

# Tension Pneumothorax following an Accidental Kerosene Poisoning: A Case Report.

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## SUMMARY

Tension pneumothorax is a rare complication following an accidental kerosene poisoning. In such situation, a bed-side needle thoracocentesis is performed because of its potential of becoming fatal; hence its clinical importance. A case of 15 month old boy with tension pneumothorax following accidental kerosene poisoning that responded to needle thoracocentesis is presented.

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**Key words: tension pneumothorax, accidental kerosene, poisoning, needle thoracocentesis, Nigerian child.**

## INTRODUCTION

Kerosene is the single most common cause of poisoning in childhood in any African community, and many parts of developing world.<sup>1-4</sup> The respiratory symptoms/complications usually encountered in children with accidental ingestion of kerosene include cough, dyspnoea, tachypnoea, lipoid pneumonitis, bronchitis and bronchopneumonia.<sup>3,4</sup> However, there are rare complications such as severe hypoxia, pneumothorax, pneumomediastinum and emphysema, which are usually associated with increase fatality,<sup>3-6</sup> but these, to the best of our knowledge, have hitherto not been reported in Nigeria. A case of kerosene poisoning complicated by tension pneumothorax is presented in order to highlight the urgent need to make the diagnosis and the use of needle aspiration thoracocentesis as a life saving bed-side procedure in such a potentially fatal complication of kerosene poisoning.

## CLINICAL MATERIALS AND METHODS

A 15-month old boy, who was referred by a private hospital to emergency paediatric unit of the University of Maiduguri Teaching Hospital Maiduguri, on April 30, 2007, with a week history of kerosene ingestion, cough, fever and difficulty in

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breathing. He was said to be alone in the room when he ingested an estimated 40mls of kerosene kept in a transparent polyethene container. He was given two tins of evaporated peak milk in an attempt to induce vomiting by the parents at home. He had no history of previous hospitalization and his growth and development milestone were considered by parents to be within normal limits. He is not fully immunized and other past medical histories were not contributory. He is the 4th child in a monogamous setting of four children, all alive and well and with positive past family history of kerosene poisoning in one of his older siblings. Mother is a full-time house wife and father is an unskilled labourer with parents having no formal education, living in a single room apartment with four other tenants in the compound.

On examination, he was wasted weighing 7.9kg (75.2% of expected weight for age) and had a mid-upper arm circumference of 13.2cm. Temperature of 38.9°C, mild pallor but was dehydrated with significant cervical lymphadenopathy. He was also found to be in respiratory distress evidenced by flaring of alae nasi, intercostal recession and tachypnoea (RR=52/min). He had asymmetrical chest movement with trachea deviation to the left and the apex beat at left 5th intercostal space, lateral to mid-clavicular line. There were hyperresonant percussion notes and absent breath sound on the entire right hemithorax. Other findings on examination were essentially normal. An initial assessment of kerosene poisoning complicated with right pneumothorax in an underweight child to rule out pulmonary tuberculosis was made. He received intravenous fluid – 1/5th normal saline in 4.3 percent dextrose (3/4 of maintainers), intravenous cefuroxime (100mg/kg in three divided doses) and intramuscular gentamycin (5mg/kg in three divided doses). An urgent chest radiograph reported by the radiologist revealed tension pneumothorax with lung collapse on the right hemithorax and mediastinal shift to the left (fig 1). Needle aspiration thoracocentesis with the needle connected to an improvised underwater seal was done, with the apparatus functioning as evidenced by bubbles of air seen through the water. Investigation results revealed pan-hypoelectrolytaemia - Na<sup>+</sup>128mmol/l, K<sup>+</sup>2.6mmol/l, Cl<sup>-</sup>90mmol/l and HCO<sub>3</sub><sup>-</sup>17mmol/l; urea 3.2mmol/l and creatinine 106mmol/l. Full blood count revealed PCV 30%, WBC 4.6 x 10<sup>9</sup>/L, neutrophils were 43%, lymphocytes 54%, eosinophil 3% and ESR was 150mm/hr. Mantoux test and HIV screening were negative.

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At approximately 24 hours after admission there were no air bubbles in the underwater seal and there was remarkable improvement in the degree of respiratory distress with respiratory rate of 40 breath/minute. Trachea returned to the mid-line and apex beat was at the left 4th intercostal space in the midclavicular line. A repeat chest radiograph revealed findings consistent with the clinical improvement. Other management instituted included electrolyte correction and nutritional rehabilitation. Parents were counsel and educated on childhood poisoning. He was discharged after completing one week of antibiotics. He was subsequently reviewed at two and four weeks after discharged in the nutritional clinic, he remained well with progressive weight gain.

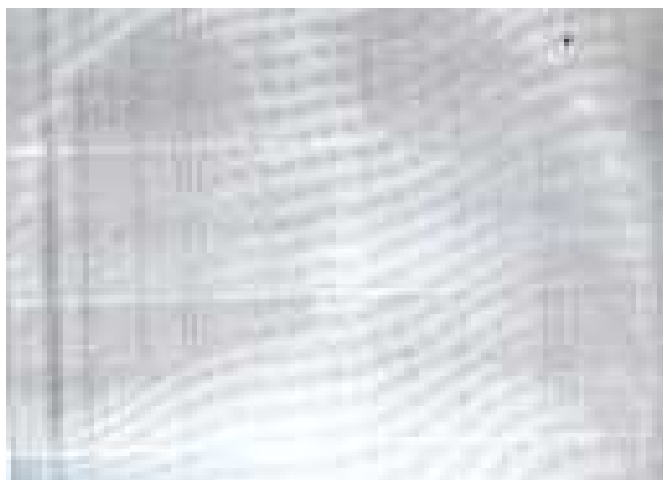


Fig 1:

### DISCUSSION

Accidental kerosene poisoning is common in childhood,<sup>1-4,6</sup> mostly in those aged five years and below.<sup>1,3</sup> The majority of cases come from low socio-economic class where illiteracy, poor housing and overcrowding is predominant. Lack of supervision, availability of kerosene in utensils ordinarily used for drinking and hot season are the major predisposing factors.<sup>1,3</sup> An initial home-based intervention aimed at inducing vomiting is usually seen.<sup>3,7</sup> A complication such as pneumothorax does occur with survival, few cases of which have been reported<sup>3,8,9</sup> but none from Nigeria where kerosene is used as a main source of energy.

Pneumothorax and other forms of air leak syndromes have been reported to complicate kerosene inhalation/aspiration.<sup>3,4,8</sup> Following poisoning, respiratory effects occur as a result of aspiration and ingestion leading to lipid pneumonitis which leads to increased transpulmonary pressure. Transpulmonary pressures that exceed the tensile strength of the noncartilaginous terminal airways and alveolar sacs can damage the respiratory epithelium. Loss of epithelial integrity permits air to enter the interstitium, causing pulmonary interstitial emphysema. Persistent elevated transpulmonary pressure facilitates the dissection of air toward the visceral pleural and/or hilum via the

peribronchial and perivascular spaces. Rupture of the pleural surface allows the adventitial air to decompress into the pleural space, causing pneumothorax. Other air leak syndromes also arise via this common mechanism.

Tension pneumothorax is a medical emergency; therefore every physician attending to a child with history of kerosene ingestion should always entertain possibility of this rare complication. Diagnosis of tension pneumothorax can be on clinical ground and confirmed by a chest x-ray film which shows a hyperlucent hemithorax, a separation of the visceral from the parietal pleural, flattening of diaphragm and mediastinal shift to the contralateral side.<sup>9</sup> This case presentation fits in the above description. Needle aspiration thoracentesis is a lifesaving bedside procedure which is both diagnostic and therapeutic in tension pneumothorax. Sometime the condition persists after this procedure and definitive chest tube drainage insertion is necessary.

In conclusion, since kerosene poisoning is an important cause of morbidity and potential mortality, methods of prevention should aim at enlightening the general public on basic methods of preventing childhood poisoning. The most effective preventive measure for poisoning is the safe storage of all drugs and chemical agents out of the reach of children. Storing chemicals such as kerosene in containers that normally contain food and beverage is extremely dangerous. Children are attracted to drink the contents in such bottles, different types of containers should be used instead. Parents should never induce vomiting rather they should take their wards to the nearest health centre. Physicians attending to such need to be meticulous so as to recognize such complications and institute appropriate management.

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## ERRATUM

In our previous publication: GM Ashir, AI Rabasa, MM Gofama, SM Yahaya: **Tension pneumothorax following an accidental kerosene poisoning: A case report.** Niger Med J, Oct-Dec. 2009, Vol 50(4): 93–96, the fourth author's address was wrongly printed.

The correct address of Dr. SM Yahaya should be: Department of Radiology, University of Maiduguri Teaching Hospital, Maiduguri, and not Community Medicine, Univeristy of Maiduguri Teaching Hospital, Maiduguri.

The errors are regretted.