Case Report

Asbestosis or Not? A Call for Accurate Identification of Asbestos-Related Diseases in Thailand

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Received: December 7, 2025
Revision received: January 12, 2026
Accepted after revision: February 3, 2026
BKK Med J 2026;22(1): 54-57.
DOI: 10.31524/bkkmedj.2026.12.001
www.bangkokmedjournal.com

Abstract

Asbestos exposure can cause several pulmonary and pleural diseases, known as asbestos-related diseases (ARDs). Pleural plaque (PP) is the most common manifestation of asbestos exposure. In Thailand, asbestosis is rarely reported despite ongoing asbestos use. Accurate diagnosis of ARDs is crucial, especially in countries where asbestos consumption remains high but the number of confirmed cases is disproportionately low.

We reported a 76-year-old male with an initial diagnosis of pleural plaque (PP) and early asbestosis. However, after a complete investigation utilising prone computed tomography, the final diagnosis was rectified to isolated PP without evidence of asbestosis. This case highlights the importance of accurate case identification for better national reporting, stronger prevention programs, and more effective policies on asbestos control in Thailand.

Keywords: asbestosis, asbestos-related diseases, diagnostic imaging, pleural diseases, pleural plaque, surveillance, occupational disease

Asbestos exposure can lead to various diseases. Pulmonary manifestations include asbestosis and lung cancer, while pleural abnormalities include pleural plaques (PP), benign asbestos pleural effusion (BAPE), diffuse pleural thickening, and round atelectasis. In addition, asbestos exposure is strongly associated with the development of malignant mesothelioma (MM).[1] Among the abnormalities, PP is the most common.[2,3] The relationship between the amount of asbestos exposure and the latency period of these diseases is generally unpredictable. However, the latency period is usually 20 years or longer.[3,4] PP may occur even after relatively low levels of exposure, whereas asbestosis typically develops only after heavy or prolonged exposure.[5]

In Thailand, the incidence of asbestos-related diseases (ARDs), reported by the Ministry of Public Health's Health Data Center (HDC), has been reported to be 0.14 cases per 100,000 population in 2023.[6] The precise diagnosis of ARDs is essential, especially for countries with high asbestos consumption but disproportionately low reported incidence of ARDs, like Thailand. Crucially, whether this reflects a truly low incidence or underdiagnosis remains in question. This report presents a case that was initially diagnosed as PP with suspected early asbestosis based on findings from a standard-position chest computed tomography (CT). However, further evaluation with prone CT imaging revealed PP only without asbestosis.

Case report

A 76-year-old male presented in April 2025 with a non-specific cough for approximately two months without other complaints such as fever, dyspnea, or weight loss. He was able to carry out his daily activities and remained functionally independent. The physical examination was unremarkable.

The patient had a history of smoking hand-rolled cigarettes, approximately 20 cigarettes per day, since the age of 12, totaling 63 years of smoking. He had quit about one year before the presentation. He had no known underlying medical conditions. He had been working as a sugarcane farmer in Kamphaeng Phet Province for over 50 years.

Occupational Exposure History

A detailed occupational history was obtained through an in-depth interview with the patient. His work history can be summarized according to the following time periods:

I. Limestone Crushing Factory (1973–1974)

The patient worked at a small, family-owned limestone-crushing factory. His main task involved operating the stone crusher at the front of the machine. The work consisted of loading small, thumb-sized stones of unspecified type into the crusher, which ground them into fine white limestone powder. He then manually transferred the powder into sacks for storage and later sale. The work area was open and dusty, with visible white limestone dust covering the surroundings, including the nearby living quarters.

He worked approximately 12 hours per day for two consecutive years, but for only 2 months per year. At that time, he worked alongside two co-workers, both of whom reportedly died later from respiratory diseases, although the specific diagnoses were unknown.

II. Sugarcane Mill (1975)

In 1975, the patient was employed at a sugarcane mill, where his primary duty involved loading sugarcane into a crushing machine. During the operation and opening of the mill, he was exposed to airborne sugarcane dust. He worked in this position for approximately seven months.

III. Construction Work (1975–1976)

From 1975 to 1976, the patient worked in the construction industry as a carpenter. His primary duties involved formwork and other wood-related construction tasks. He was exposed to airborne dust of an unspecified type, which was commonly dispersed throughout the work area. He worked in this occupation for approximately one year.

IV. Agricultural Work (1976–Present)

Since 1976, when the patient relocated from Roi Et Province to Kamphaeng Phet Province, he has been engaged in agricultural work, including rice and sugarcane farming. He reported no significant dust exposure during this period. Across all three previous workplaces, as well as in his current agricultural occupation, there were no engineering control measures in place, and no personal protective equipment (PPE), such as a respiratory mask, was used.

Radiological findings

His chest radiograph showed calcified PP involving both hemithoraces. Evaluation of the lung parenchyma was limited due to obscuration from overlying PP (Figure 1). Chest CT confirmed calcified PP bilaterally. In addition, there was subpleural reticulation along the posterior aspects of both lower lobes. The findings were suggestive of early asbestosis (Figure 2 A—C). After discussion among chest physicians, thoracic radiologists, and occupational medicine physicians regarding the CT findings and the estimated level of asbestos exposure, a repeat chest CT in the prone position was performed. It no longer showed the previously observed reticulation, indicating that the prior abnormality in fact represented dependent atelectasis (Figure 2 D).

Discussion

The present study demonstrates how CT in the prone position can differentiate between early asbestosis and normal lung parenchyma.

CT progression of asbestosis starts with dot-like lesions in the subpleural region. As lesions increase in number, ground-glass opacity with preserved lung architecture develops. Then it follows with small cystic spaces with lung distortion, subpleural curvilinear lines, and pleural-based nodular opacities.[7] Prone CT is valuable in distinguishing true parenchymal lesions from dependent densities. If an opacity

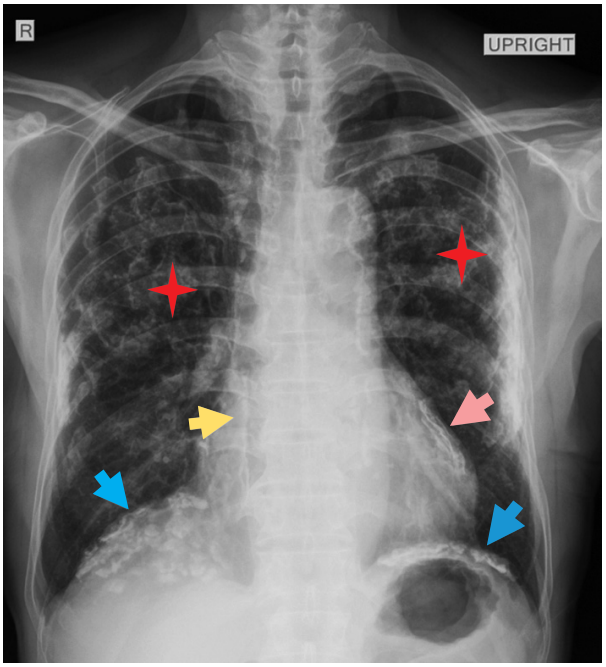


Figure 1: Chest radiograph (PA upright view) demonstrates calcified pleural plaques involving both hemithoraces, showing the characteristic 'holly leaf' appearance **(red star)**, with additional involvement of the hemidiaphragmatic surfaces **(blue arrow)**, paramediastinal **(pink arrow)**, and paravertebral pleura **(yellow arrow)**.

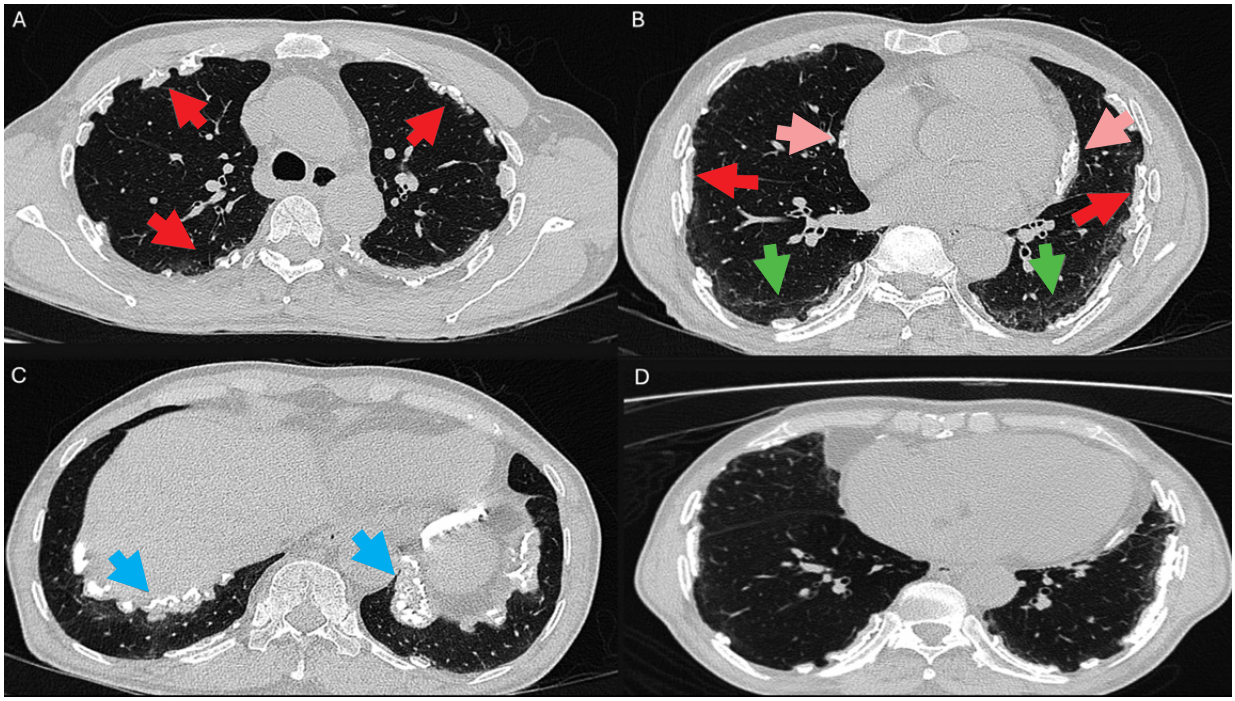


Figure 2 A—C: An initial chest CT (axial images) demonstrates calcified pleural plaques along the costal **(red arrow)**, mediastinal **(pink arrow)**, and diaphragmatic pleura **(blue arrow)**. Subpleural reticulation **(green arrow)** is present along the posterior aspects of both lower lobes, findings that are suggestive of asbestosis. **Figure 2 D:** Subsequent chest CT (the prone position) demonstrates resolution of the reticulation previously seen along the posterior aspects of both lower lobes, indicating that the prior abnormality represents dependent atelectasis.

observed on a standard supine CT disappears on a CT performed in the prone position, it indicates a dependent density rather than parenchymal fibrosis.[8,9] Conversely, if the opacities persist on prone imaging, they represent true parenchymal lesions, such as those seen in asbestosis. As a result, no evidence of asbestosis was detected in this patient following prone CT assessment.

While prone CT is not routinely performed for every chest CT examination, it is strongly recommended in international guidelines according to the International Classification of HRCT for Occupational and Environmental Respiratory Diseases (ICOERD)[7]. Prone imaging is essential for distinguishing true subpleural fibrosis from gravity-dependent phenomena. Previous studies have demonstrated that the ICOERD system provides high inter-reader reliability for identifying early fibrotic changes and offers superior sensitivity compared to conventional chest radiography, particularly in detecting early-stage pneumoconiosis.[10]

The final diagnosis of this case is PP, which is a marker of asbestos exposure in the past. Nonetheless, the definite history of asbestos in this patient remained uncertain. No specific job or task could be clearly identified as the direct source of asbestos exposure. In addition, the patient had no history of para-occupational or environmental asbestos exposure. PP is listed under the Ministerial Notification of the Ministry of Public Health (2020) on Occupational Diseases, which includes "diseases caused by asbestos (asbestosis)" and "asbestos-related cancers." The purpose of this notification is to support surveillance, prevention, and control of occupational diseases. Furthermore, according to the Ministerial Notification on Investigation and Reporting of Occupational and Environmental Diseases (2022), local public health officers or occupational and environmental disease control units are required to conduct an investigation upon identification of a suspected case promptly. It also implicates medico-legal compensation issues.

In Thailand, asbestos has been imported for more than 50 years. The country is among the top five in terms of asbestos consumption.[11] Nevertheless, there was no national database for reporting hospital-based diseases under the Ministry of Public Health until 2015.[12] According to data from HDC in 2023, the incidence of ARDs in Thailand was reported to be 0.14 cases per 100,000 population.[6] Interestingly, during 2017-2022, HDC reported 1054, 658, and 218 cases of PP, MM, and asbestosis, respectively. However, after case verification, only 11 PP cases and 45 MM cases were identified, with no cases of asbestosis (data not published). Similarly, the data for 2015-2016 reported 26 MM cases, 1 PP case, and 1 asbestosis case, while the initial reports, before case verification, showed 243 MM cases and 142 PP and asbestosis cases.[12] Therefore, the national records indicate a high proportion of false alerts in ARD surveillance in Thailand, as exemplified by the present case.

ISSN 2287-0237 (online)/ 2228-9674 (print)

This scenario highlights a broader trend. The disparity between massive asbestos consumption and low reported ARD cases is not unique to Thailand but is prevalent across many developing Asian economies.[13] However, compared to Western nations with established registries and strict bans, Thailand's confirmed case numbers are exceedingly low. This suggests that, in addition to false alerts in the database, there is likely a concurrent issue of underdiagnosis in the clinical setting due to a lack of awareness or standardized diagnostic protocols similar to those used globally. It is also important to note that PP itself does not imply a diagnosis of asbestosis. Indeed, misinterpreting ARDs like PP as asbestosis could lead to inaccurate surveillance reporting. Furthermore, in terms of disease development, asbestosis requires greater asbestos exposure than PP.[14]

Although few confirmed cases of asbestosis were reported in Thailand,[15,16] asbestosis may still be underdiagnosed. One reason is that its radiological findings may mimic those of other interstitial lung diseases, especially idiopathic pulmonary fibrosis.[13,17] Relevant exposure history is thereby particularly significant in such cases in order to reduce underdiagnosis. Consequently, the precise diagnosis of ARDs is especially critical for Thailand, to mitigate disease misclassification, strengthen the national surveillance system and inform prevention policy, potentially leading to a total ban on asbestos in the country in the near future.

Conclusion

This patient was diagnosed with PP without asbestosis. Prone CT imaging confirmed that the opacities observed on standard CT were due to dependent atelectasis rather than true parenchymal fibrosis. The present study highlights the need for accurate diagnostic evaluation before labeling a case as ARDs as such diagnoses will directly inform national occupational health surveillance data and probably influence prevention policy accordingly. From an occupational medicine perspective, this case underscores the importance of a multidisciplinary approach involving clinicians, radiologists, and occupational health professionals to ensure diagnostic accuracy, reduce false alarms, and support reliable national data for disease monitoring and prevention programs related to asbestos exposure in Thailand.

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