

Pleural plaques in smoking-associated fibrosis and pulmonary asbestosis

Rahul G Sangani¹

Andrew J Ghio²

John E Parker¹

¹Department of Pulmonary and Critical Care Medicine, West Virginia University, Morgantown, WV, USA;
²Environmental Public Health Division, National Health and Environmental Effects Research Laboratory, US Environmental Protection Agency, Chapel Hill, NC, USA

Dear editor

Bledsoe et al presents an interesting study examining the disparities between radiologic and pathologic diagnoses of asbestosis in cases referred for consultation in pulmonary malignancy.¹ The authors conclude that the clinical diagnosis of asbestosis cannot be reliably distinguished from interstitial fibrosis in heavy smokers. These findings highlight the confounding role of cigarette smoking in the diagnosis of asbestosis when it is based on non-pathologic criteria. Clinical and radiographic characteristics of lung injury following particle exposure (including fibers in which one diameter of the particle is 3× that of the other by definition) are often comparable.² The results of this investigation¹ support further evaluation of a role for cigarette smoking in interstitial fibrosis. Furthermore, asbestos exposure can cause several non-malignant diseases of the pleura and lungs (ie, pleural effusions, pleural plaques, diffuse pleural fibrosis, rounded atelectasis, and asbestosis). Malignancies are also associated with asbestos exposure (ie, lung and laryngeal cancers and mesothelioma).^{3,4} Relationships between the dose–response and prevalence of asbestos-related diseases are complex.^{3,5} The injury requiring the least exposure, and which accordingly demonstrates the highest prevalence, is pleural plaque; 80% of individuals significantly exposed to asbestos (total dose of 0.1 fiber-year or less) will have plaques on the chest X-ray while only 0.5%–8% of an unexposed population will reveal such findings.⁶ Mesothelioma impacts 2,500 to 3,000 workers annually in the United States and its risk is elevated at a total asbestos dose of between 0.1 and 1.0 fiber-year. Those diseases requiring the greatest asbestos exposure are lung cancer and asbestosis; the risk for both is considered elevated at approximately 25 fiber-years. Bledsoe et al identify 24 cases with International Labour Organization (ILO) profusion score of ≥ 1 , out of which only six cases show histological evidence of asbestosis. Of the remaining 18 cases, 16 are identified to have significant smoking history whereas two subjects had unknown smoking status. They observe radiographic evidence of pleural plaques in 82 (44%) of the cases included in the study. It would strengthen the conclusions of the study to know if those diagnosed with asbestosis demonstrated a higher prevalence of pleural plaques than those with cigarette smoking-related fibrosis.¹

Disclosure

The authors have no conflicts of interest in this communication.

References

1. Bledsoe JR, Christiani DC, Kradin RL. Smoking-associated fibrosis and pulmonary asbestosis. *Int J Chron Obstruct Pulmon Dis*. 2015;10:31–37.
2. Sangani RG, Ghio AJ. Lung injury after cigarette smoking is particle related. *Int J Chron Obstruct Pulmon Dis*. 2011;6:191–198.

Correspondence: Rahul G Sangani
Department of Pulmonary and Critical Care Medicine, West Virginia University, Robert C Byrd Health Science Center, I Medical Center Drive, Morgantown, WV 26505, USA
Tel +1 304 293 4661
Fax +1 304 293 3724
Email rgsangani@hsc.wvu.edu

3. Ameille J, Brochard P, Letourneux M, Paris C, Pairon JC. Asbestos-related cancer risk in patients with asbestosis or pleural plaques. *Rev Mal Respir*. 2011;28(6):e11–e17.
4. O'Reilly KM, McLaughlin AM, Beckett WS, Sime PJ. Asbestos-related lung disease. *Am Fam Physician*. 2007;75(5):683–688.
5. Price B, Ware A. Mesothelioma trends in the United States: an update based on Surveillance, Epidemiology, and End Results Program data for 1973 through 2003. *Am J Epidemiol*. 2004;159(2):107–112.
6. Hammar SP. The pathology of benign and malignant pleural disease. *Chest Surg Clin N Am*. 1994;4(3):405–430.

Authors' reply

Jacob R Bledsoe¹

David C Christiani²

Richard L Kradin^{1,2}

¹Department of Pathology, Massachusetts General Hospital, Boston, MA, USA; ²Department of Medicine, Massachusetts General Hospital, Boston, MA, USA

Correspondence: Richard L Kradin

Department of Pathology, Massachusetts General Hospital, Warren Building 253, 55 Fruit Street, Boston, MA 02114, USA

Tel +1 617 726 9029

Fax +1 617 726 7474

Email rkradin@partners.org

Dear editor

In our report,¹ we describe 24 cases of pulmonary fibrosis with ILO profusion ≥ 1 that were split into two groups based on histopathologic findings – six cases with evidence of asbestosis and 18 most consistent with smoking-related fibrosis. The mean potential asbestos exposure duration in each of these groups was 25 years. Pleural plaques were identified by chest radiograph in 5/6 (83%) and 13/18 (72%) of those with and without histopathologic evidence of asbestosis, respectively. As detailed in the letter by Sangani et al, pleural plaques are seen frequently and relatively early in the clinical course of patients with asbestos exposure. Therefore, in our study, given a mean asbestos exposure of 25 years, the high proportion of cases with pleural plaques is not surprising.

The detection of pleural plaques by chest radiograph is not entirely sensitive or specific,^{2,3} but with the appropriate exposure history and imaging findings is considered a reliable marker of asbestos exposure. Similarly, the association between pleural plaques and asbestosis on imaging is generally well accepted,² and the presence of plaques may be useful evidence that parenchymal fibrosis is asbestos-related. However, pleural plaques may also obscure assessment

of underlying pulmonary parenchymal disease by chest radiograph,⁴ making assessment of fibrosis and establishment of the etiology of fibrosis difficult. Furthermore, while some studies have shown a correlation between pleural plaques and microscopic asbestosis,⁵ others have found that plaques do not predict histologic asbestosis.⁶ In our study, in the majority of cases with ILO profusion ≥ 1 and despite the presence of asbestos exposure and pleural plaques, smoking-related fibrosis as the cause of interstitial fibrosis could not be excluded given histomorphology consistent with what has been described in smoking-related fibrosis and the absence of asbestos bodies. Our findings suggest that mild pulmonary fibrosis that is attributed to asbestosis on chest radiograph may not be reliably distinguished from other causes of interstitial fibrosis, such as that related to smoking, including in patients with asbestos exposure and pleural plaques.

Disclosure

The authors have no conflicts of interest in this communication.

References

1. Bledsoe JR, Christiani DC, Kradin RL. Smoking-associated fibrosis and pulmonary asbestosis. *Int J Chron Obstruct Pulmon Dis*. 2015; 10:31–37.
2. Aberle DR, Gamsu G, Ray CS. High-resolution CT of benign asbestos related diseases: clinical and radiographic correlation. *Am J Roentgenol*. 1988;151(5):883–891.
3. American Thoracic Society. Diagnosis and initial management of nonmalignant diseases related to asbestos. *Am J Respir Crit Care Med*. 2004;170(6):691–715.
4. Roggli VL, Gibbs AR, Attanoos R, et al. Pathology of asbestosis – an update of the diagnostic criteria: report of the asbestosis committee of the college of American Pathologists and Pulmonary Pathology Society. *Arch Pathol Lab Med*. 2010;134(3):462–480.
5. Hillderdal G. Pleural and parenchymal fibrosis mainly affecting the upper lung lobes in persons exposed to asbestosis. *Respir Med*. 1990;84(2):129–134.
6. Ren H, Lee DR, Hruban RH, et al. Pleural plaques do not predict asbestosis: high-resolution computed tomography and pathology study. *Mod Pathol*. 1991;4(2):201–209.

International Journal of COPD

Publish your work in this journal

The International Journal of COPD is an international, peer-reviewed journal of therapeutics and pharmacology focusing on concise rapid reporting of clinical studies and reviews in COPD. Special focus is given to the pathophysiological processes underlying the disease, intervention programs, patient focused education, and self management protocols.

Submit your manuscript here: <http://www.dovepress.com/international-journal-of-chronic-obstructive-pulmonary-disease-journal>

Dovepress

This journal is indexed on PubMed Central, MedLine and CAS. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.