ORIGINAL RESEARCH PAPER

Internal Medicine

CHEMICAL PNEUMONITIS INDUCED ACTIVE LUNG INJURY – A CASE SERIES

KEY WORDS: chemical pneumonitis; ARDS; paraquat; turpentine inhalation; MODS.

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ABSTRACT

Objective: To investigate chemical pneumonitis, a serious medical condition requiring prompt treatment, and explore diagnostic and treatment options, as well as potential complications. **Materials And Methods:** A prospective, observational study was conducted on patients attending the Emergency Department/OPD with a history of exposure to various chemicals (n=3). Relevant investigations were carried out, and data was collected in a proforma and analyzed using Statistical Package for Social Sciences. **Results:** Chemical pneumonitis diagnosis relies on clinical presentation, medical history, and diagnostic tests. Symptoms range from mild coughing and chest discomfort to severe respiratory distress and hypoxemia. Chest imaging (X-ray/CT scan) confirmed acute lung injury due to inhalation/aspiration of irritant substances. Treatment is mainly supportive, focusing on symptom relief and oxygenation, utilizing oxygen therapy, bronchodilators, corticosteroids, and mechanical ventilation as needed. **Conclusion:** This study highlights the importance of understanding the dangers of chemical exposure, emphasizing proper training, safety precautions, and caution when handling hazardous compounds. Early recognition and intervention are critical to reducing morbidity and mortality, and most poisonings can be prevented by taking necessary precautions.

INTRODUCTION:

Chemical pneumonitis is a type of inflammatory response to inhalation or aspiration of irritants. Commonly known irritants include vomitus, gasoline, chlorine gas, barium used for imaging, pesticides, smoke and gases. In developing countries, especially in India, the incidence of chemical pneumonitis is extremely underreported due to lack of comprehensive data. Complications like secondary pneumonia, bronchiectasis, ARDS and lung destruction are often associated with chemical pneumonitis related mortality. However, the extent of damage is often difficult to determine since chemical pneumonitis related changes present late in radiological scans. We present 3 cases of varied presentations of chemical pneumonitis and their course through during hospitalization.

Case 1

68-year-old male came to the emergency department with complaints of Chest pain and breathlessness since 1 day after inhalation fumes of toilet cleaner. Patient was hypoxia on room air and was started on 4 L of oxygen via face mask. On presentation X-ray of the chest showed left sided lower zone consolidation suggestive of aspiration pneumonia. [Figure 1] Patient diagnosed with chemical pneumonitis based on his history and clinical presentation. HRCT thorax was suggestive of diffuse areas of ground glass opacities with smooth interlobular septal thickening with crazy paving pattern is seen involving the bilateral lung parenchyma and patchy areas of consolidation with air bronchogram in the basal segment of left lower lobe and superior segment of bilateral lower lobes. Patient was initially managed symptomatically, however the patient gradually progressed to worsening breathlessness and tachypnea. Patient landed up with acute respiratory distress syndrome (ARDS) which eventually required mechanical ventilation. The clinical picture of the patient gradually deteriorated which lead to death.

Figure 1 : Serial X-Ray chest of case 1

Case 2

46-year-old male came with complains of Vomiting after turpentine consumption. He received gastric lavage and inj Pralidoxime 1 g stat and inj Atropine till atropinisation. After the 3rd day of presentation patient became tachypnic with a respiratory rate of 40 cycles per minute which warranted intubation and mechanical ventilation. Patient's X-ray chest was suggestive of bilateral pneumonia. [Figure 2] Labs were significant for a raised pseudocholinesterase level which was 190 units per milliliter. Patient was diagnosed with chemical pneumonitis secondary to turpentine consumption. Patient clinically worsened over days where he developed worsening ARDS, sepsis and eventually multiple organ dysfunction syndrome (MODS).

Figure 2 : serial X-ray chest of case 2

Case 3

65 year old male came with complaints of chest and epigastric pain following accidental inhalation of paraquat. These symptoms gradually progressed to dyspnea, cough and fever. Arterial blood gas analysis showed Type 2 respiratory failure. X ray chest was suggestive of bilateral pneumonia. [Figure 3] Later an HRCT thorax revealed ground glass opacities in bilateral lung parenchyma predominantly bilateral lower lobes with multiple patchy areas of consolidation demonstrating few areas of cystic bronchiectasis changes within bilateral lung parenchyma; with fibrotic changes in the form of fibrotic strands, bronchiectasis showing few thin walled cysts within. Given a history of paraquat inhalation and subsequent radiological findings a diagnosis of chemical pneumonitis was made. Patient was treated symptomatically and over a period of weeks his clinical picture improved.

Figure 3 : serial X-ray chest of case 3

DISCUSSION :

Chemical pneumonitis is a form of acute lung injury caused by inhaling or aspirating irritant substances, including gases, vapors, fumes, or particulates. Depending on the compounds inhaled and/or consumed Chemical pneumonitis can have varied picture ranging from mild symptoms to full blown ARDS and MODS as depicted in the 3 cases presented above. Patients with prior history of congenital or aquired lung disorders are especially susceptible to developing severe disease post exposure to such substances.

A good history and physical examination remain the most important tool for diagnosis of chemical pneumonitis as it not only reflects the severity of the presentation but also gives us an insight into the etiology of the disease which will aid in treatment. Other diagnostic modalities include but not limited to blood gases, X-ray of the chest, swallowing studies, CT scan of the thorax, Pulmonary function studies. Blood gas analysis is an essential biomarker as it is cheap and easy to perform and gives immediate results thus being useful as a prognostic marker.

Treatment has largely remained symptomatic with emphasis on airway protection, oxygenation, bronchodilators, and empirical antibiotic cover so as to prevent secondary infections. Corticosteroids especially early in the disease do play a major role in the treatment of Chemical pneumonitis both in combating inflammatory response to the chemicals and also to prevent long term scaring of the lung parenchyma.

Through this case series we would like to highlight the complexity of chemical pneumonitis and its sequalae. Prompt hospitalisation, early diagnosis and immediate triaging are important for improving the morbidity and mortality among patients with chemical pneumonitis.

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