

trains were passing each other in a valley filled with gas. The explosion caused mostly thermal rather than mechanical injuries. More than 1,200 people were injured of whom one in five received lethal burns. Since emphasis was on life-saving operations, eye injuries were discovered and diagnosed two days after the accident.

We examined 473 patients, of whom 440 (89%) had 2–4 degree burns of the eyelids, 103 (22%) had 1–2 degree burns of conjunctiva, 10 (2%) had 2–3 degree corneal burns, five (0.01%) had penetrating eye wounds (2 of these had intraocular glass foreign bodies), and seven (0.014%) had eye contusion with brain injuries. Thus, eyelid burns prevailed, of which 69 patients (14.6%) had skin and cartilage necrosis with eyelid melting.

Conclusion: Eyelid burns are the most common injury in disasters caused by fire. Corneal burns and penetrating eye wounds and globe contusion make up a small part of the total injuries to the eyes. Therefore, ophthalmologists must be present at the stage of sorting and removing disaster victims from affected areas.

Keywords: burns; conjunctiva; cornea; explosions; eyelids; eyes; fire; foreign bodies; ophthalmology; Ufa

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Burn Disasters from a Propane Gas Explosion

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Introduction: Approximately 3,000 propane fires and explosions are reported yearly in the United States. More than 9% of these cases result in bodily injury, and mortality occurs in more than 7% of the injured. Most of the accidents seem to be due to a lack of knowledge regarding the handling of propane gas or liquid petroleum gas, which are low-cost and widely used fuel resources. A review of a major burn incident from a propane gas explosion in Kaohsiung, Taiwan, along with prevention strategies and warning systems are reported to help increase public awareness of the problems associated with propane gas.

Results: On 13 September 1997, a huge, fiery explosion occurred on the roadside in a residential area of Kaohsiung while workers for the gas company were replacing gas pipelines. First, the workers tried to clear the old gas pipelines by water irrigation through a drilled hole. After 15 minutes of water irrigation without smelling an obvious odor, they proceeded to cut the old pipelines. Subsequently, a heavy, garlicky odor profused suddenly. The workers telephoned the fire department for assistance, and two fire engines arrived to begin evacuation. At this moment, a huge, fiery explosion occurred that destroyed 18 houses and 92 vehicles. Moreover, there people died instantly and 24 people were injured severely.

In this incident, there were six persons with near 70% second degree burns, and nine people with second degree burns between 20% to 50% of their body surface area. The task was overwhelming for the burn units in the four hospitals around that area. Despite aggressive

treatment, more patients died later, and many others still needed reconstructive and rehabilitative therapy in both physical and emotional aspects.

Conclusion: The danger of a propane system cannot be overemphasized. Proper precautions should be taken in both an industrial and a household situation. The odor is not an adequate device for detection of this volatile gas. Other devices for gas detection should be applied and careful instructions for their use provided. This effort, in conjunction with the industry's enhanced safety inspection, rigid operation standards, and the ongoing educational efforts, might prevent deaths and injuries that currently are associated with propane gas.

Keywords: arsenic; cyanide; laboratory studies; poisoning; signs, clinical

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Primitive, But Practical: Stamping-Bellows for Artificial Ventilation

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In critical situations such as during an acute phase of a disaster, artificial ventilation may be needed for the patients with respiratory failure of any form. Practical problems, and so on. The use of a hand-squeezing bag like Ambu® can ventilate a patient well, but the use of the bag-valve mask precludes the application of any other resuscitative measures by the ventilator except ventilating the patient.

The authors have successfully applied the use of a stamping bellows to ventilate an anesthetized patient through an anesthesia machine. The method also is applicable without an anesthesia machine so long as inspiratory/expiratory one-way valves are included in the system. By connecting the bellows with disposable plastic, corrugated tubes and a T-connector to an Ambu bag that is used for its valves, artificial ventilation of a patient is possible.

Using bellows is by no means a new idea. In 1898, the American surgeon, Rudolph Matas, showed how to intubate and how to ventilate a patient with "Fell-O'Dwyer apparatus" using an operator's thumb as a valve.

Ventilation using a foot gives an operator free hands, and allows the operator the ability to perform other procedures while providing adequate ventilation. The authors will demonstrate the prototype and its use.

Keywords: artificial ventilation; bag-valve ventilation; bellows; foot ventilator; ventilation; ventilatory support