

HOSPITAL PHYSICIAN®

PULMONARY DISEASE BOARD REVIEW MANUAL

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The *Hospital Physician Pulmonary Disease Board Review Manual* is a peer-reviewed study guide for fellows and practicing physicians preparing for board examinations in pulmonary disease. Each manual reviews a topic essential to current practice in the subspecialty of pulmonary disease.

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Mesothelioma and Other Asbestos-Related Pleural Diseases

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Table of Contents

Introduction	1
Malignant Pleural Mesothelioma	1
Pleural Plaques	6
Diffuse Pleural Thickening	6
Rounded Atelectasis	7
Benign Pleural Effusion	8
References	8

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Mesothelioma and Other Asbestos-Related Pleural Diseases

Rodrigo Cavallazzi, MD, and Gregory C. Kane, MD, FACP, FCCP

INTRODUCTION

Asbestos is a definitive carcinogen when inhaled or ingested that has an established causal relationship with cancer of the lung, mesothelioma of the pleura and peritoneum, cancer of the larynx, and certain gastrointestinal cancers. Furthermore, asbestos exposure causes asbestosis, a progressive fibrotic disease of the lung, and several types of benign pleural diseases.¹ This article reviews the most common asbestos-related pleural diseases, with a primary focus on malignant pleural mesothelioma (MPM) given its high mortality rate. Aspects of the following benign asbestos-related pleural diseases are discussed as well: pleural plaques, diffuse pleural thickening, rounded atelectasis, and benign pleural effusion.

MALIGNANT PLEURAL MESOTHELIOMA

CASE PRESENTATION

An 85-year-old white man with chronic obstructive pulmonary disease diagnosed several years ago presents to the outpatient clinic with shortness of breath and chest pain. His symptoms started 2 months prior to his visit and are characterized by progressive shortness of breath and dull, nonpleuritic anterior chest pain not related to exertion. He also has noticed anorexia and a 20-lb weight loss over the same period. His social history is significant for a 50-pack-year smoking history. He worked as a school teacher and has lived most of his life in a neighborhood near a company that repairs roofs. Physical examination reveals decreased breath sounds and dullness to percussion at the right hemithorax. Chest radiograph reveals volume loss of the right hemithorax with moderate right pleural effusion and nodular pleural thickening. He undergoes therapeutic and diagnostic thoracentesis, and analysis of the pleural fluid reveals a lymphocytic exudate with atypical mesothelial cells. Chest computed tomography (CT) after

thoracentesis reveals findings suggestive of MPM (Figure 1). The patient undergoes thoracoscopic pleural biopsy, which establishes the diagnosis of MPM.

DEFINITION AND EPIDEMIOLOGY

Malignant mesothelioma is a tumor that arises from the surface serosal cells of the pleural, peritoneal, and pericardial cavities and from the tunica vaginalis.² The overall age-adjusted 1999–2002 US incidence rate of mesothelioma was 1.11 cases (95% confidence interval [CI], 1.09–1.13) per 100,000 persons, according to an analysis that used cancer registry data covering 88% of the US population.³ The male-to-female ratio was 5.1:1, and whites had a higher incidence than African Americans, Native Americans and Alaska Natives, and Asian/Pacific Islanders. The incidence was higher in non-Hispanics than in Hispanics. The sex predilection is largely related to gender differences in occupational exposures. The incidence rate rises with increasing age, peaking at the 75-to-84-year age-bracket, with 8.66 cases (95% CI, 8.39–8.94) per 100,000 persons. Pleural mesothelioma accounted for 83% of all cases, and peritoneal mesothelioma accounted for 7%. Among females, however, peritoneal tumors made up 15% of the total, and 74% were pleural.³

While estimates indicate that the incidence of mesothelioma is declining in the United States,^{4,5} estimates for Western European countries and Australia predict that the incidence of mesothelioma will peak between 2010 and 2015.^{6–8} Developing countries are also expected to experience a peak rate of mesothelioma in the future due to increasing asbestos production and consumption.⁹ For the period 1999 to 2001, the overall mortality rate (number of deaths per million persons per year) due to mesothelioma adjusted to the 2000 US standard population was 11.52, with males (22.34) showing a 6-fold higher rate than females (3.94).¹⁰

Several case-control and cohort studies have demonstrated a clear association between asbestos exposure and malignant mesothelioma.^{11,12} The term *asbestos* encompasses different fibrous silicate materials, each with unique physical, chemical, and biologic properties.