



Case report: Accidental injection of 30% hydrogen peroxide

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Abstract

Hydrogen peroxide (H₂O₂) is a colourless and odourless liquid with oxidant characteristics used for various purposes. Like other caustic substances, direct injuries may develop if H₂O₂ is swallowed and systemic air embolisms, Oedema and irritation may occur due to the resultant gaseous oxygen. This study discusses a patient who was detected with the presence of accidental injection of insulin syringe filled with 60 units of 30% hydrogen peroxide instead of insulin. As there is no specific antidote was available, the patient was provided with conservative management for the clinical conditions.

Keywords: hydrogen peroxide, insulin, Oedema.

Introduction

Hydrogen peroxide is relatively unstable and will rapidly decompose, through an exothermic reaction, into water and oxygen in the presence of alkali, metals and the enzyme catalyse, which is found in mucous membranes, liver, kidney, red blood cells and bone marrow ^[1].

Hydrogen peroxide is a commonly used oxidizing agent with a variety of uses depending on its concentration. Although historically it has been used for medicinal purposes such as wound irrigation, its toxic effects preclude its routine use. Ingestion of hydrogen peroxide is not an uncommon cause of poisoning, and results in morbidity through three main mechanisms: direct caustic injury, oxygen gas formation and lipid peroxidation ^[2].

Case report

A 66 year old man presented to the emergency department following the accidental injection of insulin syringe filled with 60 units of 30% hydrogen peroxide instead of insulin. The hydrogen peroxide was in a labelled container and it was accidentally mixed up by his granddaughter and was mistaken as insulin. Immediately after subcutaneously injected hydrogen peroxide there occurs oedema over left upper arm, erythema, stinging pain, thrombotic events over the injected site and unable to mobilise his left hand. No signs of respiratory illness, loss of consciousness and seizure. On receiving, patient was conscious, the pulse rate was 69 beats/minute, blood pressure 120/90 mmHg and SpO₂ 88% without oxygen. He was alcoholic and diabetic with regular management. Fine needle aspiration was done and incision and drainage was performed in the emergency department. He was treated with IV Ceftriaxone 1g BD for the next five days along with Tablet Ranitidine 150mg BD.

Discussion

There are several grades of hydrogen peroxide. Not all are safe for home use. Swallowing small amounts of household (3%) hydrogen peroxide usually is not dangerous. Household

hydrogen peroxide can be irritating to eyes and skin. Higher concentrations can cause burns. Food grade hydrogen peroxide is sometimes used as an alternative therapy for a variety of conditions: allergies, arthritis, HIV, diabetes, emphysema, lupus, shingles, warts, and irregular heart rhythms. Users are instructed to put a few drops of the concentrated hydrogen peroxide into a glass of water. Users often store the hydrogen peroxide in the refrigerator - and that's the dangerous part of this practice. Children and adults who swallowed concentrated hydrogen peroxide suffered severe injury, and in some cases died. Hydrogen peroxide and carbamide peroxide are used in tooth bleaching materials. Sherman SJ documented the potential risk of acute stroke caused by gas embolism following ingestion of concentrated (generally greater than 30%) hydrogen peroxide, while 3 % hydrogen peroxide ingestion has few serious sequelae. Previous authors have speculated that hyperbaric therapy may be beneficial ^[3].

H₂O₂, especially in concentrated solutions, is extremely toxic and was able to produce massive epidermal necrosis accompanied by extensive endothelial damage of the dermal blood vessels. Neither BP nor LP has shown similar properties at the dosages used. Although the toxicity of H₂O₂ could account for the lack of promoting efficiency of undiluted or highly concentrated H₂O₂ solutions, because of a destruction of initiated epidermal cells, this does not adequately explain the lack of promoting ability of the 1:5 diluted solution which does not produce extensive epidermal necrosis ^[4].

Conclusion

Hydrogen peroxide (H₂O₂) is a colourless, odourless liquid that is an oxidizing agent. Household products contain 3-5% H₂O₂, and are used as antiseptics and bleach for hair or clothes. Because household H₂O₂ looks very similar to water, is packaged without child resistant closures and is often poured into a cup before using, unintentional ingestions by children and adults are common. Unintentional ingestions of dilute (3-5%) household H₂O₂ products produce mild

toxicity: nausea, vomiting, abdominal pain and gastric distention. Most unintentional ingestions of 3-5% H₂O₂ may be managed at home with fluids and symptomatic care [5].

Medical care: Establish proper patient airway. Watch for signs of respiratory insufficiency and assist ventilations if necessary. Administer oxygen by non rebreather mask at 10 to 15 L/min. Monitor for pulmonary oedema and treat shock .For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline .Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution. Do not attempt to neutralize because of exothermic reaction.

Advanced care: Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious, severe pulmonary oedema or is in respiratory arrest. Early intubation, at the first sign of upper airway obstruction, may be necessary. Start an IV with D5W. Use lactated Ringer's if signs of hypovolemia are present. Use proparacaine hydrochloride to assist eye irrigation.

References

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