Acute Hydrofluoric Acid Mass Exposure: Experience in Teaching Hospitals

Soon-Joo Wang1, Seongyong Yoon2, Seokjoon Yoon3, Sangtae Jung4
1. Hallym University, Hwaseong/Republic of Korea
2. Soonchunhyang University, Gumi/Republic of Korea
3. Chemical Safety Research Institute, Seoul/Republic of Korea
4. Inje University, Busan/Republic of Korea

Study/Objective: The study objective is to share the experience of acute hydrofluoric acid mass exposure disaster in Korea, and to understand the response needed.

Background: There are many flat display panel and semiconductor factories in Korea, and hydrofluoric acid is an important chemical to make the panel and semiconductor. We investigated the clinical characteristics and demographics of patients who suffered from hydrofluoric acid chemical injury when mass exposure happens.

Methods: We retrospectively reviewed the medical records of patients who were exposed to hydrofluoric acid in a recent disaster in Korea, and who were seen at the emergency centers and ICUs in the university teaching hospitals. Multiple patients occurrence was included, and single patient occurrence was excluded.

Results: Seventy two patients out of 240 suffered from chemical burns, and the burn injuries of the remaining 168 could not be identified by the medical records - even though chemical exposure exists. A total of 72 hydrofluoric acid chemical injury patients were enrolled during the study period, and their mean age was 34. All the patients were accidentally injured by contact with the material, and none of them ingested the material. Only 28 patients wore appropriate protective equipment, and 24 underwent the water irrigation for more than 10 minutes. The most common exposure area was the hand and forearm. Less than 1% of all of the patients had their Total Body Surface (TBS) exposed to hydrofluoric acid. The mean time interval from calcium gluconate administration to pain relief was 28.6 hours.

Conclusion: When exposed to hydrofluoric acid, it was important to wear protective equipment and undergo massive water irrigation. After treatment, we concluded that administration of calcium gluconate and pain killers was successful in relieving pain. When mass exposure by hydrofluoric acid occurs, the severities of patients are various, and most of the patients were mild cases.
Let There be Light: Evaluating Decontamination Effectiveness during a Large-scale Simulation of a CBRNe Disaster

Esli Osmanliuu, Elene Khalilb, Ilana Bankc, Peter Nugusa, Margaret Ruddyd, Meredith Youngb
1. Pediatrics, Montreal Children’s Hospital, Montreal/QC/Canada
2. Pediatric Emergency Medicine, Montreal Children’s Hospital, Montreal/QC/Canada
3. Pediatric Emergency Medicine, Montreal Children’s Hospital, Montreal/Canada
4. Center For Medical Education, McGill University, Montreal/QC/Canada
5. Pediatric Intensive Care Unit, Montreal Children’s Hospital, Montreal/Canada
6. Department Of Medicine, McGill University, Montreal/QC/Canada

Study/Objective: Evaluate the effectiveness of patient decontamination during a disaster simulation using a visual tool.

Background: Chemical, biological, radiological, nuclear, and explosive (CBRNe) disasters have significant impact on affected populations. Health care workers (HCWs) must be prepared to execute a Disaster Plan in order to mitigate the negative health outcomes of such events. Decontamination constitutes a major component of disaster response. It optimizes health outcomes by limiting the incidence of secondary, contaminant-mediated injury. Maintaining a “locked down” of the decontaminated care area also reduces the risk of significant injury among exposed HCW and un-contaminated patients.

Methods: We organized the largest documented pediatric, hospital-wide, disaster simulation with 64 simulated patients and 97 HCW participants. After a brief training, participating HCWs executed the decontamination procedure for the first time. Liquid-based Glo Germ™ was randomly applied on different body areas, and recorded in 30 simulated patients. Using an ultraviolet light, two independent raters evaluated the total contaminated body surface area before and after decontamination. Simulated patients triaged as contaminated went through a sequence of undressing, followed by low-pressure, high-volume water and soap washing. Effectiveness of decontamination was calculated using a prepared standardized diagram of body surface area. Inter-rater reliability was assessed with a two-way, mixed consistency, average-measures, intra-class correlation coefficient (ICC) using SPSS.

Results: Undressing followed by washing led to an average 80.6% reduction in total body contamination (95% CI [73.6-87.6]). The ICC was 0.91 (95% CI [0.81-0.96]), indicating that decontamination was evaluated similarly between raters.

Conclusion: A liquid-based visual tool, used as a way to determine decontamination efficacy, is easily obtainable and innovative, and it can help establish verifiable decontamination standards in disaster literature. Undressing followed by washing led to an average 80.6% decrease in total body contamination.

Preparing a Tertiary Medical Center for a “Dirty-Bomb” Threat

Dagan Schwaartz1, Dorit Nagar2, Michal Hayag1, Tamar Rubinstein1
1. Emergency Preparndness, Rabin Medical Center, Petach-Tikva/Israel
2. Emergency Medicine, Rabin Medical Center, Petach-Tikva/Israel

Study/Objective: To review hospital preparations and drill design, of a tertiary medical center for a “dirty-bomb” scenario.

Background: Terror risk in general, and specifically the risk of terror related to a dirty bomb deployment has increased in recent years. Though the radiation injuries expected to occur in such a scenario are minor, in comparison to the conventional injuries, the psychological impact and the resulting area contamination are expected to be significant. The Israeli Ministry of Health guides and evaluates public hospitals preparedness measures, for a variety of conventional and none conventional scenarios; these include radiological threats. In April 2016 following 6 months of preparations, a “dirty-bomb” drill was conducted at the Beilinson tertiary medical center.

Methods: Descriptive analysis of the drill design and the preparatory actions.