A Case Report on Chlorine Gas Leak Affecting 120 Garment Workers at Bangalore

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A Case Report on Chlorine Gas Leak Affecting 120 Garment Workers at Bangalore

Author(s): Sebastin V P

Abstract

About 120 garment workers presented to emergency medicine department, with history of inhalation of unknown gas that was leaking from an abandoned cylinder at vacant plot near to their work place. In this case report, management and medico legal issues thereof are discussed.

Key words: chlorine, gas, inhalation, gas cylinder colour codes.

Introduction

Management of mass casualties is always a challenge to health care providers. About 120 patients presenting to emergency medicine with inhalation of unknown gas in a time period of 15 to 60 minutes of exposure. A co-ordinated effort by doctors of emergency medicine, forensic medicine, nursing staff and hospital security smoothly handled the situation. Basically patients were treated symptom based, except for 3 victims all were treated as outpatients. It was through media that we learnt that it was chlorine gas, subsequently about 3 months later we received the confirmatory report from the forensic science laboratory that it was indeed chlorine gas.

Case Report

On Sept 1 2009, Over 120 people became breathless after inhaling unknown gas from a leaking cylinder at kodichickanahalli near bomannahalli a hub of garment factories. The cylinder was found dumped in an open shed in a vacant site. Around 9; 30 am an obnoxious gas engulfed the area and residence of the nearby apartments and garment workers complained of irritation in the eyes, nausea, rashes and difficulty in breathing. Some even collapsed they had to be rushed to the nearby hospitals. The fire force personnel and the police rushed to the spot the fire personnel buried the cylinder and sprinkled water to reduce the effect of the gas.

It was soon learned that a gas cylinder on a vacant site abandoned for more than a year was leaking, by then more people began complaining of breathlessness. Even plants in vicinity turned yellow after exposure to the gas leak.

Out of 120 victims, males constituted 25 victims and females constituted 95 victims, age group 18 to 45 years. The presenting symptoms varied from burning sensation of the eyes(40%), retro sternal burning sensation(60%), nausea(40%), difficulty in breathing(25%), fainting spell(02%). No specific findings were found on physical examination, arterial blood gas analysis and chest x-ray.

114 Patients were treated as outpatient they were given symptomatic treatment like O2 inhalation, Injection Pantocid, Injection hydrocortisone and were sent home with advice to take Tab Pantocid o.d for 3days and to follow up if required and none of them came back for follow up. Only 6 patients were treated as inpatient as they were suffering from fever, loose stools, hysterical behaviour, all were discharged within 3days.

Discussion

Chlorine gas is greenish yellow gas having unpleasant irritating odour. It is an oxidising agent and causes extensive destruction of organic tissues. It combines with tissue to produce Hcl, producing injury and reactive oxygen species. When inhaled, it has an irritant and suffocative effect. The symptoms of acute poisoning are intense irritation of the eyes, and throat and mucous membrane of respiratory passages, with violent coughing and extreme dyspnoea, nausea, vomiting, and spasm of the glottis. Death is caused by cardiac failure following inflammatory oedema of the lung and pulmonary congestion. Chlorine is used as bleaching agent for cotton and paper, for water purification, sewage treatment, pharmaceutical and cosmetic industry (1,2,3).

First issue after arrival of the patients was the nature of gas was unknown; however patients were treated symptomatically and responded to treatment. if the nature of gas was known definitely the nature of treatment would have varied slightly, we would have advised our patients to come for follow up and probably an endoscopy could have been done on patient complaining of abdominal discomfort to exclude gastric ulcer that is formed because of chlorine acting on organic tissue to form hydrochloric
acid and since the same was not known none of the patients were subjected for endoscopy.

It is better for doctors to be aware of various colour codes (4) that are used to identify the gas cylinders. Example: Oxygen cylinders have a white shoulder, nitrous oxide cylinders have a blue shoulder, nitrogen cylinders have a black shoulder, chlorine gas cylinders have a yellow shoulder, carbon dioxide cylinders have a grey shoulder, hydrogen cylinders have a red shoulder and etc.

In the present case fire brigade sprayed water over the leaking cylinder and buried it, the forensic science lab staffs were called to the spot and sample of water around the leaking cylinder was collected and on analysis chlorine was detected (The report was available to us after 3 months). Chlorine gas leak into atmosphere can also be detected by opening a bottle of concentrated ammonium hydroxide which will cause the production of heavy white fumes of ammonium chloride (1).

In the above cases since initially the nature of gas was not known, the blood, vomitus and urine was collected and analysed in 20 victims for identification of poison, and no poison was detected in all the samples.

Conclusion

Poisoning due to various gas leaks is reported occasionally (5). Knowledge of various gases, its effect on human body and treatment thereof is necessary for doctors working at emergency medicine. Identification of gas helps in specific treatment, other than chemical analysis for identification of poison, the colour of leaking cylinder can also aid in identifying the gas. A Poison information and an analytical laboratory at our centre would have hastened in identifying the gas and treatment.

References

Reviews

Review 1

**Review Title:** Chlorine gas leak

Posted by Faculty Dr. Saurabh Chattopadhyay on 28 Jan 2012 12:55:25 PM GMT

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<td>Is the subject of the article within the scope of the subject category?</td>
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<td>2</td>
<td>Are the interpretations / conclusions sound and justified by the data?</td>
<td>Partly</td>
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<td>Is this a new and original contribution?</td>
<td>Yes</td>
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<td>Does this paper exemplify an awareness of other research on the topic?</td>
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<td>Can you suggest brief additions or amendments or an introductory statement that will increase the value of this paper for an international audience?</td>
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<td>Are the illustrations and tables necessary and acceptable?</td>
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<td>Are the references adequate and are they all necessary?</td>
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<td>Are the keywords and abstract or summary informative?</td>
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**Rating:** 5

**Comment:**
The treatment provided was only based on the symptoms. A detailed discussion was needed regarding the treatment of chlorine gas poisoning. The legal issues involved in such cases also should have been included. Never the less it is a good effort and the topic certainly needs to be highlighted in the context of industrials pollution and intoxications.

**Competing interests:** None

**Invited by the author to make a review on this article?** : No

**Experience and credentials in the specific area of science:**
Associate Professor of Forensic Medicine.

**Publications in the same or a related area of science:** No

**How to cite:** Chattopadhyay S. Chlorine gas leak[Review of the article ‘A Case Report on Chlorine Gas Leak Affecting 120 Garment Workers at Bangalore’ by ].WebmedCentral 1970;3(1):WMCRW001442
Review 2

Review Title: Chlorine gas leak, Bangalore

Posted by Prof. Jayendra R Gohil on 14 Dec 2011 08:42:50 AM GMT

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Rating: 5

Comment:
Article ceates awareness re Industrial hazards risk to workers and surrounding area public; a follow-up will greatly add to our knowledge of long-term effects of inhaled chlorine gas exposure.

Competing interests: No

Invited by the author to make a review on this article? : No

Experience and credentials in the specific area of science:
Nil

Publications in the same or a related area of science: No

How to cite: Gohil J. Chlorine gas leak, Bangalore[Review of the article 'A Case Report on Chlorine Gas Leak Affecting 120 Garment Workers at Bangalore ' by ].WebmedCentral 1970;2(12):WMCRW001242
Review 3

Review Title: A case report on chlorine gas leak affecting 120 garment workers at Bangalore

Posted by Dr. Gurudatta Pawar on 07 Dec 2011 12:09:44 PM GMT

1. Is the subject of the article within the scope of the subject category? Yes
2. Are the interpretations / conclusions sound and justified by the data? Partly
3. Is this a new and original contribution? Yes
4. Does this paper exemplify an awareness of other research on the topic? Yes
5. Are structure and length satisfactory? No
6. Can you suggest brief additions or amendments or an introductory statement that will increase the value of this paper for an international audience? Yes
7. Can you suggest any reductions in the paper, or deletions of parts? No
8. Is the quality of the diction satisfactory? No
9. Are the illustrations and tables necessary and acceptable? Yes
10. Are the references adequate and are they all necessary? No
11. Are the keywords and abstract or summary informative? Yes

Rating: 5

Comment:
The title need to be worked out to arouse interest in readers. The data should have been given in the form of details of the victims. The structure need to be elaborated in both medical and medico legal point of view. Due to the current scenario of environmental toxins being used indiscriminately in developing countries, this topic will boost research in this field. Topic should have dealt more regarding the laws with reference to storage, abandonment of toxic materials. No deletions are needed, in fact we need more additions as afore said. It needs to be clarified regarding how many of them treated as in patient, as at one place the no is stated as 3 and other place it is stated as Six. The references are very less. Over all it is good effort by the author towards environmental toxicology division.

Competing interests: Nil

Invited by the author to make a review on this article?: Yes

Experience and credentials in the specific area of science:
I am a Professor in Forensic Medicine and Toxicology with a teaching experience of 25 years, both for undergraduates and post graduates. I am involved in medico legal and clinical toxicology since two decades. I am an editor of a national journal since last three years. I am associated with academic activities in Forensic Medicine and Toxicology at various levels and positions.

Publications in the same or a related area of science: Yes

References:
• “Profile of poisoning cases in district hospital and medical college hospitals of north Karnataka” Published in Indian Journal of Forensic Medicine and Toxicology July – Dec 2008, Vol(2)No.2.

How to cite: Pawar G. A case report on chlorine gas leak affecting 120 garment workers at Bangalore [Review of the article 'A Case Report on Chlorine Gas Leak Affecting 120 Garment Workers at Bangalore ' by ]. WebmedCentral 1970;2(12):WMCRW001215
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