LIPOID PNEUMONIA IN ADULTS: FINDINGS ON HIGH-RESOLUTION COMPUTED TOMOGRAPHY*

Edson Marchiori¹, Gláucia Zanetti², Dante L. Escusssato³, Arthur Soares Souza Jr.⁴, César Araújo Neto⁵, Luiz Felipe Nobré⁶, Klaus L. Irión⁷, Rosana Rodrigues⁸, Alexandre Dias Mançano⁹, Domenico Capone¹⁰, Suzane Mansur Fialho¹¹, Carolina Althoff Souza¹²

Abstract

OBJECTIVE: The present study was aimed at describing the findings on high-resolution computed tomography in patients with exogenous lipoid pneumonia secondary to mineral oil aspiration. MATERIALS AND METHODS: Eight adult patients — four men and four women — with mean age of 69.4 years were studied. All of the patients were users of mineral oil for treating intestinal constipation. High-resolution computed tomography studies of these patients were blindly evaluated by two radiologists. RESULTS: Air-space consolidation with areas of fat density and crazy paving pattern were the most frequent findings. The lesions were bilateral in six cases and unilateral in two. CONCLUSION: Air-space consolidation with areas of fat density, associated with a clinical history of mineral oil ingestion virtually indicates a diagnosis of exogenous lipid pneumonia.

Keywords: Exogenous lipid pneumonia; High-resolution computed tomography; HRCT; Aspiration pneumonia; Lungs.

INTRODUCTION

Several pulmonary complications may be caused by aspiration of different substances into the airways and lungs. Exogenous lipid pneumonia is a rare condition resulting from inhalation or aspiration of animal, vegetable or mineral oil. The most frequent presentation of lipid pneumonia is the one caused by aspiration of mineral oil, often orally utilized to treat chronic constipation. The clinical presentation is non-specific and is associated with the patient’s age, the aspirated volume, and when the aspiration was acute or chronic. Exogenous lipid pneumonia diagnosis is based on the history of exposure to oil, on compatible chest radiograph and/or computed tomography (CT), and on the presence of macrophages with fat droplets in sputum or in the bronchoalveolar lavage. Transbrachial or open biopsy may be necessary in case the diagnosis remains undefined. High resolution computed tomography (HRCT) plays an essential role in the investigation.

The present study was aimed at presenting the HRCT findings observed in adult patients with exogenous lipid pneumonia caused by mineral oil aspiration.

MATERIALS AND METHODS

CT images of eight adult patients with confirmed diagnosis of exogenous lipid pneumonia were submitted to retrospective, descriptive, observational analysis. The CT images were randomly selected...
from the nosologic archives of eight medical institutions in five different Brazilian states in the period between March/1994 and June/2006.

Four patients were women and four men, with ages ranging between 46 and 88 years, mean 69.4 years. All of them presented with cough, four associated with dyspnea. As regards predisposing factors, two patients had megaesophagus, one, gastroesophagel reflux disease, one Parkinson’s disease, and another, cerebral palsy. A sixth patient complained of frequent choking. In four patients, the diagnosis was confirmed by bronchoalveolar lavage; one patient was submitted to pulmonary biopsy; and, in three patients the diagnosis was reached by means of the association of the clinical picture with the finding of fat densities at HRCT. At the moment of examination, no patient presented clinical or laboratory evidence of associated infection. All of them utilized oral mineral oil as a laxative agent.

Considering the multiple institutions involved, the studies were performed in different tomographs, all of them with the high resolution technique, with slices from the apex through the pulmonary bases. Images were acquired with thin slices (1 mm or 2 mm-thick), with the patients in dorsal decubitus, during inspiration, with a high spatial resolution filter (bone filter) for images reconstruction, 10 mm increment, without intravenous infusion of iodinated contrast media. The images were acquired and reconstructed on a 512 × 512 matrix and photographed for evaluation of pulmonary fields with windows opening ranging between 1200 UH and 2000 UH, level between 300 UH and 700 UH. For evaluation of the mediastinum, the windows variation was between 350 UH and 500 UH, and center variation, between 10 UH and 50 UH.

The images were blindly reviewed by two independent observers with consensus agreement.

RESULTS

The most frequent tomographic findings were consolidations and ground-glass attenuation, associated or not with thickening of interlobular septa (mosaic pattern attenuation).

Consolidation with air bronchogram and fat densities interposition was observed in six patients; two of these cases with single findings, on in the right lower lobe (Figure 1), and the other in the middle lobe (Figure 2). In the other patients, multiple consolidations were found (Figures 3 and 4). In four cases, consolidations were surrounded by areas of ground-glass attenuation. All of the consolidations presented areas with fat density (–34 UH to –74 UH) inside.

Two patients presented areas of ground-glass attenuation associated with interlobular septa thickening, characterizing the mosaic pattern of attenuation (Figures 5 and 6). In three cases, interlobular septa thickening was observed, two of them with mosaic pattern attenuation, and one in the periphery of one of the consolidation areas. Disease-related pleural or lymph node involvement was absent in all of the patients. The lesions were bilateral in six patients, predominating in posterior regions, and unilateral in two patients.

DISCUSSION

Exogenous lipoid pneumonia is an uncommon condition, resulting from oil inhalation or aspiration into the lungs(1). The chronic presentation of the disease results from repeated oil inhalation or aspiration for a long period of time, and the acute presentation is secondary to accidental and massive aspiration of lipid materials, like that traditionally described in fire swallowerers (performers who pretend to swallow or spit fire)(5,6). The oils may be of animal, vegetal or mineral nature(2). The majority of cases occur by mineral oil inhalation or aspiration(1). In adults, the most frequent cause of exogenous lipoid pneumonia is the utilization of mineral oil to treat intestinal constipation, followed by the use of oily nose drops to treat chronic rhinitis(7).
Figure 3. HRCT image with mediastinal intermediate windows showing: A – heterogeneous consolidation on the posterior segment of the right upper lobe, with ground-glass attenuation and thickening of the adjacent interlobular septa.; B and C – two-level slices of lower fields showing heterogeneous consolidations with air bronchograms and mild ground-glass attenuation on the lower lobes. On the areas with lower attenuation, density values ranged between –53 UH and –74 UH.

Figure 4. HRCT demonstrating consolidation affecting several pulmonary lobes, with prevalence in posterior regions.

Figure 5. Areas of ground-glass attenuation with superimposition of thickened interlobular septa (mosaic pattern of attenuation), in both lungs, with prevalence at right.
mineral oil is an over-the-counter drug should be taken into consideration, since doctors. Additionally, self-medication of oropharyngeal or gastric contents. The supernatant oily material remains within the stomach, and, when aspirated, preferentially enters the airways, forming large fat drops involved by the disease alterations appear with variable patterns and distribution. HRCT is the best imaging method for lipid pneumonia. CT may demonstrate alveolar consolidations, ground-glass attenuation, interstitial abnormalities, interlobular septa thickening, intralobular interstitial thickening, and nodular lesions (small, ill-defined centrolobular nodules). Mosaic pattern of attenuation, corresponding to interlobular septa thickening superimposing ground glass attenuation is frequently observed.

The most typical sign of this disease is the presence of pulmonary consolidations with fat attenuation, i.e., negative attenuation values, particularly when associated with a history of exposure to oil, that contributes for the definition of the diagnosis. Negative densities ranging between –150 UH and –30 HU are highly suggestive of intrapulmonary fat. These measures may not be precise in the presence of pulmonary fibrosis and/or inflammatory exudate involving the oily material, which increases the attenuation values.

REFERENCES

7. Franquet T, Giménez A, Rosón N, Torrubia S, Sabaté JM, Pérez C. Aspiration diseases: find-...
Lipoid pneumonia in adults: findings on HRCT