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CASE REPORT

Exogenous lipoid pneumonia in an infant

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Lipid,
Child,
Mineral Oil,
Diagnosis,
Bronchoalveolar Lavage.

Abstract

Objectives: To report a case of an exclusive breastfeeding infant who developed pneumonia after bronchoaspiration of mineral oil for the treatment of intestinal pseudoconstipation. **Case Report:** LGZ, male, 5 months old, previously healthy, exclusive breastfeeding, with maternal report of absence of evacuation for six days. She sought medical attention at the basic health unit (UBS), where mineral oil was prescribed and later, discharged home. She reported that when administering mineral oil the patient had a choking crisis followed by cough and vomiting. After four hours of the event he was brought to the emergency room due to grunting. He checked in presenting regular to poor general condition, tearful, tachypneic, with nasal obstruction and grunting, saturation oxygen 90% in ambient air. Non-invasive supportive measures were taken, followed by infectious screening and chest radiography. We chose immediate initiation of parenteral antibiotic therapy for exogenous lipoid pneumonia. He was admitted to the nursery for 10 days, received corticosteroid therapy (methylprednisolone 2mg/kg/day) and antibiotic therapy with amikacin (15mg/kg/day) and clindamycin (30mg/kg/dose) for secondary infection coverage. During hospitalization, the patient underwent chest computed tomography on the 3rd day and bronchoalveolar lavage was collected on the 9th day. He got better as expected and soon discharged after 10 days of hospitalization, in good general condition, eupneic, remaining in outpatient follow-up, without apparent sequelae. **Conclusions:** Lipoid pneumonia is a potentially fatal condition, caused by alveolar filling with oil. The main treatment is the immediate suspension of mineral oil.

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INTRODUCTION

Chronic constipation and pseudo-obstruction (among exclusively breastfed infants) are common complaints in pediatric practice and a frequent reason why physicians prescribe mineral oil[1]. Despite the lack of estimates on the use of mineral oil in Brazil, one may assume that it is used extensively, since it can be bought without a prescription. And since it is widely used, mineral oil is often involved in cases of aspiration.

Oily intranasal and oral medications, petroleum jelly, high fat milk, egg yolk, lipstick, feeding in a horizontal position (infants), having a cleft palate or swallowing disorders[2] rank among the top reasons for lipoid pneumonia. However, in many cases accidental aspiration occurs despite the absence of risk factors[3].

The high viscosity of mineral oil in the respiratory tract does not trigger the cough reflex and inhibits the motion of cilia in the bronchial epithelium, potentially affecting the alveoli in an insidious manner[1]. Aspiration and microaspiration in particular may occur unnoticed, since the infant does not choke or suffocate and parents do not see it as an event worthy of medical attention, which hampers the diagnosis of individuals with the condition[4].

Laughlin was the first to mention exogenous lipoid pneumonia in the literature. In an article published in 1925[5], the author described the condition based on the autopsy findings of three children and an adult[3]. Although it may produce severe clinical symptoms, literature on exogenous lipoid pneumonia is still scarce.

CASE REPORT

L.G.Z., a previously healthy exclusively breastfed male infant aged five months, was taken by his mother to a Basic Healthcare Clinic for being constipated for six days. The infant was prescribed mineral oil and discharged. The mother said that when she administered the oil the infant choked, coughed, and vomited. Four hours later, she took him to an Emergency Unit. The infant was admitted in poor general condition, crying, tachypneic, with nasal obstruction, and grunting. His oxygen saturation level was 90% in ambient air. Noninvasive support measures were introduced, followed by screening for infection (Table 1) with complete blood count (Hb= 11.4, Platelets= 306,000; WBC= 16,700 with 2% rods, 76% segmented, 17% lymphocytes) and chest X-rays showing hilar infiltrate (Figure 1**)**. The patient was started on parenteral antibiotics.

The infant ran a low fever on day 1 of hospitalization with mild deterioration of respiratory symptoms. Workup (Hb= 10.0; Platelets= 259,000; WBC= 19,300 with 7% rods, 64% segmented, 25% lymphocytes) (Table 1) and X-rays were ordered. Control chest X-rays taken six hours into admission (Figure 2) showed diffuse ground-glass opacity predominantly in the right pericardium. These findings supported the idea of mineral oil aspiration and a diagnosis of exogenous lipoid pneumonia.

Table 1. Workup performed during hospitalization.

Test/Date	Day 1 of Hospitalization	Day 2 of Hospitalization
Hb (g/dL)	11.4	10
Ht (%)	34.1	30.2
MCV (fl)	75.1	74
MCH (pg)	25.1	24.5
MCHC (g/dL)	33.4	33.1
RDW (%)	14.7	14.9
Platelets (/mm3)	306 mil	259 mil
WBC (/mm3)	16,71 mil	19,34 mil
Neutrophils (%)	78	71
Rods (%)	2	7
Segmented (%)	76	64
Typical lymphocytes (%)	17	25
Monocytes (%)	5	4
CRP (mg/dL)	0,3	7,8
Blood culture	No growth	-
ESR (mm3/hour)	-	24
BUN (mg/dL)	-	9,9
Creatinine (mg/dL)	-	0,4
Sodium (mmol/L)	-	136
Potassium (mmol/L)	-	4,8
GOT (U/L)	-	43
GPT (U/L)	-	23
LDH (U/L)	-	1219



Figure 1. Chest X-ray upon admission: lung parenchyma with bilateral hilar infiltrate, with apparent involvement to the right of the upper lobes.

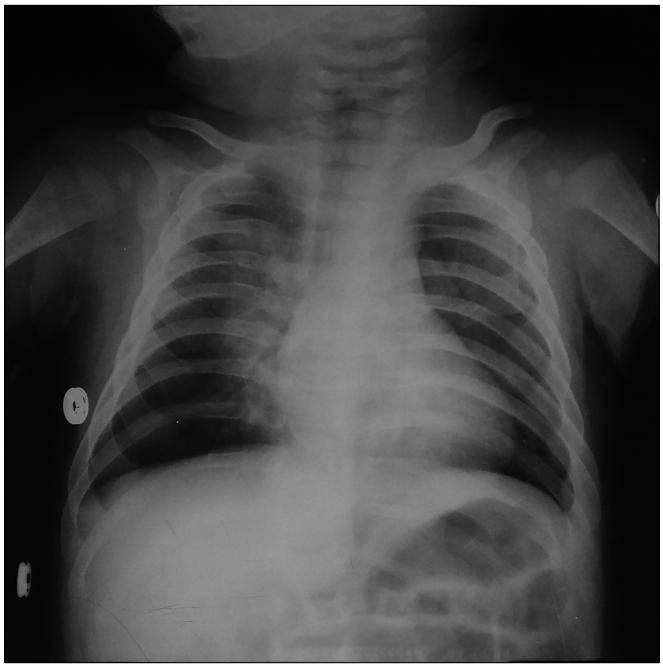


Figure 2. Chest X-ray taken six hours after admission: deterioration with diffuse ground-glass opacity in the pericardium and upper lobes.

The infant was hospitalized for 10 days and was prescribed corticosteroids (methylprednisolone 2 mg/kg/day) and antibiotics amikacin (15mg/Kg/day) and clindamycin (30mg/kg/dose) to cover against secondary infection. A chest CT scan was taken on day 3 of hospitalization and bronchoalveolar lavage was collected on day 9 (Table 2). Cytology tests or special staining methods for fat were not performed.

The patient progressed well and was discharged 10 days after admission in good general condition and eupneic. The infant was followed in the outpatient clinic and remained without apparent sequelae.

DISCUSSION

A literature review was organized based on searches performed on databases Medline/Pubmed and Scielo using the following keywords: "lipoid pneumonia exogenous" and "pneumonia lipóide exógena".

Table 2. Reports 1, 2, and 3.

Report 1	Chest CT scan: Lung consolidations with bilateral air bronchograms consistent with inflammation/infection from pneumonia.
Report 2	Bronchoscopy report (PREP: General anesthesia. DEVICE: FB 530P-Fujinon): Normal bronchoscopy findings. Bronchoalveolar lavage performed and part of the aspirated material was sent for laboratory testing.
Report 3	Test for acid-alcohol resistant bacilli, bronchoalveolar lavage: Aerobic culture was negative: Culture for fungi was negative: Bacterioscopy was negative: Leukocytes were frequent: Absence of microorganisms in bacterioscopy: Few yeast cells: Absence of microorganisms.

Cases of exogenous lipoid pneumonia have been described in Asia, the Americas, and Europe[6] in connection with the aspiration of fat, causing respiratory symptoms due to the high viscosity and surface tension of fat mocelules[7]. It is a rare and often underdiagnosed condition[8]. It has been associated with risk factors such as feeding in a horizontal position (infants) and presence of a cleft palate or swallowing disorders[3]. Iatrogenic causes are most often listed[9], thus placing great relevance on primary prevention practices[10]. Mineral oil is one of the main causing agents and must be avoided in individuals at greater risk of aspiration.

The clinical manifestations of lipoid pneumonia range from asymptomatic disease to severe lung involvement depending on the quantity, quality and duration of aspiration. The most common symptoms are cough, fever, tachydyspnea, difficulty gaining weight, and cyanosis[7]. Most of the case reports published in the literature tell of severe involvement. Individuals with lipoid pneumonia improve slowly on account of the difficulties in removing oil from the lungs[9]. Additionally, mineral oil may serve as a carrier of germs into the lower airways and cause recurring acute respiratory infection. Coinfection with mycobacterium has been described[5]. Lipoid pneumonia must be considered in the differential diagnosis of individuals with tuberculosis or long-standing pneumonia who do not respond well to antimicrobial agents[8].

Thorough patient interviews, physical examination, and bronchoalveolar lavage combined with imaging methods such as chest CT are usually enough for diagnostic purposes[2]. Bronchoalveolar lavage is a safe method that precludes invasive procedures such as biopsies, and is considered the diagnostic method of choice.

Patient interviews may help find information about the use of oily intranasal medication, high fat milk, fish oil, lip gloss, and mineral oil[11]. Oil may not irritate the mucosa at first and does not trigger the cough reflex[2].

Chest X-rays may show patterns such as diffuse opacity or consolidations in topographies suggestive of aspiration, such as the posterior segments of the two upper and lower lobes. CT scans may show, as in the case of our patient, diffuse ground-glass opacity, interlobular septal thickening, right upper lobe consolidation, and fat attenuation in areas of consolidation of the air space[6].

Bronchoalveolar lavage is the gold standard diagnostic method for this type of pneumonia. Macrophages with multiple intracytoplasmic vacuoles stained with Red Oil or Sudan due to the presence of lipids, along with extracellular lipid droplets, and increased cell counts may be observed[6]. Longitudinal studies showed that lavage alterations such as lipid-laden alveolar macrophages might be present for up to 18 months after an aspiration event[11]. Although improvements have been described as the number of lipid-laden alveolar macrophages decrease, some patients may suffer permanent damage from necrosis and fibrosis of the lung parenchyma[11].

The reviewed articles agree in that treatment is administered with bronchoscopy and bronchoalveolar lavage. They also emphasize the relevance of prevention against aspiration. Since the removal of aspirated oil is often slow, the best course of therapy stipulates that oil should be removed as quickly as possible with the aid of bronchoscopy[12].

Administration of corticosteroids in the treatment of lipoid pneumonia is controversial, although it is recommended for severe cases as a strategy to block inflammation, scar tissue development, and fibrosis[11]. Corticosteroids have also been suggested for cases in which functional and imaging alterations continue to manifest in spite of clinical improvement[13]. Respiratory physiotherapy may be beneficial and help remove fat from the lungs[8].

The interview proved helpful at identifying a typical story of aspiration in this case report and pointing us in the right direction in terms of diagnosis and initiation of treatment.

Treatment was started with antibiotics on account of clinical symptoms and imaging signs consistent with pneumonia. Corticosteroids, although controversial in literature, were prescribed to decrease an irritative inflammatory process and bronchoalveolar lavage was performed as part of diagnosis and treatment, to prevent prolonged contact of the substance in question and the patient's airways, fibrosis, and recurrent pneumonia.

The 11 days it took until a bronchoscopy was performed was due to the unavailability of the procedure in the town in which the infant was receiving care. The procedure was ultimately performed at a referral center and, differently from the CT scans, it did not find signs of disease. The mean time between the first CT scan and the bronchoscopy procedure reported in the literature is 2.4 (1-7) days[14]. The delay in performing the bronchoscopy probably explains the absence of signs of disease.

The previously healthy infant had, as risk factors for aspiration, his age and the fact that he was fed in a horizontal position[15].

The fact that the infant was being fed exclusively with breast milk is an additional factor to increase risk. Constipation lasting for up to seven days is normal in these cases[15]. Breastfeeding is one of the pillars of primary care, and inadequate health practices were observed in the Basic Healthcare Clinic in which the infant was originally seen. There was no need to prescribe mineral oil but proper childcare measures and advice on the physiological aspects of breastfeeding[16].

Inadequate prescription of mineral oil and the absence of knowledge about the risks of aspiration in individuals of any age given mineral oil put the patient at risk and produced psychological, social, and economic impacts on the infant's family, in addition to the incurrence of significant expenses by the public healthcare system.

Primary healthcare workers need to be advised about how to prevent aspiration and provide proper advice to breastfeeding mothers.

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