

## Case Report

### Histopathological changes in chemical pneumonitis following diesel fuel siphonage.

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#### Abstract

Diesel is commonly used as fuel for engines and is a mixture of the hydrocarbons which are obtained from fractional distillation of petroleum. Hydrocarbon pneumonitis following aspiration of diesel during siphoning of diesel though infrequent but can happen in people who are employed in the automobile field. We present a case of a 23-year-old male mechanic who aspirated diesel while siphoning it from fuel tank, developed fever, cough & bilateral pneumonitis. The patient received the symptomatic therapy at a local hospital. However, 3 days later, he developed breathlessness and was brought to R.L. Jalappa Hospital for tertiary care. Despite all resuscitative measures, the patient succumbed to death after 6 hours of treatment. Autopsy examination revealed haemorrhagic lungs with consolidation. Histopathological examination showed the features of bilateral pneumonitis. Literature pertaining to accidental aspiration of diesel during siphonage are rare. The complications and clinical spectrum are alarming after ingestion. So, it is vital to prevent hydrocarbon ingestion.

**Key words:** Hydrocarbons, diesel, siphonage, pneumonitis, histopathology.

#### Introduction

Hydrocarbon pneumonitis following accidental aspiration of petroleum compounds such as diesel is an uncommon and under-reported emergency medical condition. Majority of cases of hydrocarbon pneumonitis are linked with accidental aspiration in occupational exposure in fire-eaters and children.<sup>1</sup> Fuel siphoning involves using a spout and a simple rubber tube to siphon diesel fuel from a vehicle's tank or fuel drum. This siphoning method

may result in accidental intake and inhalation of diesel fuel. The practice of manual siphoning of diesel from fuel tanks is common among automobile mechanics in India. Chemical pneumonitis due to aspiration of diesel during siphoning of diesel though rare can happen in people who are working in the automobile field. Hamilton was the first to describe pneumonitis due to hydrocarbon aspiration in 1897.<sup>2</sup> Aspiration of diesel can cause range of symptoms from mild discomfort to severe ARDS and chemical pneumonitis and even death.<sup>3</sup> Aspiration of vomitus containing hydrocarbon compounds can also happen after unintentional ingestion particularly in children and elderly.<sup>4</sup> Aspiration of diesel leading to pneumonitis is under-reported in our country.<sup>5</sup> There is paucity of literature limited to very few case reports of such accidents and its implications from India. So, we are reporting a case of a young adult male, novice mechanic who developed bilateral chemical pneumonitis following aspiration of diesel while siphoning.

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### Case Report

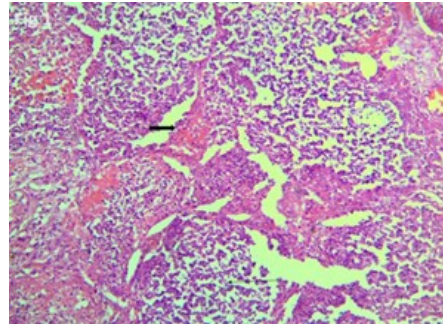
A 24-year-old man, a novice mechanic, presented with alleged history of accidental diesel aspiration while siphoning from the fuel tank of a bike, which happened three days earlier. The chief complaints were gradually increasing breathlessness, bilateral chest pain, high-grade fever, and non-productive cough for three days. The patient had no history of haemoptysis, dysphagia or hoarseness of voice. He was initially treated at a local hospital for three days and rushed to tertiary hospital after once his condition got worsened. The patient had no past medical history of note, no history of allergies, and had not consumed any drugs or medications recently. Chest X-ray (CXR) done at admission Figure:1 showed pneumonic consolidation over the bilateral lung fields. The patient showed gradual recovery with the symptomatic therapy. However, the same day, the patient developed sudden chest pain and had a fatal cardiac arrest.



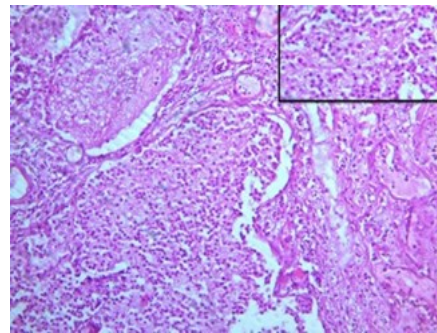
**Figure 1: CXR lungs showing bilateral consolidation.**

**Post Mortem Findings:** Autopsy was conducted 24 hours after death and dead body was that of a young adult male who was moderately nourished and moderately built. External examination showed bluish discoloration on the fingers, ears, and lips.

The larynx and trachea mucosa showed marked hyperaemia. The both lungs showed evidence of congestion, and the lower lobes of the both lungs had a soapy fluid. The stomach contained around 210 ml of greyish coloured fluid and mucosa was haemorrhagic. The viscera and blood were collected, preserved and sent to state forensic science laboratory (FSL) for chemical analysis, which came negative for any toxic compound. The both lungs were sent for histopathology examination and reports were conclusive for consolidation Figure: 2 & 3.



**Figure 2: Section studied shows alveolar spaces filled with inflammatory cells. Intervening alveolar septa is thickened and shows engorged blood vessels. (Thick arrow: Blood vessel in septa, thin arrow: Inflammatory cells in alveolar spaces) H&E: 100x**



**Figure 3: Section studied shows alveolar spaces filled Foamy macrophages and few eosinophils. (Inset: Foamy macrophages). H&E: 400x**

Based on the history, clinical features, radiological findings, autopsy examination, and histopathology examination, the cause of death was opined as aspiration pneumonia following consumption of diesel.

### Discussion

In the automobile garages, diesel is one of the most commonly used petroleum derived product. Cases of poisoning either due to inhalation or ingestion mostly occurs accidentally. Individuals most affected are those working in the automobile garage, here patient aged about 23 years was working in automobile garage.<sup>6</sup>

Accidental poisoning of diesel occurs by inhalation, aspiration and absorption through skin. If the exposure of hydrocarbons is through inhalation, then the system affected most commonly is respiratory system. They first enter lungs and blood

stream later reach central nervous system.<sup>7</sup> In this case accidental poisoning occurred through inhalation / ingestion. Toxicity on lungs depends on its physical properties, quantity of consumption and occurrence of vomiting and usually it manifests clinically as crackles, rhonchi, hypoxemia, tachypnoea and acute respiratory distress syndrome.<sup>8</sup>

In this case post mortem findings of lung showed haemorrhagic and consolidation which is in similar lines to the case of diesel poisoning reported in 18-year-old male.<sup>11</sup> Histopathological study of lungs showed the features of aspiration pneumonitis. Diesel has irritant property on the gastric mucosa, which was seen in our case with congestion of stomach mucosa.<sup>9,10</sup>

Post-mortem findings of cases with history of acute hydrocarbon ingestion will have mostly features of pulmonary pathology. Biological materials like stomach content, blood, and urine are analysed for presence of diesel/petroleum products. FSL report being negative because of its volatile nature and lag between occurrence and time of sample collection, method of collection, method of specimen packing, treatment received and delayed death. In patients who die after some days of treatment, chances of getting positive result on chemical analysis are negligible.<sup>10,11</sup>

### **Conclusion**

In our case report, the patient lived for few days after the incident. This may be the most likely reason for the negative chemical analysis report. The post-mortem findings were also nonspecific. The histopathological examination of the lungs, which showed features of chemical pneumonitis. Hence, the clinical features and histopathology report, when linked with the history helped us in furnishing the cause of death. We conclude by saying that, in cases of aspiration pneumonitis, the autopsy findings are usually nonspecific and the FSL report will be negative if the patient survives for a few days. Hence, in such a situation, the investigative information, the hospital case sheet extract and histopathological findings must be correlated to make the diagnosis in favour of chemical pneumonitis. A high index of clinical

suspicion with confirmation by radiological findings can help in early management and permanent damage prevention. Along with clinicians, awareness of this condition is also equally crucial for mechanics. Community intervention to raise awareness regarding this disease among mechanics is of utmost importance, and the practice of mineral oil siphonage should be abandoned permanently.

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