72. DEVELOPMENT OF AN OPERATIONAL WATERBORNE WEAPONIZED CHEMICAL AGENT TRANSPORT MODELING CAPABILITY

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The fate of chemical warfare agents (CWAs) in aqueous environments is not well characterized. Limited physical and kinetic data are available for these chemicals in the open literature, partly due to their inherent lethality. As a result, the development of methods for determining the persistence and extent of impact for waterborne chemical agent releases is a significant challenge. In this study, a hydrolysis model was developed to track the fate of several critical CWAs. VX, sarin, soman, tabun, and cyclosarin modeling capabilities were developed for an instantaneous point source aqueous release. Hydrolysis products were tracked and the resulting change in pH was calculated for the local dispersive environment. Using this data, instantaneous hydrolysis rates were calculated. This framework was applied to assess the persistence and fate of the CWAs in different turbulent environments. From this hydrolysis model, estimates of the time and extent of lethality from an aqueous release can be made. Refinement to these estimates requires further investigation into the impact of potential catalysts on these chemicals. Enhanced understanding of equivalent acute percutaneous toxicity for solutions requires changes to current testing and estimation methods.

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73. NOVEL OPERATIONAL APPROACHES TO SUPPORT MEDICAL COUNTERMEASURE RESPONSE TO RADIOLOGICAL OR NERVE AGENT EVENTS

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Presentation will highlight two unique operational approaches developed by CDC to support the US Government,s rapid medical countermeasure response to radiological and nerve agent exposures ˆ Specifically new CDC,s DTPA Forward Placement Project and CHEMPACK program will be discussed and contrasted as will the planning efforts necessary to develop an optimized operational approach and integrate each of these countermeasures into a rapid medical response program whose success is dependent on collaboration of both National and local authorities.

Key Words/ Phrases: Medical Response, Radiological, Chemical, Operational Planning

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74. COMPARING THE THERAPEUTIC EFFICIENCY OF AMINOGUANIDINE AND 3-AMINOBENZAMIDE IN LUNG AND INTESTINE TOXICITY CAUSED BY NITROGEN MUSTARD IN RATS

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Introduction
Nitric oxide (NO) produced by inducible nitric oxide synthase (iNOS) and peroxynitrite are responsible for sulfur mustard (SM) induced toxicity. Since endogenous production of peroxynitrite is known to lead to poly(ADP-ribose) polymerase (PARP) activation and sometimes ultimately cell death, in this study, it was aimed to compare the therapeutic efficiencies of aminoguanidin (iNOS inhibitor) and 3-aminobenzamide (PARP inhibitor) in lung and intestine toxicity caused by nitrogen mustard in rats.

Material and methods
A total of 40 male sprague-dawley rats were divided into 4 groups. Group 1 served as control and given 2 ml saline, three groups received single dose of mechlorethamine (MEC) (3.5 mg/kg subcutaneously) with the same time intervals. Group 2 received MEC only, group 3 received selective iNOS inhibitor aminoguanidine (AG) (100 mg/kg i.p.) and, group 4 received PARP inhibitor 3-aminobenzamide (3-AB) (20 mg/kg i.p.).

Results
MEC injection resulted in severe lung toxicity with strong interstitial and alveolar edema, hemorrhage, emphysematous changes, Mild inflammatory cell infiltration and septal thickening. MEC injection also caused mucosal thinning, mild inflammatory cell infiltration, ischemic changes and multifocal, superficial ulcerations (erosions) in small intestine. In AG group, interstitial and alveolar edema, hemorrhage slightly reduced in lung comparing to MEC group. Inflammatory cell infiltration was minimal, septal thickening was similar to MEC group at densely edematous and hemorrhagical areas. In 3 AB group, edematous and hemorrhagic areas were very small, inflammatory cell infiltration was minimal and there were no densly densely edematous and hemorrhagical areas in lung. The results were better than AB group. In intestine, results of AG group were better than MEC group but worse than 3 AB group

Conclusion
These results suggest that both iNOS and PARP inhibitors are effective but PARP inhibitors may be more promising for treatment of SM induced early lung and intestinal toxicity

Key Words/ Phrases: mechlorethamine; lung, poly(ADP-ribose) polymerase, iNOS

Will not be presented

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75. MEDICAL MANAGEMENT OF RADIOLOGICAL ACCIDENTS IN NON-SPECIALIZED CLINICS: MISTAKES AND LESSONS

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In 1996-2002 three radiological accidents were developed in Georgia. There were some people injured in those accidents. During medical management of the injured some mistakes and errors were revealed both in diagnostics and scheme of the treatment. The goal of this article is to summarize medical management of the mentioned radiological accidents, to estimate reasons of mistakes and errors, to present the lessons drawn in result of Georgia radiological accidents. There was no clinic with specialized profile and experience. Accordingly due to having no relevant experience late diagnosis can be considered as the main error. It had direct influence on the patients' health and results of treatment.
Lessons to be drawn after analyzing Georgian radiological accidents: 1. informing medical staff about radiological injuries (pathogenesis, types, symptoms, clinical course, principles of treatment and etc.); 2. organization of trainings and meetings in non-specialized clinics or medical institutions for medical staff; 3. preparation of informational booklets and guidelines;

Key Words/ Phrases: radiation injury, radiation trauma, radiological accident, medical management of a radiological accident, radiological accidents in Georgia, mistakes and errors of medical management

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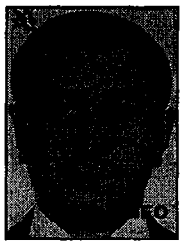

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76. DISPERSION ANALYSIS OF BIOTOXINS USING HPAC SOFTWARE

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Biotoxins are emerging threat agents produced by living organisms: bacteria, plants, or animals. Biotoxins are generally classified as cyanotoxins, hemotoxins, necrotoxins, neurotoxins, and cytotoxins. The application of classical biotoxins as weapons of terror has been realized because of extreme potency and lethality; ease of production, transport, and misuse; and the need for prolonged intensive care among affected persons. Recently, emerging biotoxins, such as ricin and T2 micotoxin have been clandestinely used by either terrorist groups or military combat operations. It is thus highly desirable to have a modeling system to simulate dispersions of biotoxins in a terrorist attack scenario in order to provide prompt technical support and casualty estimation to the first responders and military rescuers.
The Hazard Prediction and Assessment Capability (HPAC) automated software system provides the means to accurately predict the effects of hazardous material released into the atmosphere and its impact on civilian and military populations. The system uses integrated source terms, high-resolution weather forecasts and atmospheric transport & dispersion analyses to model hazard areas produced by military or terrorist incidents and industrial accidents.
We have successfully incorporated physical, chemical, epidemiological and biological characteristics of a variety of biotoxins into the HPAC system and have conducted numerous analyses for our emergency responders. The health effects caused by these hazards are closely reflected in HPAC output results.
