Lipoid Pneumonia Associated with Paraesophageal Hernia: Angiocardiographic Study of a Case*

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Aspiration pneumonia due to ingestion of mineral oil for a laxative has become recognized in the apparently healthy; its occurrence in weak, debilitated and chronically ill infants, children and adults is probably better known. Dysphagia and cardiospasm, because they are associated with regurgitation, have also become well established as causes of lipoid pneumonia.

The purpose of this report is to re-emphasize the importance of a high index of suspicion that patients with chronic pulmonary infiltration may have lipoid pneumonia. Despite the suggestive appearance

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FIGURE 1. Frontal teleroentgenogram shows a large rounded spun-glass density at the left base. Diffuse, fine granular densities are also present at the right base (arrow).
of the roentgenograms in the case herein reported, 13 years elapsed before a history of ingestion of mineral oil for laxative purposes was elicited. An unsuspected paraesophageal hernia may have contributed to the aspiration pneumonia. Finally, the angiocardiographic findings of the pulmonary circulation in lipoid pneumonia, probably reported for the first time, are presented.

Report of a Case

A 33 year old former schoolteacher (N.Y.H. No. 765989) was referred on April 28, 1957, by Dr. Raymond E. Miller because the chest roentgenogram suggested aspiration pneumonia. Thirteen years prior to admission she was asked to set her pupils an example by having a chest roentgenogram in a mobile chest roentgenographic unit. Her film was the only abnormal one; subsequently she was told that it contained a rounded ball-like shadow in the left side with a smaller one in the right lung. Visits to several physicians and bronchoscopy failed to establish a diagnosis. Because of the insistance of the schoolboard for repeated examinations, and because she was suspected of having tuberculosis, although she was asymptomatic, the patient gave up teaching and became a secretary. The roentgenogram (Fig. 1) shows a large rounded "spun-glass" density at the left base and a smaller fine linear coalescent density at the right base that immediately suggested the possibility of mineral oil pneumonitis. Direct questioning then elicited a history of ingestion of one to four teaspoonful doses of mineral oil before retiring every evening. She denied dyspnea, cough or expectoration.

Physical examination revealed a well developed and nourished woman in no distress. The gag reflex was diminished. The only abnormal physical findings were dullness and decreased breath sounds at the left base. The heart was not enlarged and there were no murmurs; the blood pressure was 128/80 mm. Hg. Studies of the blood and urine were normal. The sputum did not contain lipids.

Gastrointestinal studies revealed an unsuspected large (8 cm. in diameter) paraesophageal hernia (Fig. 2). Angiocardiography disclosed absent pulmonary arterial circulation in the anterior and lateral basal segments of the left lower lobe, the site of the infiltration (Fig. 3A). Similarly, the pulmonary venous circulation of the anterior and lateral basal segments of the left lower lobe were also absent (Fig. 3B). Bronchoscopy revealed no abnormalities of the tracheobronchial system. The aspiration specimen of the lower lobes contained many lymphocytes and macrophages, but

FIGURE 2. Roentgenogram showing a large paraesophageal hernia.
lipids were not present in the latter. Smear and cultural studies were negative. Bronchography showed the tracheobronchial system to be normal except for poorly filled anterior and lateral basal segments of the left lower lobe (the region of the pneumonitis) — (Fig. 4). Mineral oil ingestion was stopped and re-examination, a year later, showed the patient to be asymptomatic; the chest roentgenogram was unchanged.

Discussion

Lipoil (mineral oil) pneumonia is difficult to diagnose in the absence of a history of ingestion or medication of the throat and nasal passages with mineral oil. Chronic pulmonary diseases (bronchiectasis, tuberculosis, fungus, sarcoidosis and neoplasm) may simulate lipid pneumonia. Indeed, the recent literature records accounts of lipid pneumonia becoming recognized only after extensive resectional surgery. In several instances, had the diagnosis been established, surgery would have been obviated and segmental or lobar excisions made with preservation of pulmonary function.7,13-16

In the absence of history of aspiration of lipid material, the diagnosis can be established by cytologic and histochemical study of the sputum or material obtained by aspiration biopsy of the lung.7,13,17,18 In the case reported above, special (Papanicolaou) studies of the bronchial tree obtained by injection and aspiration of saline at bronchoscopy failed to show macrophages containing lipid granules.

Although a definite diagnosis of lipid pneumonia cannot be made from the roentgenographic studies alone, the diffuse bilateral, lower lung field "spun or ground-glass" appearance (Fig. 1) is highly suggestive of mineral oil pneumonitis.7,18 The bronchogram (Fig. 4) with obstruction of the terminal bronchi of the involved areas is also a common finding in lipid pneumonia.7,19 These, coupled with the history of habitual use of mineral oil as a laxative establish the diagnosis of lipid pneumonia.

Mineral oil is a non-irritating, insoluble hydrocarbon which readily flows from the pharynx into the tracheobronchial tree without causing cough or reflex closure of the glottis. Furthermore, mineral oil hinders ciliary movement and mucous secretion enhancing alveolar aspiration of the foreign material. Experimentally, mineral oil causes pulmonary capillary edema and albumin seepage into alveoli. A reticulum of collagenous fibers surround macrophages containing mineral oil droplets and the mineral oil becomes fixed in fibrous tissues obliterating many air spaces and eventually causes an oil granuloma.7,20

The finding of a paraesophageal hernia in the patient reported above (Fig. 2) raises the questions of its role in aspiration of mineral oil. Since the patient took the laxative prior to retiring and because oil rises to the top of emulsions, it may be that its presence in the thorax in concentrated form favored passage into the tracheobronchial system and lung.

FIGURE 3B

FIGURE 3. Frontal teleangiocardiograms. A. There is absence of the pulmonary arterial circulation in the region of the left lower lobe density. B. The pulmonary venous circulation of some of the segments of the left lower lobe is also absent. In both studies, the large paraesophageal hernia containing air is readily visualized.
Angiocardiography (Fig. 4) revealed that the pulmonary circulation was cut off in the region of the lipoid pneumonia. This finding is in keeping with the damage to the pulmonary circulation observed in experimental lipoid pneumonia. Caution must, therefore, be used in attributing decreased vascularity of the lungs to bronchogenic cancer; particularly because many pulmonary diseases (especially tuberculosis) show this phenomenon.

SUMMARY

An asymptomatic adult with bilateral lower lung field infiltrations went 13 years before the history of nightly ingestion of mineral oil was elicited. An unsuspected paraesophageal hernia was also found and may have contributed to mineral oil aspiration and lipoid pneumonia. Bronchography showed obstruction of the bronchi leading to the involved segments. Angiocardiography revealed avascularity of the lung in the regions of the lipoid areas, probably because the pulmonary circulation was destroyed by fibrotic changes early in the disease. A year after cessation of mineral oil ingestion the patient was asymptomatic; no change in the chest roentgenogram could be detected. Surgical repair of the paraesophageal hernia did not seem warranted because of the asymptomatic state.

RESUMEN

Un adulto asintomático, con infiltraciones bilaterales de las dos bases luminares pasó 13 años antes de que se descubriera por su historia, que ingería todas las noches aceite mineral.

Se encontró que tenía también una hernia para-esofigina no sospechada que pudo haber contribuido a facilitar la aspiración del aceite mineral y la creación de la neumonía lipídica.

La bronco grafía demostró la obstrucción de los bronquios que iban hacia los segmentos comprometidos. La angiociardiografía reveló la falta de vascularización del
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pulmón en las áreas de la afectación lipídica probablemente porque la circulación pulmonar se destruyó por cambios fibrosos desde el principio de la enfermedad. Un año después de haber cesado la ingestión de aceite mineral, el enfermo era asintomático y ninguna modificación en el aspecto radiológico pudo notarse. El tratamiento quirúrgico de su hernia esofágina no se consideró pertinente por ser asintomática.

RESUMÉ

Un adulte ne présentant pas de symptômes particuliers était atteint d’infiltrations bilatérales de la partie inférieure du champ pulmonaire. Il fallut 13 ans avant qu'on put mettre à jour l’histoire d’une ingestion nocturne d’huile minérale. On trouva également une hernie para-ösopaghienne insouciée et qui a pu contribuer à l’aspiration d’huile minérale et à la pneumonie lipodique. La bronchographie montra l’obstruction des bronches conduisant aux segments atteints. L’angiographie révèle une absence de vascularisation du poumon dans les régions de l’atteinte lipodique, probablement parce que la circulation pulmonaire avait été détruite par des altérations fibreuses précoces pendant la maladie. Un an après la cessation d’ingestion d’huile minérale, le malade n’avait plus aucun symptôme et on ne put mettre en évidence aucune altération des clichés thoraciques. Une réparation chirurgicale de la hernie para-ösopaghienne ne sembla pas souhaitable étant donné l’absence de toute manifestation pathologique.

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REFERENCES