BURNS, INHALATION TOXOCOLOGY

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Organization of Rendering Medical Aid to Those Burned at Group Thermal Trauma in Kherson Region

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This presentation considers administrative items to be solved before and during emergency situations. A two-stage system of evacuation and treatment is utilized. The first stage is the catastrophe hot-bed (incident scene) and the district hospital; the second stage is the burn department. Diagrams of the scope of evacuation transport, triage, protocols for individual medical personnel and medical teams, and in-hospital triage are provided.

First Stage: At the incident scene, instead of using gauze bandages to protect the burn wound from ambient contamination, swaddling [loose-fitting] clothes or sheets affixed with adhesive tape may be substituted to allow faster on-scene treatment of burn wounds by medical personnel, so that more burn victims may receive care more quickly on-scene.

All victims must be evacuated from the incident scene to a location in the emergency department (Reception Room) where secondary triage can be accomplished. Burn victims only should be brought to the hospital if the hospital suggests transport there first. No distribution among hospital departments is allowed except for those victims with burns that require hospital intensive-care therapy and treatment to suppress anaerobic infection. On average, burn victims with superficial burns undergo a 15-day treatment period at the district hospital.

Second Stage: For specialized treatment in the second stage of treatment, burn patients are transferred to the burn department after initial recovery from shock, or after their general condition improves. This secondary treatment is applied to patients with severe burns, irrespective of the body area affected, especially second- and third-degree burns covering more than 30% of the body, or for children with burns over 10% of the body, patients with acute-phase respiratory burns, and those with compound burn trauma.

The implementation of these administrative measures, following the two-stage evacuation system, made it possible to use facilities and means of public health service more expediently, to decrease the number of errors during initial triage of victims, use of bandaging material more expediently, and to begin rendering qualified and special medical aid to burn victims more quickly following their injuries. These steps accurately fulfill the main principal of "catastrophe medicine" [Disaster Medicine] to do the utmost with a minimum use of energy and medical-service facilities.

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Critical Evaluation of Transportation of Burned Patients

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Introduction: Rendering first-aid and ensuring safe transportation are initial phases of therapeutic efforts in thermal injury. Both factors exert a significant influence on morbidity and mortality of burned subjects.
Methods: The means of transportation and the quality of first-aid measures were analyzed for 228 burn patients hospitalized at this department from 1 January 1986 to 31 December 1992, for the purpose of identifying shortcomings and errors.
Results: Forty-four patients were transported by emergency medical service (EMS) ambulance cars, 112 by ordinary ambulances, 51 by private cars, and 21 by other means. Adequate first-aid was provided only by EMS ambulance staff (one doctor, one nurse), with resuscitation continuing throughout the entire journey. Transportation by ordinary ambulances had numerous shortcomings: 1) no first-aid at the site of an accident; 2) no analgesia; 3) no intravenous fluids; and 4)no accompaniment. Secondary transports from other medical facilities also were flawed.
Conclusions: On the basis of this experience, it is recommended that all burn patients within a 30 km radius of a burn unit be transported directly to that facility by EMS ambulances. Patients from more distant places should be transported either by the EMS helicopter to the burn unit or to the nearest surgical facility where triage must be conducted to determine the need for and type of secondary transport.

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Fire Explosion Accident in a Greek Oil Refinery

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On 1 September 1992, Greece suffered the most severe industrial accident of modern times. Thirteen workers died (one on-site) and seven were injured after a fire explosion of petroleum-derivative leakage occurred in an oil refinery plant near Athens.

All patients suffered major burns and inhalation injuries and were transferred from the site of the accident to the Athens hospitals by ambulances, through heavy Athenian traffic. First-aid and intubation were carried out by the accident and emergency departments at the on-call hospitals. Later, all patients were transferred selectively to the burn unit beds,

mainly in Athens General Hospital and KAT Accident Hospital.

In less than two-and-one-half hours from the time of the accident, the use of burn resuscitation fluid formulas were commenced and, as a result, none of the patients died within the post-burn shock period. The main effort of the medical team was to maintain the respiratory function in most of the patients, since they all suffered from inhalation injuries. Despite early initiation of mechanical ventilation and pulmonary lavage, all patients of TBSA >70% died of acute respiratory distress syndrome (ARDS) and pulmonary complications.

The position of the workers within the plant at the time of the accident was proportional directly to the severity and outcome of the injuries. As the mapped diagram shows, all workers within the core of the explosion died, whereas those in the perimeter suffered less severe burns and eventually survived.

In conclusion, the combined effort of the NHS ambulances, the medial crush teams, the Athens Fire Brigade and Traffic Police forces and, last but not least, the medical and nursing staff of the Athens Burns Units, managed to transfer, resuscitate, and hospitalize burn victims from a major disaster.

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Smoke Inhalation in Deep Burns: An Algorithm to Predict the Severity of Lung Injury and Its Outcome

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Introduction: Smoke inhalation is a major factor in fire-related morbidity and mortality. The toxicity of smoke results from inhalation of irritants, toxic chemicals, and hypoxic gas mixtures.

Methods: Retrospective review was made of the charts of all patients admitted to this regional intensive care unit (RICU) with diagnoses of burns associated with smoke inhalation between May 1988 and February 1990, in order to determine parameters that would predict the severity of lung injury and its outcome.

Results: Data were collected retrospectively on 10 patients who were classified into two groups: five patients with acute respiratory distress syndrome (ARDS) and five patients without ARDS. They were analyzed for age, gender, BSA, bronchoscopic findings of smoke inhalation, immediate respiratory complications (aspiration, pneumothorax), need for immediate intubation, use of steroid therapy, and days in RICU. The results suggest that the percentage and degree of burns, as well as the level of bronchoscopic findings of smoke inhalation, are important determinants in the severity of the disease. The need for early intubation or the use of steroid therapy may not modify the outcome.

Conclusion: This algorithm may assist the physician in determining the steps of treatment in such complicated cases.

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The Clinical Spectrum of Accidental Inhalation of Chlorine Gas

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Introduction: On 10 June 1991, six tons of liquid chlorine leaked from a tank car through a ruptured pipeline. The chlorine cloud soon covered the plant and caused a worker's death. More than 500 nearby residents visited medical clinics for help during the three days following the incident.

Objective: To describe the clinical presentations of chlorine gas exposure on residents living near a chemical plant after an accidental release of chlorine.

Methods: The medical records of these patients were reviewed and the results of a self-answered questionnaire concerning the course of clinical presentation were analyzed.

Results: The major symptoms experienced in the first day after exposure were respiratory (90%), gastroenteral (68%), and eye (60%). Non-specific symptoms such as dizziness, weakness, and headache also were reported by most residents (76%). Most symptoms were relieved within six days. The 50% recovery time for eye symptoms was shortest (two days), followed by gastroenteral (3 days), and respiratory (4 days). There was a major inconsistency between medical records and self-reported symptoms in eye discomforts. No eye symptoms were recorded in the charts, however, 60% of the patients reported eye problems.

Conclusion: Acute exposure to chlorine gas among residents in an industrial accident on this scale might not result in severe health effects. A well-prepared disaster plan definitely will benefit residents living in close proximity to industrial parks.

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Nebulized Corticosteroid Improves Pulmonary Function After Chlorine Gas Exposure in Pigs

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Objective: To optimize the treatment after toxic-gas exposure and to evaluate an easily available therapeutic alternative in mass casualty situations.

Methods: Thirty-six pigs were exposed to a sublethal dose of chlorine gas and then observed for six hours during anaesthesia and mechanical ventilation. Twenty-six were given nebulized corticosteroids with a high local anti-inflammatory potency at different time intervals after the injury. Ten pigs served as a control group with no treatment. Changes in lung mechanics, gas exchange, and hemodynamics were followed over a six-hour observation period.

Results: Corticosteroid inhalation after chlorine gas exposure significantly reduced the impairment of respiratory function and stabilized hemodynamics. Early treatment improved the results.

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