CASE REPORT

Pneumothorax following inhalation of caustic soda fumes

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INTRODUCTION

Caustic soda (sodium hydroxide) in its granular form or in solution is widely available for use as a drain cleaner. Contact of the chemical with skin causes alkali burns and accidental ingestion can lead to oesophageal burns and subsequent stricturing (Lucian *et al.*, 1971). There are no reports of pneumothorax related to the use of sodium hydroxide. The authors report such a case.

CASE REPORT

A 17-year-old man was referred to the Accident and Emergency Department, Central Middlesex Hospital, London, England, by his General Practitioner with chest pain. Twelve hours previously, he mixed 98% sodium hydroxide granules with tap water in a bucket, according to the manufacturer's instructions, in order to clean the drains of the new family home. He accidentally leant over the bucket and inhaled the fumes produced by the solution.

Five minutes after the inhalation, he developed persistent pleuritic, right-sided chest pain and breathlessness. There was no personal or family history of pulmonary disease, and he had never smoked.

Physical abnormalities were confined to the chest. He had a respiratory rate of 30 a minute and signs consistent with a right-sided pneumothorax. Radiology confirmed a 40% pneumothorax with some mediastinal shift (Fig. 1).

He was treated with an underwater-seal chest drain. The right lung was fully expanded within 48 h and the drain was removed the following day. He has remained well since his discharge from hospital 3 months ago.

Fig. 1. Chest X-ray at presentation.

DISCUSSION

Sodium hydroxide granules, when added to tap water, undergo an exothermic reaction. The heat produced is sufficient to vaporise the sodium hydroxide solution, producing fumes.

The authors postulate that the inhaled sodium hydroxide fumes caused a burn in the respiratory mucosa. In order to cause a pneumothorax, the affected mucosa may have been in distal alveolus adjacent to the pleura or, alternatively, in a pre-existing bulla,

although there was no clinical or radiological evidence of pulmonary bullae when the lung had expanded.

At present, sodium hydroxide containers are marked with instructions to avoid contact with skin or ingestion of the contents. Avoidance of inhalation of fumes obtained from mixing sodium hydroxide granules with water should be added to these instructions.

REFERENCE

Lucian L., Leape M. D., Keith W., Ashcroft M. D., Dante G., Scorpelli M. D., Thomas M. & Holder M. D. (1971) Hazard to health: liquid lye. *New England Journal of Medicine* **284**, 578–81.