# ExogenouslipoidpneumoniaFOLLOWINGlactuloseintakeinaninfant.Clinicalcase.

Comment [H1]: Authors should be sure that the case did not consume paraffin oil also for treatment of constipation. As lactulose is a sugar derived from milksugar lactose and is completely different from paraffin oil derived from kerosene whichis known to cause lipoid pneumonia.On the other hand, Lactulose is not known to cause lipoid pneumonia.

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## Abstract

Exogenous lipoid pneumonia is a rare condition in common pediatric practice. Its clinicalpresentation is non-specific. Delay in diagnosis and treatment exposes infants to chronic respiratoryfailure. We report the observation of a 2-month-old infant with respiratory signs that drag on.The imaging showed several negative density pulmonary ~~opacity~~opacities. Foam cells ~~was~~ wereisolated onsputumcytologicalstudy.TakinglactuloseforconstipationsuggestedExogenouslipoidpneumonia.Theaimo f hereinobservationistodrawattentiontomineraloiladministrationdrugsrisks in infants especially if they are at risk.



**Keywords:**Exogenouslipoidpneumonia-Lactulose-Infant.


## Introduction

Exogenous lipoid pneumonia (ELP) is a rare condition in routine paediatric practice. Itsclinical presentation is non-specific. Delayed diagnosis and treatment expose the patient torespiratorycomplications that can lead tochronicrespiratory failure. ~~The benefitsof~~

Ourobjective~~objective~~commentis to draw attention to the risks of administering mineral oil-based medicines toyoungchildren, especially if they are at risk.

**Case presentation :**

G.M.,a2-month-oldinfant,wasadmittedtohospitalwithdyspnea,malaise,coughandtachycardia,whichhadbeenevolvingfor20daysinacontextofapyrexia.Thissymptomatologydidnotseemtorespondtothetreatmentsadministeredduringseveralconsultations. The patient was born of a well-monitored pregnancy carried to term. There wereno incidents during the neonatal period. She has had regurgitation since birth, with untreatedbreastfeeding and bouts of cyanotic coughing during feedings. Her constipation was treatedorally with kerosene oil. Examination revealed an infant in good general condition, Rose,weighing 5 kg for a height of 58 cm, apyretic, polypneic at 70 cycles/min, with no signs ofstruggleandsnoring,~~especiallyontherightside~~.Therewerenosignsof heartfailure.Biological workup does not suggest bacterial infection. The abdomen is soft and there is nohepatosplenomegaly. The rest of the examination was normal. No signs of bacterial infection(whiteblood cell count 8800 ~~E~~c/mm3, CRP 13 ~~mg~~mmol/l).

**Comment [H2]:** If authors mean lactulose here its wrong as lactulose is not a kerosene oil.

A frontal chest X-ray and chest CT scan were performed (figs. 1 and 2). The frontal chest X-rayshowedmultiplealveolar-typeopacities(blurredboundarieswithbronchogram),oneinthe right upper lobe and bilateral para-hilar. Chest CT revealed several bilateral parenchymalpara-hilarground-glassopacities,heterogeneousandcontainingafewareasofnegativedensity.

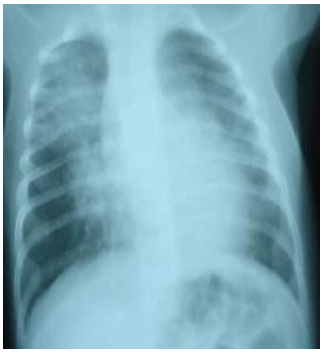

**Figure 1** Front chest X-ray shows multiple alveolar opacities (blurred boundaries withbronchogram),onein the right upper lobe and bilateral para-hilar.

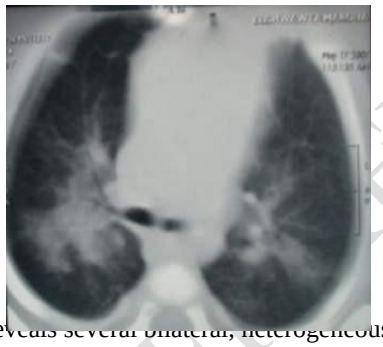

**Figure 2** Chest CT scan reveals several bilateral, heterogeneous, intra-parenchymal para-hilarground-glass opacities,with someareas ofnegativedensity.

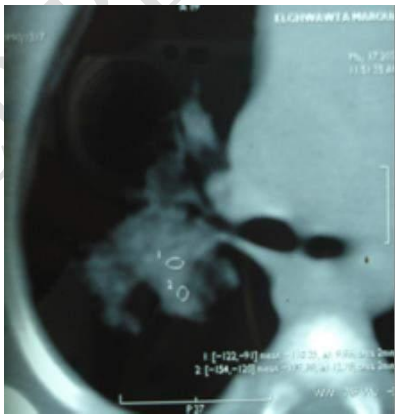

**Figure 3** Chest CT parenchymal opacities with negative density between -154 and -122HU.

Given the notion of vomiting since birth, we performed PH-metry, which was not in favor ofgastroesophageal reflux (acid time (PH<4) less than 2% on a 24-hour recording, gastric tubecontrolled taking meals into account). The notion of taking kerosene oil to treat constipationprompted us to explore the possibility of exogenous or oily inhalation pneumonitis or lipoidpneumonia. To confirm the diagnosis, we reassessed the density of the parenchymal opacities,which were between -154 and -122 HU and therefore lipidic in nature. We were able todemonstratethepresenceoflipidfoamcellsinthesputumwithmultiplesessionsof~~kine~~aspirations. Our patient w a streated symptomatically with respiratory physiotherapy andoxygen therapy according to hemoglobin oxygen saturation, and prednisone 2 mg/Kg/d for 2weeks. Clinical evolution was favorable after 10 days of hospitalization, and radiologicalclearancewasobtained after 3 months.

**Discussion**

Lipidorlipoidpneumonitiscomprisestwoentities:theexogenousform,alsoknownasexogenous lipoid pneumonitis (ELP) or oily pneumonitis, and the endogenous form, known asendogenous lipoid pneumonitis or cholesterol pneumonitis. The latter is secondary to thereleaseoflipidsnormallycontainedinlungtissuedestroyedupstreamofanobstructivebronchial lesion or by suppuration. More rarely, endogenous lipoid pneumopathy results fromfatembolism, alveolar proteinosis or lipid storage disorders.(reference)

~~PLE~~ELP, a rare condition, is most often the result of repeated micro-inhalations of mineral oil.Lung damage varies according to the type of oil (mineral, vegetable or animal), the quantityand duration of intoxication [1]. The acute form corresponds to significant inhalation, andalthough it can lead to acute respiratory failure, it is often unrecognized due to the non-specificnature ofthesymptoms andits rarity.The chronicform

**Comment [H3]:** ELP should be used as authors mean egogenous lipoid pneumonia . ELP is abbreviation for other diseases as protein losing enteropathy or panlobular emphysema.

correspondstorepeated,pauci-symptomaticmicro-inhalations,leadingtofibrosislesionsassociatedwith a granulomatous "paraffinoma" reaction [2].

Fromapathophysiologicalstandpoint,mineraloilisapure,inerthydrocarbon.Itstracheobronchial penetration inhibits the cough reflex and the action of vibratile cilia. At thealveolarlevel,mineraloilis responsibleforanintra-alveolarinfiltrateofmacrophagesassociated with an acute inflammatory reaction. The oil is then emulsified and phagocytized,leading to vacuolation of the macrophages, which migrate to the interstitium, forming amultinucleated, vacuolated giant cell granuloma. In the later stages, the disease progresses tofibrosis [3]. In the majority of cases, ~~PLE-~~ ELPresults from the administration of mineral oil givenorally to treat constipation, or from the inhalation of milk [4]. Rabah~~R~~ et al [~~5~~6], report theoccurrence of ~~PLE-~~ ELPafter rectal administration of mineral oil in a patient with Hirschsprung'sdisease via an embolism mechanism. De la Rocha et al [~~6~~7] reported 1 case of ELP followingaccidental aspiration of mineral oil in a 13-month-old infant who required oxygen therapy foraperiodoffivemonths.Furthermore,vigorousoppositionbyinfantstotheoraladministration of mineral oil exposes them to aspiration [6]. Patients with motor delay and/orassociatedswallowing disorders are particularly atriskof developing ~~PLE~~ELP[7].

The clinical presentation of ~~PLE-~~ ELPis non-specific and depends on the patient's age, the volumeof oil aspirated, the presence or absence of risk factors and the chronicity of aspiration. Thelatent nature of the disease is classic, hence the importance of the anamnesis in authenticatingand characterizing exposure to the lipid product and in identifying risk factors. In the series by~~P. R. Bandla~~ et al,(8) 41% of cases were discovered incidentally, of which 25% remainedclinicallylatent.Cough,chestpain,fever,weightlossandcrepitusraleswerethemostfrequently observed clinical symptoms. In another study, the same percentage of cases wasfound tobe latent~~.~~.

asymptomatic in 41% of cases, fever in 39%, weight loss in 34%, cough in 64%, dyspnoea in50%, chest pain in 21%, haemoptysis in 13% and, on physical examination, 54% of cracklingrales [8]. These patients are at risk of non-tuberculous mycobacterial infections, which can berevealing, as lipids increase the growth of these organisms and prevent their phagocytosis bymacrophages [9,10,19,20].

Standardradiographicsignsarenonspecificandvariable,rangingfromaperi-hilar,bilaterallobaralveolarsyndromeaffectingmainlythelowerandposteriorlobes,givinga"ground-glass" appearance, to an interstitial and nodular or even pseudotumoral syndrome."paraffinoma".Theappearanceofabilateralexcavatednoduleconfusingwith Wegener'sgranulomahasbeenreported,followinginhalationofkeroseneoil.ChestCTishighlysuggestiveoftheli pidicnatureofopacitiesfoundonstandardradiography,asitmeasuresnegativedensity(between-150and-30Hounsfieldunits)withintheselesions[11,12,21].Itcanalsoshowthickeningoftheinterlobularsept a,areasofgroundglassortheassociationofsmallreticulatedopacitieswithinareasofgroundglasskno wnas"crazy-paving".CTcanalsobeusedtodeterminetheexactnumberoflesions,theirlocationandsize,andtomon itortheirevolution.Someauthorsalsosuggestcomparingthisdensitywiththatofsubcutaneousadipos etissue,whosedensityiscomparable[13].Lee~~JS~~etal[~~14~~17]analyzedhigh-resolutionCTfindingsin25patients,accordingtothepresenceorabsenceofpredisposingfactors,andt herouteanddurationofinhalationofamineraloil"squalene"derivedfromsharkliver.Resultswerecla ssifiedintothreepatterns:diffuseground-glassopacity,consolidation,andinterstitialabnormalities.Theground-glassappearancewasmostlyfoundinpatientswithpredisposingfactorsandafternasalinstillationinla rgequantities.Theappearanceofconsolidationwasfoundmainlyinpatientswithnopredisposingfact orsandtakingsqualeneforseveralmonths. Patients with

interstitial syndrome all show "squalene" uptake beyond 1 year. A similar study was carriedout by ~~BARON~~ Baronet al(15) on 15 cases of ~~PLE~~ELP, the aim of which was to distinguish between acuteand chronic forms of PLE on the basis of radiological presentation. He concluded that thefeatures favouring acute forms were the presence of a pleural reaction and enhancement onstandard imaging and chest CT ($p < 0.05$). The presence of masses was synonymous withchronicforms($p<0.05$).ThoracicMRIcanconfirmthediagnosisonisosignaltofatoflesionsonT1-weightedsequences.Fatsuppressionsequencesshowadecreaseinlesionsignal,enablingdifferentiationfromhemorrhagicinfiltrates.Inpractice,analysisofradiological images (standard radiography and thoracic CT or even MRI) in the light ofanamnesticdata(exposuretooilwithorwithoutriskfactors),andoftheevolution(reversibility or not) makes it possible to link clinical symptomatology to ~~PLE~~ ELPand to outline aprognosis. Cytochemical analysis of bronchoalveolar lavage fluid can, if necessary, confirm~~PLE~~ELP.Bronchoscopywithexaminationofthebronchoalveolarlavagefluidenablesthediagnosis of ~~PLE~~ ELPto be made, as lipid globules are found on the surface of the fluid and lipid-laden macrophages are present, with measurement of the load index [15]. Bronchoscopy hasthe added advantage of exploring the airways to rule out other causes of dragging pneumoniathat could be confused with ~~PLE~~ELP. On the other hand, invasive investigations such as needlebiopsy or thoracotomy are not justified [16] if the clinical history and thoracic CT scan aresuggestiveenough,unlessitisagranulomaorparaffinomawithsignsofactivity.

Treatment of ~~PLE~~ ELPin children is generally symptomatic, with resolution of symptomsand radiographic abnormalities within months of cessation of exposure [22,23,24]. In cases ofdiffuselung damage,high-doseprednisone [17]andtherapeuticlunglavagemaybeconsidered[18].Itisclear~~thatinthis~~

that the prevention of another episode of pneumonia should involve not self-medicating,consultingaspecialistintheeventofworryingorlingeringsymptoms,andeliminatinglactuloseas a ~~1ère~~ 1ry treatment for constipation[24].

**Conclusion**

~~PLE~~ELPshouldbeconsideredinthepresenceofexposureto~~apetroleumproduct~~lactulose,especiallyiftherearériskfactorsandradio-clinicaldiscordance.Theadministrationof~~mineral oil~~lactulose for the treatment of chronic constipation should be approached with caution, andpreferably avoided in infants resistant to its administration, and in children with or withoutmentalretardation and swallowingdisorders.

**Comment [H4]:** Authors should be sure again from patient's history if she used only lactulose or also used liquid paraffin for her constipation or even the pneumonia resulted from her regurgitation of food and milk and correct the title and the conclusion according to that history. Whatever the cause of pneumonia in this case, it is an interesting case.

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