes with large amounts of tepid water for at least 15 min.

4. Conclusion

As there is no specific clinically proven antidote for paraquat poisoning, supportive Recommended treatment of persons suffering from acute accidental chlorine inhalation exposures is supportive and symptomatic. Nurses have played a crucial role in providing care. They are responsible for educating the patients on the dangers of chlorine gas poisoning, which is usually self-limited and most of them have been trained by supportive treatment doctors and other professionals including prevention of future chlorine gas exposure episodes.

As instructed by the doctor, bronchodilators, steroids, diagnostic testing, and treatment were administered. The nursing care provided was of the highest quality. As a result, the patient's condition improved significantly. He was discharged with detailed instructions for home care.