Case report

Thoracic empyema and pectoral abscess resulting from attempting suicide by injection of benzene in the pleural cavity

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ABSTRACT

Background: Exposure to hydrocarbon compounds, such as benzene may cause injury to several organ systems. It occurs accidentally or intentionally by ingestion, inhalation, cutaneous exposure and either subcutaneous injection or intravenous injection. We report a patient who injected benzene into the left hemithorax and secondly attempted to commit suicide with paracetamol.

Case presentation: A 52-year old man was admitted in the hospital because of an attempted suicide with an injection of benzene in the left hemithorax and ingestion of 50 tablets of 500 mg paracetamol. He developed a hydro-tension pneumothorax due to inflammatory pleural effusion as a reaction to intrathoracic benzene. Therefore a chest-tube was inserted. A few days later he developed an empyema in the left lung and secondly a pectoral abscess, which required surgical debridement. After surgery, recovered fully and after 23 days of hospitalisation he was discharged to a psychiatric care facility.

Conclusion: Hydrocarbon poisoning is either accidentally or intentionally and leads to thoracic pathology in rare cases. The most affected organ system is the respiratory system, and the cytotoxic effects of hydrocarbons can manifest as respiratory failure, pneumonitis and even acute respiratory distress syndrome (ARDS).

1. Background

Exposure to hydrocarbon compounds, such as benzene may cause injury to several organ systems. It occurs accidentally or intentionally by ingestion, inhalation, cutaneous exposure and either subcutaneous injection or intravenous injection [1]. Most poisoning cases with these compounds occur in children via ingestion; however inhalation poisoning is more common in young adults [1]. Petroleum and gasoline are the most common hydrocarbons that cause poisoning, but self-injection of these hydrocarbons is rare and are purposed by suicidal intent. The clinical manifestation of such injection can vary between respiratory distress, arrhythmia, soft tissue necrosis, thrombophlebitis, abscess formation and chronic bone injury [1–4]. In this article, we report a patient who injected benzene into the left hemithorax and consequently attempted to commit suicide with paracetamol.

2. Case report

A 52-year old man was admitted in a general hospital because of an attempted suicide (at 11 p.m. the night before) with an injection of benzene in the left hemithorax and ingestion of 50 tablets of 500 mg paracetamol. His medical history reports severe alcohol and nicotine abuse, chronic lower back pain and several transient ischaemic events (TIA). Initial evaluation at the Emergency Room revealed no signs of hemodynamic or respiratory instability e.g. the vital signs were tympanic temperature 37.5° Celsius; 90 beats per minute, respiratory rate of 14 breaths per minute, oxygen saturation of 98% and blood pressure of 166/140. Physical examination revealed two small injection marks on the left hemithorax without any subcutaneous swelling of emphysema. His blood work revealed a paracetamol level of 38 mg/L and no signs cardiac abnormalities (normal EKG and troponin levels). He was admitted to the Internal Medicine ward for intravenous treatment of his paracetamol intoxication with acetylcystein. On day 2, he developed a small pneumothorax at the left upper quadrant of the lung (Fig. 1). Due to a fever (temperature of 39.5° Celsius) and a tachycardia of 125 beats per minute, intravenous antibiotic treatment and prednisone (due to existing chemical pleuritis) was started. The day after the patient developed a respiratory insufficiency because of a hydro-pneumothorax (Fig. 2), therefore a chest tube was inserted in the left hemithorax and he was transferred to the Intensive Care Department for hemodynamic and respiratory monitoring and stabilisation. Secondly on the left hemithorax in the region of the pectoral muscle a subcutaneous abscess formed.
swelling of approximately 7 cm was seen for the first time. On the same day a pressure measurement of pectoral muscle compartment was performed and showed a normal intra-compartment pressure. In the next few days, the patient was stabilized and his clinical situation improved, therefore after two days he was transferred to the surgical ward. The following chest x-rays showed improvement of his pulmonary situation, with a small residual pneumothorax left (Fig. 3), therefore the chest tube was removed. Antibiotic treatment was continued intravenously. However in the following two days, the patient developed a fever (temperature of 38.5° Celsius) and his C-reactive protein levels increased from 208 to 304 mg/L. On day 9 (Fig. 4), the chest X-ray revealed a suspect lesion in the basal lobe of the left lung. A CT-scan showed an empyema in the left lung and secondly a pectoral abscess (Fig. 5). On day 11, a Video Assisted Thoracoscopic Surgical (VATS) procedure was performed to evacuate the empyema for the left hemi-thorax and the pectoral abscess was drained. Two chest tubes were inserted during the operation, one at the dorsal side and one at the ventral side. After a few days, our patient significantly improved and the chest tubes were removed. Finally after 23 days of hospitalisation the patient was recovered completely and was discharged to a psychiatric care facility.

3. Discussion

Hydrocarbon poisoning can lead to thoracic pathology in rare cases [5,6]. Hydrocarbons include three major groups; aliphatics, aromatics and halogenics. Aliphatic hydrocarbons are mostly associated with human poisoning [1]. Hydrocarbon poisoning occurs usually through inhalation or by percutaneous exposure, in rare cases these compounds are injected into the human. Hydrocarbons have detrimental cytotoxic effects and can cause injury to soft-tissues, fat and the nervous system. The most affected organ system is the respiratory system and the cytotoxic effects of hydrocarbons can manifest as respiratory failure, pneumonitis and even acute respiratory distress syndrome (ARDS) [1,7]. Subcutaneous injection of hydrocarbon compounds can cause swelling, redness, tenderness, crepitation and abscess formation according to the volume, the depth and the impregnation time after the injection [1–9].

Bronchopleural fistulas are also a frequent complication of intrathoracic injections of hydrocarbon compounds. In the report of Eskandarlou et al. [6] a similar case was presented and they needed frequent surgical procedures and debridements and eventually a segmentectomy and chest wall reconstruction due to the empyema and bronchopleural fistulas formed after such a intoxication attempt.

The initial evaluation of our patient showed no significant abnormalities besides the high paracetamol level in the blood work. However, the initial evaluation of a patient after intrathoracic injection of a chemical substance needs to be done with extreme caution because changes in the clinical situation can occur rapidly. Firstly, such an injection site should include inspection and palpation of the injection area, and secondly early local treatment in terms of incision, drainage and frequent debridement of necrotic tissue (if needed). Thirdly, irrespective of the injection area, always be cautious for symptoms of possible respiratory failure. When having any doubts about the clinical symptoms and/or presentation of the patient, do make an additional ultrasound and/or chest x-ray.

Fig. 1. Chest X-ray on day 2, showing a small pneumothorax at the left upper quadrant of the left lung.

Fig. 2. Chest X-ray on day 3, showing a hydro-tension pneumothorax of the left lung.

Fig. 3. Chest X-rays on day 4, 5 and 6, showing improvement of the pneumothorax.
Conflicts of interest

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.rmcr.2018.04.010.

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