

CHEST[®]

Official publication of the American College of Chest Physicians



Pulmonary Alveolar Microlithiasis Associated with the Inhalation of Snuff in Thailand

NINART CHINACHOTI and PRASAN TANGCHAI

Chest 1957;32:687-689
DOI 10.1378/chest.32.6.687

The online version of this article, along with updated information and services can be found online on the World Wide Web at:
<http://chestjournals.org>

CHEST is the official journal of the American College of Chest Physicians. It has been published monthly since 1935. Copyright 2007 by the American College of Chest Physicians, 3300 Dundee Road, Northbrook IL 60062. All rights reserved. No part of this article or PDF may be reproduced or distributed without the prior written permission of the copyright holder (<http://www.chestjournal.org/misc/reprints.shtml>). ISSN: 0012-3692.

A M E R I C A N C O L L E G E O F



P H Y S I C I A N S[®]

Case Report Section

Pulmonary Alveolar Microlithiasis Associated with the Inhalation of Snuff in Thailand

NINART CHINACHOTI, M.D. and PRASAN TANGCHAI, M.D.*
Bangkok, Thailand

During a routine chest x-ray survey in Bangkok, abnormal pulmonary shadows were encountered in nine men who had been addicted heavily to the inhalation of snuff. These men were accustomed to insufflate powdered snuff into the nose at two or three hour intervals for 20 to 30 years. None had tuberculosis. One of them developed pulmonary symptoms and died showing pulmonary alveolar microlithiasis at autopsy. This disease was described by Friedreich¹ in 1856 and by Puhr² in 1933. The morphology and pathogenesis were detailed by Kent, Gilbert, and Meyer³ in 1955 and they added a case to 14 others in the literature. An additional case was reported the same year by Badger, Gottlieb, and Gaensler.⁴

Case Report—A Thai man, 48 years of age, was discovered in a routine mass chest x-ray survey to have fine mottlings in both lung fields with some sparing of the apices and right middle lobe. Numerous minute calcified specks were visible throughout, with some areas of honey-comb appearance. The heart and diaphragm were almost completely obscured. The trachea was normal in position and size (Figure 1). The antero-posterior diameter of the thorax was shallower than normal. He was asymptomatic except for chronic cough with mucoid sputum for three years and a tendency to catch colds which were accompanied by difficulty of breathing. He had been a snuff addict for 23 years, and took about 7.5 gm. per day in divided doses two to three hours apart. The snuff contained 9.47 per cent calcium. He subsequently was admitted to Nunburi

*From Nunburi Tuberculosis Hospital.

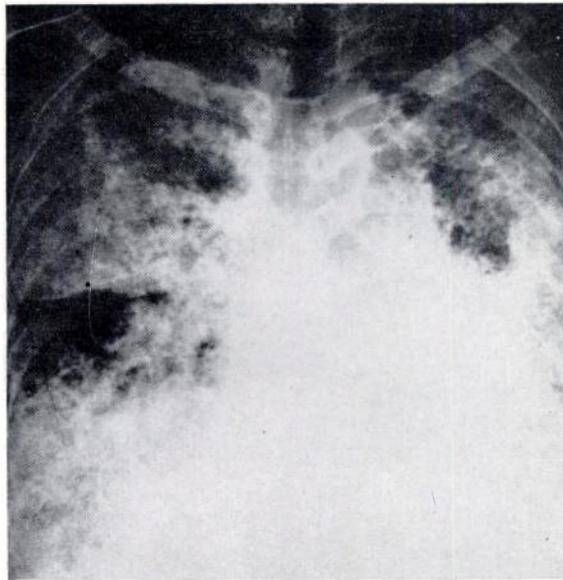


FIGURE 1: Chest x-ray showing extensive mottled densities in both lung fields.

Hospital with symptoms of dyspnea and cyanosis which followed a cold. He soon recovered with penicillin and oxygen, but felt much weaker than before. Examination showed a man of good physical condition. However, he had clubbed fingers, and occasional crepitations were heard over the base of the lungs. After walking up and down stairs eight meters high, he became tired, his respiratory rate increased, and there was facial cyanosis. Routine laboratory findings were negative except for a moderately positive tuberculin reaction. Histoplasmin, coccidioidin and blastomycin skin tests were negative. Six cultures of sputum revealed no growth of *Mycobacteria*. The electrocardiogram showed ventricular extra-systole. He died three months later following pneumothorax which attended needle biopsy of the lung.

The autopsy revealed firm red-brown lungs which together weighed 2400 gm. and were sectioned with difficulty. The cut surfaces were coarse and looked like pumice stone. The gritty texture was present throughout. Areas of honey-combing were located subapically in both upper lobes. The pleura was somewhat thickened. A collection of 200 cc. of blood-stained fluid occupied the right thoracic cavity. Analysis showed the dried weight of the lung to be 43.24 per cent (normal about 20 per cent), and the calcium content was 3.96 per cent. The tracheobronchial lymph nodes were enlarged to 2.5 cm., firm, dark brown, and uncalcified. The other organs showed no calcification, nor was there evidence of resorption from the bones.

Microscopically, decalcified sections of the lung showed innumerable intra-alveolar basophilic bodies. These calcific structures were round, laminated, and often completely filled an alveolus. A few were present in pleural lymphatic spaces. The alveolar septa were irregularly thickened and collagenous in patches with obliteration of air spaces (Figure 2). The fibrosis appeared to be secondary to the presence of the calcific bodies. Mononuclear cells and dust cells were noted in some alveoli and interstitial tissue. Occasional small patches of metaplastic osseous tissue replaced a few alveoli and inclosed several of the calcific bodies. The bronchi and larger arteries were not remarkable.

Discussion

The clinical symptoms of the nine patients were limited to history of frequent respiratory infections. Two had dyspnea and tiredness with the exertion of walking or stair-climbing, and they had clubbed fingers. All had negative coccidioidin, histoplasmin, and blastomycin skin tests. At least six samples of sputum from each of those who had positive tuberculin

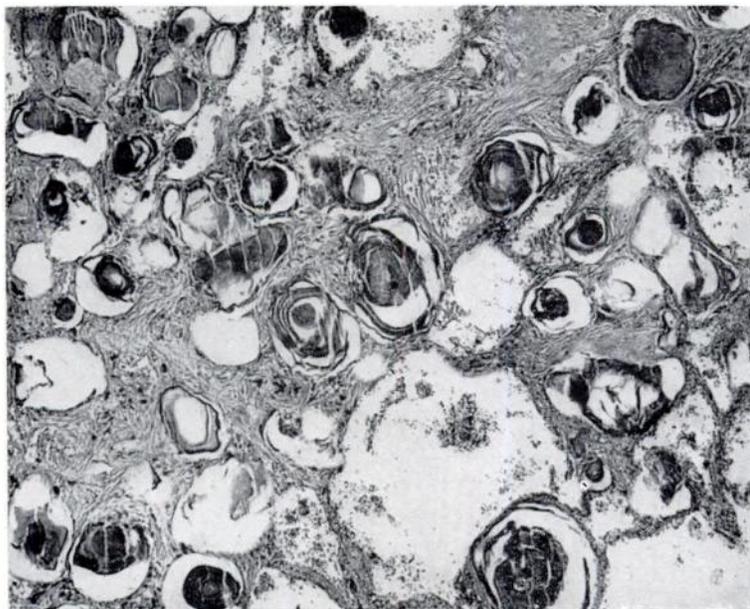


FIGURE 2: Section of lung showing calcific bodies and fibrosis,

tests were cultured for tubercle bacilli with negative results. This experience agrees with the review of clinical findings by Meyer, Gilbert, and Kent,⁵ who pointed out that late stages are characterized by respiratory embarrassment, cor pulmonale, and cardiac decompensation. The alterations in the fatal case were classically those of pulmonary microlithiasis.

The snuff used in Thailand is a fine dry tan powder which is taken in small doses with a U-shaped metal tube. One end of the tube is inserted into the nostril and the other end into the mouth. A blast of air from the mouth disperses the powder into the nasal cavity from where it is inspired suddenly, similar to tobacco smoke.

The exact method of preparation of the snuff is secret, but its composition is roughly 50 per cent dry tobacco and 50 per cent oriental gum, with a small part of powdered cuttlebone added. The oriental gum is made by the process of heating "white earth" at high temperature in a kiln. The earth has a high percentage of carbonates and phosphates of calcium. The oriental gum is made into a paste with water and is mixed with tobacco, spread in a thin layer, and allowed to dry in the sun. The mixture is then ground into a powder. Analysis revealed the composition of the commercial powdery snuff to be 75 percent organic material with 15.4 per cent silicates and 1.6 per cent silica.*

The etiology of pulmonary microlithiasis is unknown but is regarded by Kent et al as a "peculiar exudative response to a variety of insults which include pneumonia and rheumatic fever." Four of the patients reviewed by them had been exposed to "dust." Their case was that of a man who worked for five years handling sulfur rocks which were ground and mixed with "some kind of earthy material" requiring the use of a mask because of the high concentration of dust in the air. It would seem possible that the inorganic material in the snuff might have incited a pulmonary exudative reaction leading to microlithiasis. The low content of silica and the nature of the pulmonary lesion excluded silicosis. A filtrate of a suspension of this snuff has been shown to inhibit the activities of the cilia of cells of the palate of frogs. If such a factor operated in the human being, particles of snuff might more easily gain access to the lungs.

In conclusion, a typical case of pulmonary alveolar microlithiasis was associated with inhalation of snuff composed of tobacco and earthy material. The lesion in this case and certain others may have resulted from a hyperimmune reaction to an inhaled irritant as suggested by Kent and associates.

*Analyzed by the Division of Industrial Medicine of the University of Colorado School of Medicine.

REFERENCES

- 1 Friedreich, N.: "Corpora Amylacea in den Lungen," *Arch. Path. Anat.*, 9:613, 1856.
- 2 Puhr, L.: "Microlithiasis Alveolaris Pulmonum," *Arch. Path. Anat.*, 290:156, 1933.
- 3 Kent, G., Gilbert, E. S. and Meyer, H. H.: "Pulmonary Microlithiasis," *Arch. Path.*, 60:556, 1955.
- 4 Badger, T. L., Gottlieb, L. and Gaensler, E. A.: "Pulmonary Alveolar Microlithiasis, or Calcinosis of the Lungs," *New England J. Med.*, 253:709, 1955.
- 5 Meyer, H. H., Gilbert, E. S. and Kent, G.: "A Clinical Review of Pulmonary Microlithiasis," *J.A.M.A.*, 161:1153, 1956.

Pulmonary Alveolar Microlithiasis Associated with the Inhalation of Snuff in Thailand

NINART CHINACHOTI and PRASAN TANGCHAI

Chest 1957;32;687-689

DOI 10.1378/chest.32.6.687

This information is current as of May 6, 2007

Updated Information & Services	Updated information and services, including high-resolution figures, can be found at: http://chestjournals.org
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://chestjournals.org/misc/reprints.shtml
Reprints	Information about ordering reprints can be found online: http://chestjournals.org/misc/reprints.shtml
Email alerting service	Receive free email alerts when new articles cite this article sign up in the box at the top right corner of the online article.
Images in PowerPoint format	Figures that appear in CHEST articles can be downloaded for teaching purposes in PowerPoint slide format. See any online article figure for directions.

A M E R I C A N C O L L E G E O F



P H Y S I C I A N S[®]