

Accidental Aspiration of Diesel during Siphoning causing Chemical Pneumonitis

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Abstract

Diesel is a form of hydrocarbon commonly used as fuel in transport vehicles. In developing countries like India, manual siphoning of diesel is a common practice by mechanics and drivers. Aspiration of any hydrocarbon compound is lethal and can lead serious complications like chemical pneumonitis and even death. There is paucity of available data regarding diesel siphoning causing chemical pneumonitis and its future consequences. Here we are reporting a case of 38 year old male mechanic presenting after accidental aspiration of diesel while siphoning. He was managed empirically with injectable antibiotics and steroids and was discharged after 10 days in asymptomatic condition.

Keywords: Hydrocarbon, diesel, chemical pneumonitis, siphoning

Introduction

Hydrocarbons are volatile organic compounds used in routine activities as fuel for cooking gas and transport. Diesel is a hydrocarbon which is extracted from distillation of crude oil. Aspiration of diesel can cause range of symptoms from mild discomfort to severe ARDS and chemical pneumonitis and even death.^[1] Aspiration of hydrocarbon compounds can also occur due to vomiting that occurs after accidental ingestion particularly in children and elderly.^[2] Siphoning of petroleum and diesel is a common practice in rural areas which increases the chances of aspiration.^[3] First case of diesel aspiration causing pneumonitis was reported in 1897 by Hamilton.^[1] Although exact prevalence of this form of accident in-

juries are not known and often under reported. There is scarcity of literature limited to very few case reports of such accidents and its implications from India. So, we are presenting a case of chemical pneumonitis post aspiration of diesel while siphoning.

Case Report

A 38 year old male, mechanic by occupation, came to emergency department with history of accidental aspiration of diesel around 30-50 mL while he was siphoning at his shop 4 days back followed by right sided chest pain, cough and fever. Chest pain was moderate in intensity, continuous, localized to lower costal margin, non-radiating, not relieved by taking rest

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with no postural variation and associated with shortness of breath at rest. No history of orthopnea and postural nocturnal dyspnea. Fever was sudden in onset, moderate to high grade, continuous and not relieved on medication. It was associated with chills and rigor. He also had history of cough with sputum minimal in amount, blood tinged for last 2 days. He was a non-smoker and social drinker. There was no history of ischemic heart disease, diabetes, hypertension, tuberculosis, asthma, COPD in past. At the time of presentation, patient was febrile, tachypneic, having respiratory rate of 28 per min and SpO_2 of 94% with $4L$ of O_2 /min. Blood Pressure was 100/70 mmHg and Pulse rate was 108 beats per minute. General physical examination was unremarkable. On Respiratory system examination, there was decreased movement and chest expansion on right side lower region. On percussion infra-axillary, infra-mammary and infra-spinous region on right side were dull. Air entry was also decreased in the same region with coarse crepitations within same area. Cardiac auscultation was normal. Abdominal examination and CNS examinations were also normal. Hemogram suggested leucocytosis (TLC-13000/cumm) with neutrophil predominance (88%). ECG was normal except rate. His renal function test and liver function test were normal. Sputum for Acid fast bacillus and mantoux test were negative. Blood gas analysis show uncompensated metabolic acidosis. Chest X-rays showed right sided pleural effusion with underlying consolidation (Figure 1). CT chest was

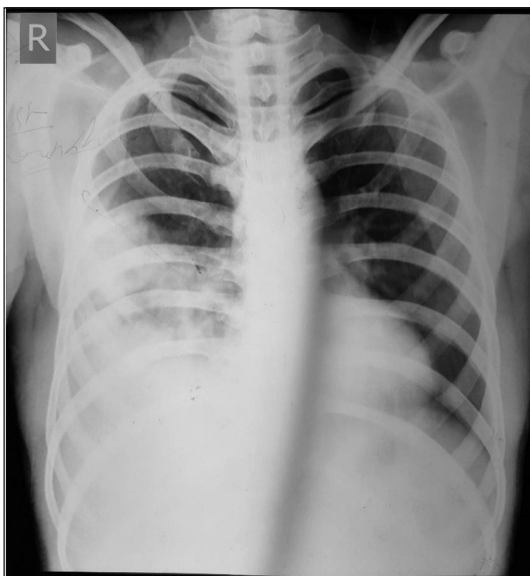


Figure 1 : Chest X-ray showing right side consolidation and pleural effusion

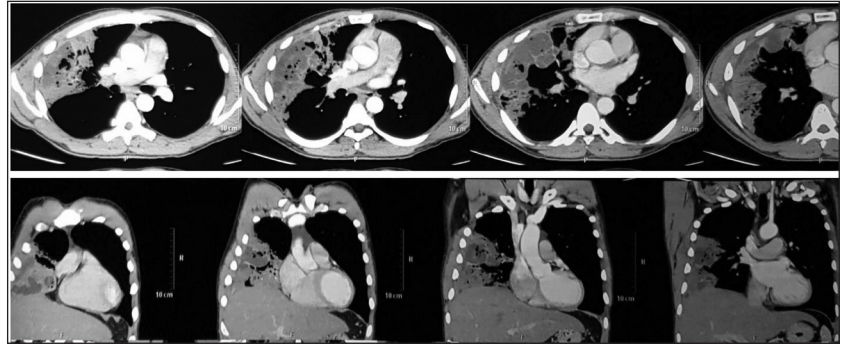


Figure 2 : CT chest showing area of consolidation with air bronchogram

done which revealed large area of consolidation with air bronchogram and area of breakdown with multiple hypodense cystic areas within the right middle, anterior and lateral basal segments of lower lobe along with small acinar nodules with tree in bud appearance. CT finding were suggestive of chemical pneumonitis in view of history of petroleum production aspiration (Figure 2). Patient was treated empirically with injectable antibiotics and injection hydrocortisone. Patient started improving clinically after 2 days and hematologically upright in 4 days and patient was discharged after 10 days in asymptomatic condition.

Discussion

Hydrocarbons are organic compounds classified into aliphatic and aromatic class. Petrol, diesel, kerosene, gasoline are some of the most commonly used hydrocarbons in routine daily life mainly as transport and domestic fuel. Various modes of toxicity of hydrocarbons include ingestion either accidental or suicidal, dermal and inhalational. Dermal route is more common in children.^[4,5] In our case mode of exposure was accidental aspiration while siphoning. Diesel being a fuel of low viscosity and low volatility is associated with higher chances of aspiration.^[6]

Exact pathogenesis of diesel aspiration causing pneumonitis is not clear. However, animal studies showed it occurs due to deficiency of surfactant, which occur either due to direct injury of epithelial causing damage to Type II alveolar cell and inflammatory reaction. Macrophages initiates inflammatory reaction and phagocytose the aspirated content and emulsified lipid and release inflammatory cytokines and recruit the immune cells.^[7]

Initial symptoms may be non-specific like cough, hemoptysis, fever. Majority of patients with history of toxicity presented with respiratory involvement such as, shortness of breath, chest pain, bronchitis, bron-

chopneumonia, pneumothorax, pneumatocele, subcutaneous emphysema which can later develop to acute respiratory distress syndrome due to respiratory failure.^[8,9] Involvement of other system can also be seen in form of CNS toxicity as weakness, confusion, and coma. Gastrointestinal manifestations are primarily due to irritation like nausea, vomiting, diarrhoea and esophageal perforation rarely. Other manifestations can be cardiomyopathy, arrhythmias and renal toxicity.^[9,10] Various radiological findings seen hydrocarbon aspiration include peri-hilar densities, bronchovascular markings, basilar infiltrates, consolidation predominantly involving right middle lobe, pneumothorax, pleural effusion, pneumo-mediastinum.^[1,6]

There is no special test to quantify the amount of exposure of diesel and usually diagnosis is made by taking proper history and examination.^[3] HRCT chest is considered as investigation of choice which show exogenous lipid pneumonia like consolidation with crazy paving pattern. Bronchoscopy is considered as useful investigation to establish the diagnosis foamy macrophages in alveoli and interstitial are characteristics finding of lipid pneumonia due to hydrocarbons. There is no specific treatment for chemical pneumonitis. and patient is managed empirically and symptomatically. Role of corticosteroid and antibiotics is unequivocal.^[2] Though there is no role of prophylactic use of antibiotics but when signs of infection like fever, leucocytosis, tachypnea appear antibiotic therapy should be considered.^[11]

Similar case was reported by K. Gowrinath *et al* in 2012, in which a 30 year old male presented with fever, cough, vomiting, chest pain and dyspnea. He was managed by O₂ therapy, injectable antibiotics and corticosteroids. Patient was discharged asymptotically after 5 days.^[12] In another case by Verma AK *et al*, 16 year old male presented with pneumothorax post aspiration of diesel. He was managed with ICD, injectable antibiotics, antitussive and analgesics. He was discharged asymptomatic.^[13]

In our case patient was treated with steroids and antibiotics and started improving after 4 days. Early recovery in our patient may be attributed to small amount of diesel inhaled.

Conclusion

Siphoning of diesel is quite common practice in drivers and mechanics which accidentally get aspirated. Diesel aspiration can cause variety of illness from mild cough and fever to severe ARDS and death. It can pres-

ent as acute as well as chronic with severe complications. So manually siphoning should be prohibited and if performed should be done cautiously. Proper history taking includes occupation and examination should be done to prompt diagnosis and further management. Education and safe practice to deal manual siphoning of fuel is necessary for primary prevention.

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