Paraquat Poisoning: Case and Review of the Literature

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Introduction :

Paraquat (PQ) is a widely used herbicide. In the United States, PQ is restricted to professional users; however it is more widely available in developing countries. Since PQ is known to be highly toxic, ingestion as a mode of suicide is not uncommon. The toxic dose of as low as 10ml is enough to kill.

PQ ingestion can lead to gastrointestinal bleeding, and liver, kidney, lung, and heart failure. Free Radical generation and oxidative stress, is the main way by which PQ produces most damage. Supplementing Oxygen exacerbates and fuels free radical formation and further lung damage. Its related death can occur up to 30 days after ingestion. We present a fatal case of PQ poisoning, with a review of the literature.

Case Description:

A 39-year-old male from South America presented after ingesting 100 ml of PQ 10 days prior to current admission. He had several admissions over the past week in South America for excessive vomiting, pain on swallowing, and renal impairment. He was initially treated with IV fluids and charcoal and later with pantoprazole, ceftriaxone and metronidazole.

His condition improved and he was discharged home. Three days later he developed a fever, dry cough, shortness of breath, and tachypnea, at which time he travelled to the US to receive medical care.

On current arrival, the patient had oxygen saturation of 85% on NRBM and was intubated. Chest X-ray showed interstitial changes in the middle and lower zones bilaterally.

Patient had elevated BUN, creatinine, and leukocytosis. Empirical antibiotics, IV fluid, IV PPI and aggressive supportive measures were employed. Patient developed worsening infiltrates and had an increased oxygen requirement. He was treated with low tidal volume and high PEEP with the aim to decrease FIO2 and lung injury.

Due to patient's instability, transfer to an advanced center for hemoperfusion or ECMO was not possible. Hospital course was complicated by spontaneous pneumomediastinum and subcutaneous emphysema. Despite treatment, patient's condition continued to deteriorate and he passed away 8 days after admission.

Figures:

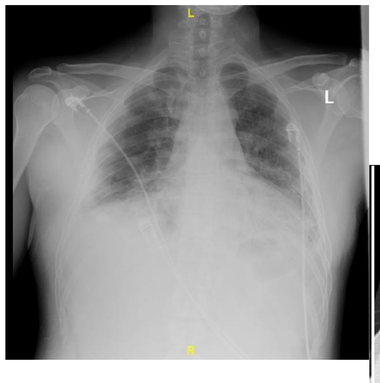

Fig.1: X-ray at presentation showing Interstitial changes at the mid to lower lung zones bilaterally

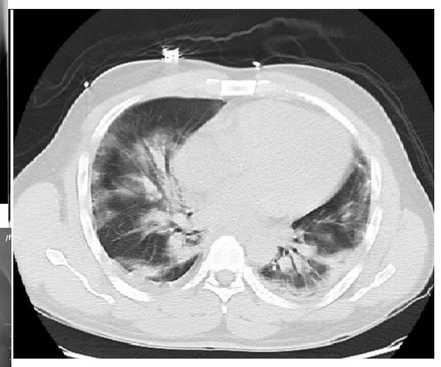

Fig.2: CT at presentation, consolidation with air bronchograms in the upper and lower Lobes. Bilateral infiltrates

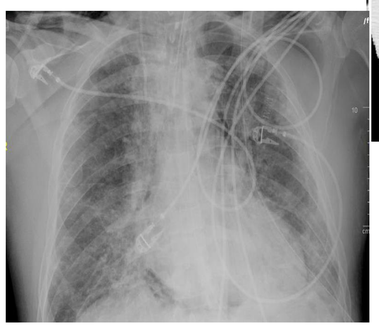

Fig.3: Final X-ray showing Pulmonary venous congestion, diffuse bilateral infiltrates, extensive soft tissue emphysema at the neck bases

Discussion:

Although restricted in the United States, PQ is easily accessible in developing countries. Studies have demonstrated that the classic picture of PQ ingestion starts with corrosive gastrointestinal injury plus kidney and respiratory failure leading to death. To date, there is no specific antidote for PQ poisoning.

Early recognition and management are imperative to avoid fatal lung complications. Plasma and urine concentrations are useful diagnostic procedures; therapy includes charcoal within the first hour of exposure and providing continuous renal replacement therapy in addition to hemoperfusion. Cyclophosphamide and solumedrol may have some benefit.

Mortality rates are higher in patients with acute kidney injury. Investigations with newer anti-fibrotic agents have recently been completed with the intention of reducing lung-injury due to PQ ingestion.

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