

Conclusion: Early treatment with intrapulmonary administration of a corticosteroid with a high anti-inflammatory potency significantly reduced the impairment of respiratory function after chlorine gas exposure. The method has to be evaluated further, but could be a very useful and easily available therapeutic alternative after toxic-gas exposure in mass-casualty situations.

62

Swimming Pool Heater Dysfunction: An Unusual Case of Carbon Monoxide Toxicity

Heller JL

Virginia Mason Hospital
Section of Emergency Medicine
Seattle, Washington, USA

During a large family gathering, 14 individuals, ages 7 months to 63 years, developed signs and symptoms compatible with carbon monoxide (CO) intoxication. All were evaluated at the referral hospitals, and then transferred for consideration of hyperbaric oxygen therapy (HBO).

At transfer, all were re-evaluated, and definitive criteria for HBO were reviewed. Seven patients underwent such therapy, and all patients recovered without sequelae.

Signs and symptoms of CO intoxication are discussed, criteria for HBO reviewed, and therapy protocols explained through the use of charts and graphs.

64

A Trial for Classifying a Large Number of Burn Victims in Case of Mass-Casualty Incident in France

Baux S,* Wasserman D**

* Centre des Brûles Hopital Saint-Antoine-Paris

** Centre des Brûles Hopital Cochin-Paris
Paris, France

During a catastrophe, a large number of burn victims from a mass-casualty incident imposes a problem of classification. When properly conducted, the use of triage criteria may save lives and minimize morbidity.

The main points for immediate evaluation are the following: the age, medical history, and known pathologies; the extent, depth, and site of the burns; inhalation injury; and associated traumatic lesions.

Four groups may be identified: severe burns; major burns; moderate burns; and minor burns.

The evaluation in situ, in most of the cases, generally may permit evacuation under the best conditions toward different medical facilities. These medical facilities already should have been prepared to receive these patients, according to certain modalities that already have been identified.

66

Burn Disasters: Role of the Fire Brigade Health Department in Forest Fires

Calatayud C, Georgopoulos C

Service Départemental d'Incendie
et de Secours des Alpes-Maritimes
Fire Department of France
France

Objective: To define the role and the tools of the medical personnel in order to ensure the safety of firefighters in forest fires.

Methods: 1) Description of the fire engines used in forest; 2) Specific characteristics of forest fires: topography, surface, development, duration, pathology; 3) Medical personnel: number of tools uses; and 4) Operational protocol.

Results: Fire of 24 August 1986 in the Alpes-Maritimes district: Surface area: 5,460 Hectares [21 sq mi]; Operational Means: 21 districts involved, 1,474 personnel, 252 fire engines; Pathology: 580 injuries: 171 trauma-related injuries; 29 deep burns, slight burns; 320 ophthalmologic injuries; 32 dehydration; and 26 digestive tract.

Summary: The medical department must be activated as soon as the firefighters are called to respond. The medical response must have mobile capability and have the necessary means to treat the variety of injuries encountered (trauma, burns, carbon monoxide, ophthalmologic). The medical response also must provide medical treatment to firefighters to ensure their good health and hygiene. The medical headquarters, in direct contact with the fire headquarters, must manage all medical personnel.

67

Use of Polymyxin-B Immobilized Fabric (PMX-D) for Burn Wound Dressing

Yamamoto Y,* Takahashi S,* Ninomiya N,* Matsui K,*
Kurokawa A,* Otsuka T,* Shoji H**

* Department of Emergency and Critical Care Medicine,
Nippon Medical School

** Toray Industries, Inc.
Tokyo, Japan

In 1976, Morrison reported the endotoxin neutralizing effect of Polymyxin-B (PMX). In 1982, Kodama et al successfully fixed PMX on α -chloroacetamide methylated acid polystyrene fiber by covalent bonding. Amino acid analysis revealed that the amount of PMX immobilized on the fiber was 3.7 mg/lg of fiber on average. An elastic fabric was developed (PMX-D) made of PMX immobilized fiber, and the following basic and clinical studies were performed to determine if this fabric could be used as dressing material for burn wound care.

1. SEPARATION OF PMX FROM PMX-D: PMX-D was irrigated by normal saline one to four times, and the concentration of separated PMX in the irrigated solution was measured using bacteriological method. Inhibition of bacterial growth by both irrigated solutions was not recognized.

2. **ANTIBACTERIAL EFFECT OF PMX-D:** Suspension of *E. coli* (ATCC 25922) in sterile normal saline in the concentration of 10^5 CFU/ml was prepared. Five ml of the suspension and PMX-D 0.25 g (2-3 cm in length) was incubated in a sterile 50 ml test tube at room temperature. PMX-free fiber was used as a control. After one hour, the number of bacteria in the test tube was 4×10^5 for control and 136×10^5 for PMX-D; in four hours it became 7×10^5 for control and zero for PMX-D.

3. **PMX-D SHEET FOR BURN WOUND DRESSING:** PMX-D fabric (10x20 cm sheet) was used clinically as dressing for five patients with scald and flame burn (SDB-DDB). When compared with Biobrane or porcine skin, the PMX-D sheet had superior antibacterial effect and protected the wound against secondary infection

69

Burn Treatment

Petit P,* Bouchard,* Fonrouge JM**

* Université de Lyon
Lyon, France

** Université de Bordeaux I, SAMU 71, MD, DEA,
Centre Hospitalier
Chalon S/Saone, France

Video Film

This film presents the risks and effects of burns to the skin. The authors present the first-aid and medication used in treatment of a burn patient; venous access; tracheal intubation; volume replacement rules; thermal protection; and ventilation rules.

This film represents an irreplaceable pedagogic document for physicians and for the training of emergency teams.

70

Immediate Assistance and First-Aid on the Spot in Fire-Disaster Education of the Public and Self-Sufficiency Training

Masellis M

Department of Plastic Surgery and Burns Therapy
Palermo, Italy

In the event of any kind of disaster, the moments immediately following its occurrence are, without any doubt, the most crucial. In persons suffering physical pain, their panic and anxiety about the fate of their near and dear ones create a state of psychological paralysis, a genuine state of shock. In other persons, these emotions provoke a feeling of pity and an impulse to try, at all costs, to help those who have been affected by the disaster.

The organization of rescue work, the arrival of rescue forces on the scene, and the operational phases inevitably take various hours. The distance, ways of access, the geographic features of the territory, the moment in time of the disasters,

whether day or night, all constitute decisive factors. Therefore, the management of immediate rescue work is the responsibility of operational forces in loco, i.e., the able population and, if there are any available, physicians and nurses. If the disaster has been caused by fire, the situation acquires specific characteristics. An educational program must systematically cover the following aspects:

Technical Aspects: An assessment of the extent of the damage that has been caused and of the behavior of the persons involved in the immediate post-disaster phase;

Clinical Aspects: An evolution and analysis of the number of burned persons, their age, associated lesions, and the number of dead; and

Operational Aspects: This provides for the realization of coordinates and efficient measures of first-aid care and assistance so as to prevent the damage suffered by the physical organism from causing irreversible lesions in vital organs and systems before more specialized medical care can be given.

73

Early Care of Victims Exposed to Fire and Smoke

Arturson, G

Burn Centre, Department of Plastic and Hand Surgery
University Hospital, Sweden

Inhalation injury is a dominant cause of mortality in thermally injured individuals. Smoke inhalation produces early airways constriction and mucosal edema. The resulting heavy work of breathing and stress response causes a marked increase in oxygen consumption. The particles in the smoke produce both large and small airways injury as well as focal atelectasis and alveolar edema. There is evidence of increased oxygen free radical activity after smoke inhalation with and without concomitant burn injury. It is also known that smoke exposure produces lipid peroxidation in both lung and systemic organs. The presence of lipid peroxidation corresponds with both increased lung injury and mortality.

The involvement of fire gases may cause oxygen depletion and intoxication by toxic gases produced by combustion or by pyrolysis of materials, mainly carbon dioxide, carbon monoxide, and cyanohydrin derivatives. The extreme gravity of this form of intoxication requires early diagnosis and emergency treatment initiated systematically on the spot, combining oxygen therapy and the administration of hydroxycobalamin.

A survey of 14 severe fire disasters (seven indoor and seven outdoor disasters) which occurred in different parts of the world between 1973 and 1990 showed results with implications for disaster planning. The outcome was related to the presence of smoke and poisonous compounds. In indoor fires those who failed to escape died very rapidly, within 2 to 3 minutes after the start of the fire, from a combination of hypoxia and inhalation of toxic chemicals. All kinds of preventative measures must be taken to avoid these kinds of disasters.