

Interstitial Lung Disease in a Glass Industry Worker: A Rare Case Report

Seshagiri Rao Damaraju¹, Raghavendra Rao Manukonda²

¹Associate Professor, Department of Pulmonology, Rangaraya Medical Collage, Kakinada, Andhra Pradesh, India, ²Professor & Head, Department of Pulmonology, Rangaraya Medical Collage, Kakinada, Andhra Pradesh, India

Abstract

Occupational lung diseases are caused by long-term exposure to irritating or toxic agents in the workplace for the workers. Epidemiologic studies in humans suggest that there is no direct evidence of chronic lung disease associated with glass exposure. However, rare cases of granulomatous lung disease have been reported. We report a case of a 27-year-old male patient working in a glass manufacturing industry with recent onset of breathlessness and cough. Chest X-ray, high-resolution computed tomography revealed nodular opacities. Bronco-alveolar lavage sample and lung biopsy revealed histopathological examination report. Patient is being managed by corticosteroid inhalers and respiratory physiotherapy. Change in profession has been advised for prevention of future exposure.

Key words: Glass industry worker, Investigation profile, Occupational lung diseases, Respiratory illness, Steroid inhalers

INTRODUCTION

Occupational lung diseases are caused by long-term exposure to irritating or toxic agents in the workplace for the workers.¹ Clinical presentation is usually asymptomatic or with mild cough and breathlessness, which the patient neglects. Radiological, endoscopic and invasive guided biopsy are the tools to establish the diagnosis. The management is mostly symptomatic, but identification of one case is very helpful in planning prevention strategies in the same industry or similar places.²

CASE REPORT

A 27-year-old, male presented to the pulmonology outpatient department with exertion dyspnea since 3 years and breathlessness at rest since 3 weeks. There is no

history of fever, cough with expectoration and hemoptysis. There is a history of asthenia, loss of appetite and loss of weight (8 kg - 12.9% of prior weight of 62 kg) over 3 months. Patient gives a history of working in a glass manufacturing industry at industrial zone since 15 years. He is a glass shiner with silica dust and glasscutter without any specific protective measures and works 6 h/day. On examination, Grade 3 breathlessness, accessory respiratory muscles are acting, no evidence of cyanosis and clubbing, no generalized or cervical lymphadenopathy, diffuse coarse crepitations heard over all zones of lungs, vocal fremitus, vocal resonance - normal, breath sounds were diminished. No clinical evidence of effusion. Finger pulse oximeter showed - PaO₂: 95% pulse rate 85/min. Investigation are complete blood profile -hemoglobin: 10.2 mg%, white blood cell: 10,400/cmm, differential count: P - 68%, L - 27%, M - 3%, E - 2% platelets count was 2.5 lakhs/cmm. Sputum staining showed negative for acid-fast bacilli in Zeil-Nelson stain and florescent microscopy. Mixed connective tissue disease blood profile; complement 3 and 4 negative, enzyme-linked immunosorbent assay for antinuclear antibodies and double standard DNA antibodies negative. Chest X-ray: Bilateral multiple military mottling (Figure 1). Pulmonary function tests: Mixed functional disorder with both restrictive and obstruction pattern has been noted. Peak expiratory flow rate: 70%, forced expiratory volume in 1 s: 10%, forced vital

Access this article online



www.ijss-sn.com

Month of Submission : 12-2014

Month of Peer Review : 01-2015

Month of Acceptance : 01-2015

Month of Publishing : 01-2015

Corresponding Author: Dr. Seshagiri Rao Damaraju, D.No. 1-9-23, Sriram Nagar, Kakinada - 533 003, Andhra Pradesh, India. Phone: +91-9912577664. E-mail: drdsraosai@gmail.com

capacity: 40%. A high resolution computed tomography thorax: Bilateral multiple interstitial mottling with fibrosis (Figure 2). Broncho alveolar lavage showed: Cytology shows macrophages with dust particles and lymphocytes and fibroblasts. Lung biopsy has been performed with soft tissue biopsy needle gun (an open lung biopsy was performed because of an uncommon radiologic pattern rarely observed in patients with an occupational history of glass fiber exposure). Light microscopy showed peri-bronchiolar infiltration of lymphoid cells (Figure 3) and many foreign-body-type granulomas throughout the examined tissue. Alveolar macrophages observed by light microscopy had numerous round and elongated particles inside their cytoplasm and plate like material when examined.

Later the patient was admitted in intensive care unit and treatment consisting of tablet prednisolone 20 mg once a day along with inhalation bronchodilator and corticosteroid (budesol respules – levalbuteral 1.25 mg with budesonide 0.5 mg). Oxygen supplementation by mask with monitoring with pulse oxymeter was also carried out along with immuno nutrition of antioxidants multivitamins and protein. Some improvement is there, but patient is bed ridden and respiratory cripple. Prognosis was good, and patient was advised relocation in the same plant or change of profession.

DISCUSSION

Epidemiologic studies in humans suggest that there is no direct evidence of chronic lung disease associated with glass exposure. A cohort study of 6586 workers engaged in glass fiber production indicated no excess malignant or non-malignant respiratory disease.² Guber *et al.* (2006) reported a case of interstitial lung disease with a relatively benign course during the follow-up period of ≥ 4 years.³ The biopersistence mechanism of the fibers deposited in the respiratory tract results from a combination of physiologic clearance (mechanical translocation/removal) and physicochemical events (chemical dissolution and leaching, mechanical breaking).⁴ In our case, a thorough work up of the patient with signs and symptoms of respiratory disease revealed a peculiar occupational parenchymal lung disease. Biopsy proves it to be associated with fibrosis thus leading to vulnerability of the patient to land in respiratory failure. An expectant management with corticosteroid and broncho-dilator therapy was started.⁵ Inhalation route is the most preferred one to avoid systemic side effects. Immediate re-location or change in profession has been advised for the suffering patient. Industrial authorities have been informed, and a study of the other employees was undertaken. Out of eight members employed another

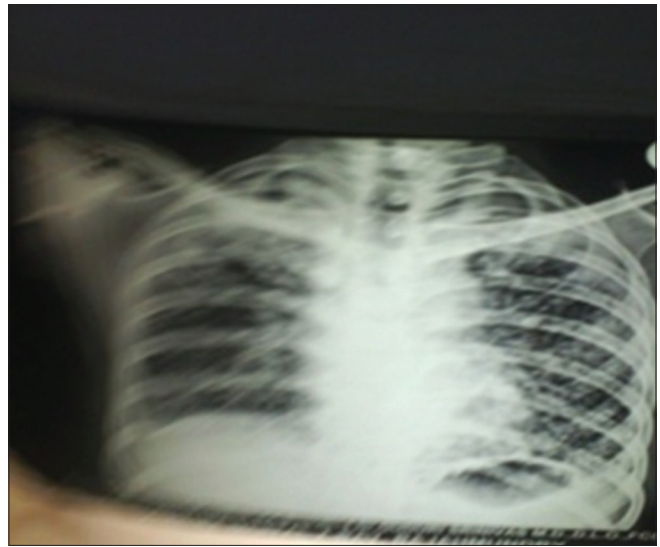


Figure 1: Chest X-ray: Bilateral multiple military mottling

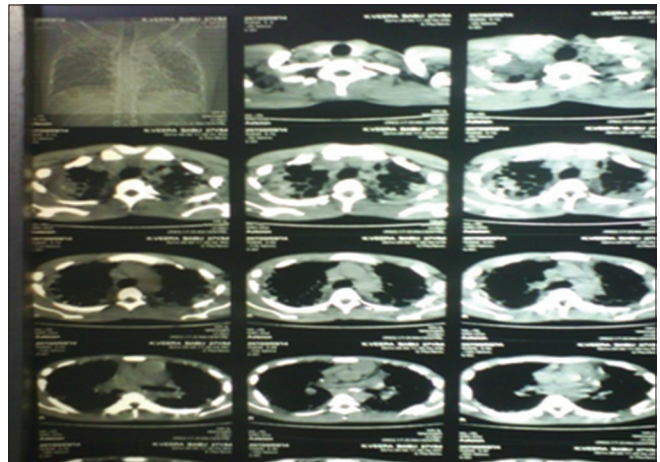


Figure 2: Computed tomography thorax: Bilateral multiple interstitial mottling with fibrosis

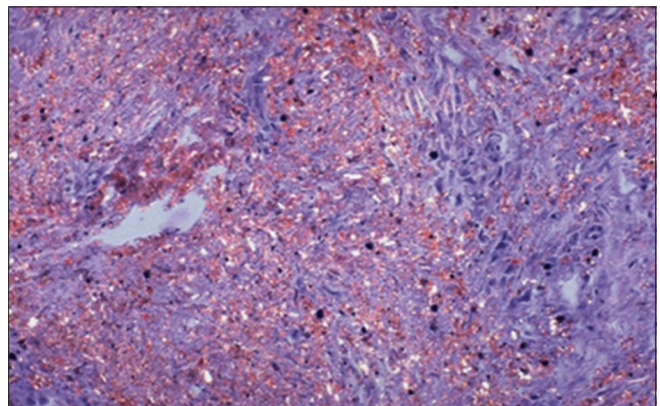


Figure 3: Peri-bronchiolar infiltration of lymphoid cells

male has been identified with early changes in pulmonary function tests. Hence, surveillance has been advised. Other precautions, like using filter-masks, maintenance of ideal

humidity, have been discussed with the authorities of the industry.^{6,7}

CONCLUSION

Interstitial lung disease due to exposure to glass particles is very rare case that has come across. In our case, a thorough work up of the patient with signs and symptoms of respiratory disease revealed a peculiar occupational parenchymal lung disease. Biopsy proves it to be associated with fibrosis thus leading to vulnerability of the patient to land in respiratory failure. An expectant management with corticosteroid and broncho-dilator therapy was started. Inhalation route is the most preferred one to avoid systemic side-effects. Immediate re-location or change in profession has been advised for the suffering patient.

ACKNOWLEDGMENT

All the contributors would like to thank the entire Pulmonology Department, which worked as a team in

making the diagnosis and assisting the various procedures done for the patient.

REFERENCES

1. Lippmann M. Effects of fiber characteristics on lung deposition, retention, and disease. *Environ Health Perspect* 1990;88:311-7.
2. Ferreira AS, Moreira VB, Castro MC, Soares PJ, Algranti E, Andrade LR. Case report: analytical electron microscopy of lung granulomas associated with exposure to coating materials carried by glass wool fibers. *Environ Health Perspect* 2010;118:249-52.
3. Guber A, Lerman S, Lerman Y, Ganor E, Trajber I, Edelstein E, *et al.* Pulmonary fibrosis in a patient with exposure to glass wool fibers. *Am J Ind Med* 2006;49:1066-9.
4. Marsh GM, Youk AO, Stone RA, Buchanich JM, Gula MJ, Smith TJ, *et al.* Historical cohort study of US man-made vitreous fiber production workers: I. 1992 fiberglass cohort follow-up: initial findings. *J Occup Environ Med* 2001;43:741-56.
5. Morgan RW, Bratsberg JA. Mortality study of fibrous glass production workers. *Arch Environ Health* 1981;36:179-83.
6. Baan RA, Grosse Y. Man-made mineral (vitreous) fibres: Evaluations of cancer hazards by the IARC Monographs Programme. *Mutat Res* 2004;553:43-58.
7. Zisman DA, Keane MP, Belperio JA, Strieter RM, Lynch JP rd. Pulmonary fibrosis. *Methods Mol Med* 2005;117:3-44.

How to cite this article: Damaraju SR, Manukonda RR. Interstitial Lung Disease in a Glass Industry Worker: A Rare Case Report. *Int J Sci Stud* 2015;2(10):169-171.

Source of Support: Nil, **Conflict of Interest:** None declared.