

Session 2: Chemical, Biological, Radiological, and Nuclear

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Differentiated Tactical and Therapeutical Approach to Nerve Agents of the Same Chemical Class as a Result of Their Different Physical, Chemical, and Physiological Properties

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Background: Nerve agents are toxic substances which primarily cause an inhibition of the enzyme acetylcholinesterase (AChE). The varying chemical substances of the same class of nerve agents have different physical, chemical, and physiological properties, such as their signature aging half-life. Early specific chemical identification of these agents will impact triage and therapeutic measures.

Discussion: Nerve agents are derivatives of organophosphates (OP) with very specific physical, chemical, and pharmacological properties. Nerve agents are usually divided into the G series, such as sarin (GB), and V series, such as VX. Usually, these agents are absorbed by inhalation or by skin or mucosal contact, which will cause a certain toxidrome over time. Their differing solubility and vapor pressure determines their propensity for inhalative versus contact absorption. Knowledge of volatility, vapor pressure, and gas density will influence tactical consideration in triage and rescue efforts. Their different aging half-life has a major impact on whether specific and early antidote intervention with AChE enzyme-reactivating therapy is useful or whether patients will require ventilatory support. Early recognition of an epidemic toxidrome will help detect the presence of a certain toxin class. Early, readily available, mobile and highly specific chemical detection methods like GC/MS are pivotal elements in tactical rescue consideration, medical decision making, and resource allocation.

Conclusion: The rapid and specific chemical identification of individual toxic substances will guide and impact tactical rescue and medical decisions due to their different chemical, physical, and physiological profiles. Additionally, all healthcare and rescue personnel should be able to recognize toxidromes.

Keywords: nerve agents; organophosphates; toxidrome; toxin class; triage;

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Lessons Learned from Chemical Gas Leak at Esenboga Airport

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A package suspected of being contaminated with an NBC agent was found at the Ankara Esenboga Airport Cargo section on 10 February 2005. The Civil Defense was called on-site and responded with necessary equipment. Following decontamination, three people who been in contact with the suspicious package and another five people who had been in the room at the time of the contact were

dispatched to SSK Diskapi Hospital. The dispatches were organized under the coordination of the Ankara EMS. Quarantine preventions were undertaken at the Emergency Service. Biological and chemical analysis of the material inside the suspicious package was performed. Chemical and biological detector scanning was conducted. The end of quarantine was announced to the public.

Lessons learned from this incident include: For emergency incidents, a system should be established to transmit information to a higher level coordination center and to start the process depending on the responses received from this center. A communication map should be formed that is functional in meeting the needs of the center.

Contaminated people should not be transported from the scene to another place. Response teams should be prepared to enter a contaminated scene. Decontamination units should exist at the entrance to the Emergency Services. All people who have any contacts at any levels of the medical treatments of the incident and cases should be aware and trained and approach the incident seriously.

Keywords: chemical release; contamination; coordination; decontamination; precautions

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Comprehensive Disaster Medical System for Newly Emerging Threat of Nuclear Disaster in Korea

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Introduction: The medical response system against nuclear disaster in Korea usually is focused on the regions located near nuclear power reactors, but recently, the newly emerging threat of nuclear disaster should be considered, due to the rise of nuclear, biological, and chemical terrorism and the change of the international political situation. Researchers examined and recommended the new comprehensive disaster medical system for the newly emerging threat of nuclear disaster.

Methods: The national disaster response system and the Emergency Medical Services (EMS) for nuclear disaster were reviewed and data from the preliminary study regarding the nuclear emergency medical system around the nuclear power plant were reorganized based on a risk assessment method. A questionnaire survey was conducted for experts in disaster response and EMS regarding the threat of nuclear disaster.

Results and Discussion: The primary EMS around the nuclear plants was considered to be good, but problems during nights and holidays were identified. Some of these problems could result in many injured victims. The systems for decontamination in receiving facilities were insufficient. Medical teams were not well-equipped with personal protection devices. The new system is based on the assumption that a nuclear disaster could happen anywhere, in any situation. This includes the scenario of urban radiological material leakage, nuclear contamination from a neighboring region, or