

LONG-TIME PERIOD OUTCOMES OF MUSTARD FUELOLINE ON RESPIRATION ORDER OF IRANIAN VETERANS AFTER IRAQ-IRAN WAR: A REVIEW

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ABSTRACT

To assessment long-time period respiration results of mustard fueloline on Iranian veterans having gone through Iraq-Iran war. Electronic databases of Scopus, Medline, ISI, Iran Medex, and Irandoc web-sites have been searched. We everyday articles posted in clinical journals as a nice criterion. The essential pathogenic elements are unfastened, radical mediators. Prevalence of pulmonary involvement is about 42.5%. The maximum not unusual-place lawsuits are cough and dyspnea. Major respiration headaches are persistent obstructive pulmonary disease, bronchiectasis, and asthma. Spirometry consequences can screen restrictive and obstructive pulmonary disease. Plain chest X-ray does now no longer assist in approximately 50% of lung diseases. High-decision CT of the lung is the fine modality for diagnostic evaluation of parenchymal lung and bronchi. There isn't anyt any specific healing remedy for mustard lung. The powerful remedy regimens include oxygen management, use of vaporized wet air, respiration physiotherapy, management of mucolytic agents, bronchodilators, corticosteroids, and long-appearing beta-2 agonists, antioxidants, surfactant, magnesium ions, healing bronchoscopy, laser therapy, placement of respiration stents, early tracheostomy in laryngospasm, and in the end lung transplantation. High-decision CT of the lung is the maximum correct modality for the assessment of the lung parenchyma and bronchi. The remedy efficacy of sufferers uncovered to mustard fueloline relies upon on affected person conditions (acute or persistent, higher or decrease respiration tract involvement). There are numerous remedy protocols; however, alas none of them is truely curable.³⁷

KEYWORDS

Lung damage; Chemical warfare; Mustard gas

INTRODUCTION

During the Iran-Iraq War (1980-1988), more than 1,000 tons of mustard gas was used against Iranian forces. More than 50,000 people were injured in the attack¹. There have been several studies of survivors 22 years after infection, each focusing on a specific aspect of the subject. Khateri et al² reported that in one study of 34,000 victims of chemical warfare, 42.5% of the victims (14,450 patients) had respiratory problems. Problems were classified into three types according to the severity of the lesion. Among them, 12,580 patients (37%) had minor injuries, 1530 patients (4.5%) had moderate injuries, and 340 patients (1%) had severe injuries. In another study, Emad and Rezaian³ reported the prevalence of respiratory complications. Out of 197 injured patients after 10 years of exposure, the outcomes were: bronchitis - 58.80 seconds; lung fibrosis 12.18%; Asthma - 10.67%; Airway stricture due to granulation tissue - 9.64% and bronchiectasis - 8.60%.³⁷

ORIGIN

Information was collected using electronic databases including Scopus, Medline, ISI, IranMedix, and Irandocsites. We used the following keywords from international and international sources. (Chemical Warfare) or (Chemical Review)fight) or (sulfur mustard). There was no separate evaluation on the quality of papers, and only papers published in scientific journals were recognized as quality standards. The title and abstract were separately evaluated by two experts, and irrelevant reports were excluded from the study list. Then, I used them by categorizing the topics.³⁷

PREDISPOSITION FACTORS

Zarchi et al.⁴ A retrospective cohort study of 1,337 soldiers exposed to mustard gas found an association between multiple factors and long-term lung complications. These factors include age, smoking status, frequency of exposure, and mask use. They found that the cumulative incidence of pulmonary complications was 31.6%, and they found that the risk of pulmonary complications increased significantly with age. Thus, the risk is 0.75 per 1000 people in the first year after infection and 9.76 per 1000 people at the 7th year after infection. They also reported that mask use reduced the risk of pulmonary complications and that gas concentrations, duration of exposure, and high ambient temperature also affected the incidence and severity of the disease. Smoking for unknown reasons does not increase the risk of pulmonary complications. In one study, Ghanei et al⁵ found that the effects of sulfur mustard gas were independent of the severity of the exposure.³⁷

PATHOLOGY

One of the pathological factors in the development of lung disease caused by exposure to mustard gas is free-mediated radicals.⁶ Affects the respiratory and pulmonary parenchyma. When absorbed from the respiratory system, it causes inflammation of the bronchial epithelium with severe filtration of white blood cells, alveolar hemorrhage with clot formation, and parenchymal vacuolization of the lungs.⁷ Some of the pathological changes that occur after exposure to mustard gas are asthma, chronic obstructive pulmonary disease (COPD). and chronic bronchitis. The most prominent symptom of asthma is increased sensitivity of the airways to methacholine and other irritants. Airway hypersensitivity can cause burns (acid burning) of the vocal cords, which can cause laryngitis and hoarseness. Tissue granulation may also increase airway stenosis.¹¹ Aghanouri et al¹², in a study of 126 veterans with chronic lung disease, found that transforming growth factor B1 (TGFB1) increased in bronchoalveolar lavage. Found it. Therefore, theoretically, destroyed TGFB1 in the lungs could contribute to the pathogenesis of pulmonary fibrosis.³⁷

SIGNS AND SYMPTOMS

Mustard gas has acute (short-term) and chronic (long-term) effects on the respiratory system.^{13,15} In general, exposure to mustard gas causes acute symptoms such as irritation of the throat and throat of pain, increased runny nose, sneezing, and discomfort in the nose and sinuses, and more severe exposure causes dry cough and bronchitis. Other signs of acute upper respiratory disease include hoarseness, dry cough, and bleeding in the nasal mucosa, which are early symptoms of intoxication after mustard gas. Burning hemoptysis, respiratory irritation. And there is some degree of pneumonia and even acute respiratory failure.¹⁷ These symptoms become progressively chronic over time. For example, in the study by Ghanei et al¹⁸, the main symptoms were chronic cough, shortness of breath, and phlegm. In the study by InEmad et al¹⁹, chest pain, gastroesophageal reflux, hemoptysis, and chronic bronchitis occurred in 59% of 197 patients. Other chronic signs may include arousal, cyanosis, decreased voice in the lungs, and tearing. These results come from a study that included 287 Kashan and Isfahan veterans, 34 chemical veterans¹⁸ and 408 wounded.^{20,37}

UPPER RESPIRATORY COMPLICATIONS

EARLY COMPLICATIONS

Bronchitis usually occurs within hours of exposure.²⁰ Ferietag et al¹¹ A study of 21 Iranian soldiers injured by mustard gas found that early lung lesions included hemorrhagic inflammation of the bronchial tree.³⁷

LATE COMPLICATIONS

In a study of survivors of victims of World War, I (1914-1918), the most common pattern of pulmonary function tests

(PFT) was obstructive, with bronchitis and emphysema being the most important long-term complications. Secondary complications were chronic infection and suppurative bronchitis.¹¹ In general, prolonged exposure to mustard gas of the respiratory system includes shortness of breath, irritant cough, and frequent respiratory infections. These effects are mainly associated with complications such as obstructive pulmonary disease, chronic bronchitis, asthma, bronchiolitis, bronchiectasis, COPD, and narrowing of the air-ways.^{17,20} but the symptoms persist and progress gradually in the chronic form of the disease, namely COPD. This condition tends to be gradual and turns into typical bronchiolitis after a few years. According to a WHO report, laryngitis is one of the leading respiratory complications among chemical victims in Iran. Ahavan et al.²¹ studied 50 cases of laryngeal pathological changes after 20 years of acute chemical exposure. In this study, they assessed patients' speech and found some degree of dysphonia, including harsh sounds in 14%, hoarseness in 32%, and more commonly chronic laryngitis. This study shows that vocal cord paralysis can cause long-term neurotoxic effects of mustard gas, and adhesions and vocal cord nodules can result from infections of the larynx and bronchi. In addition, due to the inability to use the edematous vocal cords, hypertrophy of the vocal cords may occur, resulting in dysphonia. All these symptoms confirm the presence of chronic laryngitis.²¹ Another report found that the most common complication for veterans after 15 years of exposure is bronchiolitis, and airway hypersensitivity may be the first sign of the condition.²² Some victims of mustard gas exposure develop bronchomalacia after 15 years.²³ In a series of bronchoscopy, bronchomalacia is observed in 14% of patients with chronic cough.²³ Bronchomalacia is usually caused by weakening of the cartilage walls and supporting areas of the airways, and the central airway. It can develop into a severe form. There are two forms of bronchial bronchomalacia, primary and secondary. The primary type causes stenosis and lung infections in children, and the secondary type causes bronchial damage. Extensive pain-bronchitis may play a role in exacerbating bronchiectasis.^{20,37}

LOWER RESPIRATORY TRACT COMPLICATIONS

Respiratory failure, secondary pneumonia, and sometimes hemorrhagic pulmonary edema are usually fatal²³. The major pulmonary complications in mustard gas victims are COPD, bronchiectasis, asthma, and major airway constriction. impact will occur. One study of mustard gas victims found that persistent lung complications were asthma symptoms, occurring in 78% of cases. We can point to other late effects of gene mutations on cancer, particularly laryngeal and lung cancer.²⁴ Epidemiological studies clearly show that mustard gas causes lung cancer.²⁵ Exposure to sulfur mustard gas during World War first It was discovered in a survey of soldiers who had been the relative risk of lung

cancer was 1.3 and the lung cancer mortality rate was 400% higher than in the normal population²⁶. Between 1929 and 1945, 4,444 workers at the Mustard gas pipeline developed upper respiratory cancer, which is 37 times more common than the general population²⁷. However, while these workers have regular, long-term contact with mustard gas, soldiers often take large doses of the gas in one dose. There is no association between lung cancer and hemoptysis. Sulfur mustard gas may also cause breathing difficulties depending on concentration and duration of exposure²⁴. Rushan et al.²⁸ studied 266 military support personnel. In 15-18 after infection, the incidence of bronchiolitis was 13.1%, fibrosis 2.3%, COPD 17.6%, asthma 16.6%, and chronic bronchitis 2.3%.³⁷

DIAGNOSIS

PLAIN CHEST X-RAY

Hyperinflation, air retention, increased marks around the bronchi (bronchial wall thickness), and bronchiectasis.^{6, 13, 18} Several studies have shown that conventional radiographs of symptomatic patients are present in 17% of cases and 54% of cases. It was found to be normal^{6, 16, 29} as you can see, the range of normal and abnormal findings reported on the chest radiograph of this patient is very wide. Therefore, plain x-rays are a non-specific diagnostic tool and are not very helpful in diagnosing respiratory problems in people exposed to radiation.³⁷

SPIROMETRY

One of the best diagnostic methods is the PFT assessment. The most common PFT pattern is the blocking pattern¹⁴. In a study of 202 chemical veterans, spirometry results were found to be abnormal in 142 patients (70%) and normal in 60 (30%). Abnormal spirometry results included an obstructive pattern in 43% of cases, a restrictive pattern in 16%, and a combination of obstructive and restrictive forms in 10%. Although these abnormal findings were more evident 7 years after exposure, there was no significant association between abnormal spirometry results and time of injury. The possibility of abnormal spirometry due to obstructive and restrictive lesions is seen more in patients with persistent dyspnea than in patients with intermittent dyspnea.^{16,37}

HIGH-RESOLUTION CT

High-resolution CT is the most accurate diagnostic assessment of parenchyma, bronchi and lung.³⁰ A study by Ghanei et al. Bagheri et al.³⁰ conducted a study of 50 victims of chemical warfare and found at least one anomaly in all patients using high-resolution CT, and these findings were observed in all patients. 80% of cases on plain chest X-rays. The most frequent high-resolution CT findings in this study

were bronchial wall thickening (bronchitis and peribronchitis) at 100 sec. Other important findings were interstitial lung disease in 80%, bronchiectasis in 26%, and emphysema in 24%. On the other hand, nodular lung involvement, lung mass, traction bronchiectasis, and calcification of the lung parenchyma were not observed. It was concluded that high-resolution CT of the lungs is much more sensitive than conventional chest x-rays. Among exposed volunteers 15 to 18 years after exposure, normal high-resolution CT views were 64%, partial air retention 17%, and significant air retention 12%.^{28,37}

HAEMOPHILUS INFLUENZA

Antibiotic treatment does not prevent the secretion of purulent sputum, since the function of the respiratory cilia is impaired. The mucus is so thick and sticky that even a young victim cannot remove it with an effective cough. Many patients have hypoxia and rapid breathing (hypercapnia). Histological examination reveals tissue necrosis and non-specific granules of the bronchial tree.¹¹ Eosinophilia in the bronchoalveolar lavage fluid may indicate the presence of asthma as one of the main consequences of chemical exposure in the victim.⁹ Study by Ghanei et al^{5,15} Prior to the study, victims of chemical warfare with chronic respiratory disease who had been exposed to mustard gas at least 17 years prior to the study were concluded with surgical lung biopsy in the diagnosis of complex cases such as symptomatic contractile or bronchiolitis obliterans with normal high-resolution CT and PFT, may be helpful.³⁷

Ganji³¹ also performed echocardiography and arterial blood. Patient gas analysis and evaluation indicate that the right ventricle pressure is significantly higher than normal but does not cause significant changes in the left ventricular pressure. Arterial blood gas results are also normal. Overall, currently, the most useful diagnostic tests for veterans are spirometry and high-resolution CT of the lungs.³⁷

CONCLUSION

According to a study of Iranian veterans who served in the Iraq war with Iran, the lung injury rate for Iranian veterans is approximately 42.5%. Age, frequency of exposure, duration of exposure, gas concentrations and amounts, high ambient temperature, and mask use are factors that affect results. The main lung complications of mustard gas victims are COPD, bronchiectasis, asthma, and other large airway strictures. Spirometry results show restrictive and obstructive lung disease. In about 50% of cases, conventional chest x-rays are not helpful in the diagnosis. High-resolution CT of the lungs is currently the most accurate method to evaluate the parenchyma of the lungs and bronchi. There are a number of treatments available, but unfortunately, none of them is the only one that works.³⁷

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