

Chemical Pneumonia with Complications Due to Accidental Inhalation of Hydrocarbon in a Child: A Case Report

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Abstract

Case Report

Hydrocarbon poisoning, particularly from accidental ingestion, is a significant risk for children and often lead to chemical pneumonitis and severe respiratory complications. This case report describes a 12-year-old boy with intellectual disability who ingested petrol, leading to chemical pneumonia complicated by pleurisy detected through chest CT scans. This case underscores the importance of timely imaging in managing hydrocarbon poisoning and highlights the need for preventive strategies to reduce such incidents in children.

Keywords: Accidental inhalation, Benzene toxicity, Chemical pneumonitis, CT scan.

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INTRODUCTION

Hydrocarbons are a heterogeneous group of substances primarily composed of carbon and hydrogen molecules, widely used in modern life. Common examples include gasoline, motor oil, and kerosene [1].

Exposure to hydrocarbons occurs through inhalation, ingestion (with or without aspiration), or skin contact, and depending on the substance's characteristics and its level of systemic absorption, multiple organ systems may be affected [2]. The pulmonary system is most often impacted, particularly through inhalation or aspiration [3].

Acute hydrocarbon poisonings frequently lead to chemical pneumonia and, though rare, may also result in complications such as pneumatocele, pulmonary abscess, pleural effusion, and acute respiratory distress syndrome (ARDS) [4].

While such cases are more frequently observed in children [5], instances of pneumonia, pleurisy, and pneumothorax following hydrocarbon poisoning in children have been scarcely reported. Here, we present a case of severe chemical pneumonia complicated by pleurisy and abscess formation due to accidental petrol consumption.

CASE REPORT

A 12-year-old boy with intellectual disability was admitted to the pediatric emergency department after accidentally ingesting petrol three hours earlier. His mother had attempted to treat him with traditional remedies, including milk and honey.

Upon admission, he presented with vomiting without respiratory symptoms or fever. Laboratory tests and a chest X-ray showed no abnormalities, and prophylactic antibiotics (amoxicillin and clavulanic acid) were initiated. He was monitored for 24 hours and discharged with a follow-up appointment scheduled for one week later.

Three days after the initial ingestion, the child returned with respiratory distress, an irritating cough, rapid breathing, and a fever of 39°C.

Physical examination revealed a conscious child with a respiratory rate of 30 breaths per minute and a heart rate of 118 beats per minute. Pulmonary auscultation detected crepitating rales at both basal lung areas. Laboratory results indicated normal renal function, hemoglobin of 12.3 g/dL, leukocytosis at 19,000/mm³, and a C-reactive protein level of 290 mg/L. An upright chest X-ray revealed bilateral basal reticular opacities obscuring the cardiac margins, indicating anterior localization.

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A chest CT scan showed multiple compartmentalized cystic lesions enhanced after contrast injection in the right basal region and left basal posterior

segment, along with adjacent areas of consolidation and ground-glass opacity, leading to a diagnosis of bilateral abscessive chemical pneumonia.

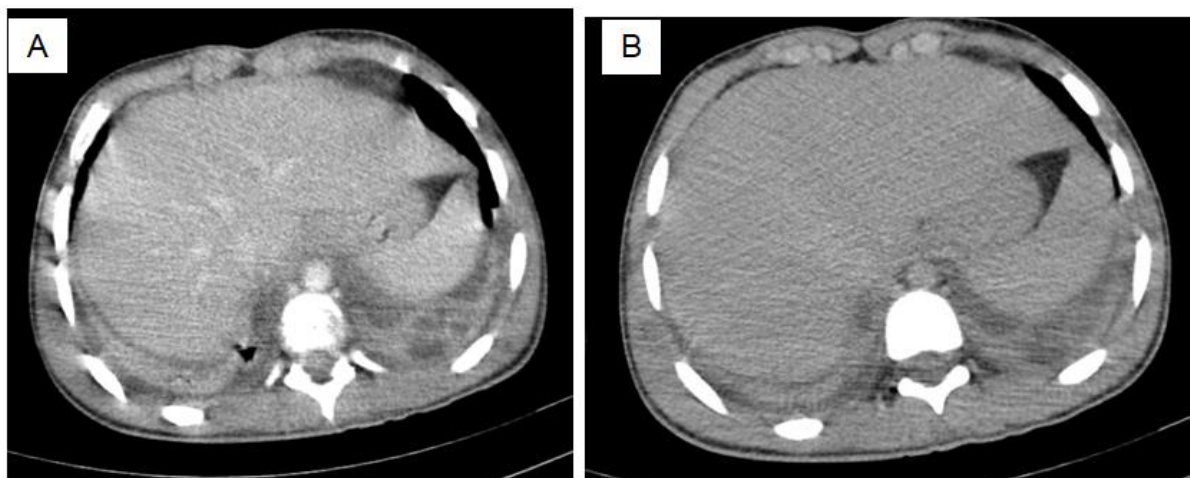


Figure 1: Axial chest CT scan mediastinal window with (A) and without contrast injection (B) shows bilateral basal cystic lesions, some of which are confluent, with enhanced walls after contrast injection, along with bilateral pleural effusion

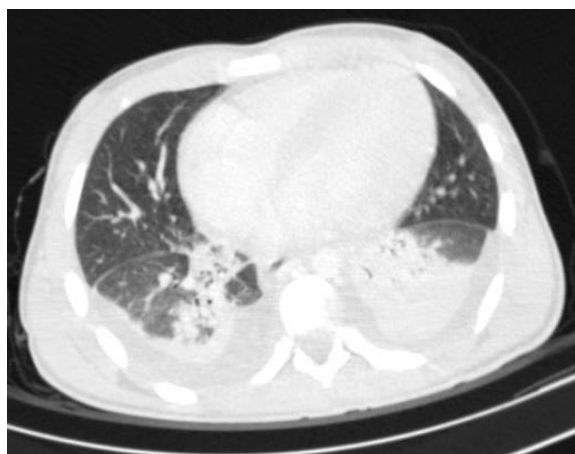


Figure 2: Axial chest CT scan parenchymal window shows areas of consolidation and adjacent ground-glass opacities adjacent to the basal abscesses

DISCUSSION

Chemical pneumonitis is the most frequent complication of hydrocarbon poisoning, particularly in children following accidental ingestion, which is a common cause of emergency admissions in tropical environments [6, 7]. Hydrocarbons, due to their low viscosity and high volatility, such as gasoline and kerosene, are easily aspirated, leading to respiratory complications [2].

In domestic accidents, boys are predominantly affected, with a male-to-female ratio of 1.5 [8]. Our patient, a male child, accidentally ingested gasoline, mistaking it for water, due to careless storage by parents.

Intoxication occurred through tracheal and duodenal absorption, with secondary inhalation following vomiting exacerbating the clinical picture.

Symptoms often appear rapidly and include dry cough, dyspnea, and fever. Our patient presented with respiratory distress and hyperthermia three days after ingestion, accompanied by elevated leukocytes and C-reactive protein.

Chest X-ray typically shows reticulonodular opacities or consolidations, often bilateral. In our case, the X-ray revealed reticular basal opacities, while the CT scan detected pulmonary micro-abscesses, a rare complication in hydrocarbon pneumonia.

Chemical pneumonitis often presents as bilateral interstitial inflammation [6, 9]. Hydrocarbon aspiration can lead to severe pulmonary effects, including interstitial hemorrhage, edema, and necrosis, potentially culminating in complications such as

hemorrhagic pleural effusion, although this is rarely reported [10].

Increased transpulmonary pressure from lipid pneumonia can disrupt the respiratory epithelium, allowing air to enter the interstitium and causing pulmonary interstitial emphysema. Persistent elevated transpulmonary pressure may lead to further complications, including pneumothorax [11]. While the development of pneumothorax, pneumatocele, and other severe pulmonary complications like ARDS is rare, it highlights the seriousness of hydrocarbon poisonings [11, 12].

Pulmonary abscesses following hydrocarbon pneumonia are infrequent, and the factors contributing to their development remain unclear. In our patient, repeated vomiting after a traditional treatment may have facilitated the aspiration of food particles, contributing to the formation of micro-abscesses.

Antibiotics are generally recommended in such cases, although the role of infection is often uncertain in early stages. Initially treated with amoxicillin-clavulanic acid, our patient was switched to a third-generation cephalosporin due to signs of superinfection, resulting in a favorable clinical and biological outcome [13, 14].

CONCLUSION

Hydrocarbon poisoning, especially through accidental ingestion, poses significant risks in children, with chemical pneumonitis being the most common complication. While pulmonary abscesses are rare, our case highlights the need for awareness regarding the handling of toxic substances. Timely diagnosis and appropriate treatment are crucial for better outcomes. Ongoing education for parents is essential to reduce the incidence of such poisonings.

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