

Results: Preparations included training radiation monitoring personnel, decontamination station's staff and training of ED, and ED reinforcement medical and ancillary staff. The main sites that were prepared and later drilled included: The decontamination site in which patients with possible radiologic contamination were decontaminated and received emergency care, The staff radiation clearance stations, The designated ED areas for care of potentially contaminated patients, The uncontaminated ED areas including areas for acute stress reaction victims, The ED imaging facilities and a designated OR for care of contaminated patients requiring surgical decontamination, or other urgent surgeries, in patients of whom routine external decontamination was insufficient. A total of 220 hospital employees participated in formal training sessions, preparatory internal drills and the final full scale drill.

Conclusion: The "dirty-bomb" scenario for a receiving hospital is challenging. It requires identification of radiological contamination in terror related bomb explosion victims, safely decontaminating the victims while minimizing staff exposure, and allowing prompt care of both conventional and radiation related injuries. A successful response also requires designated radiation detection and monitoring equipment, and vigorous training of a large proportion of the hospital's staff.

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A Cost-effective Prescription for Radiological Emergency Preparedness in Community Hospital Emergency Departments

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Study/Objective: To present a cost-effective approach for community hospital emergency department (CH-ED) personnel, trained at the first receiver operations level, to deploy a radiation screening, detection, and decontamination capability.

Background: Few CH-ED are prepared to treat victims with external radiation contamination who might be seen after a terrorist attack using a radiological dispersal device. Furthermore, hospital staff or facilities may become secondarily contaminated if such victims are not identified and decontaminated immediately upon arrival. Demonstration of five actionable objectives defines CH-ED hazmat/WMD preparedness: recognition/identification, notification, isolation, protection, and decontamination.

Methods: An operational system description which includes education, technical training, technology acquisition, and hazard-specific strategy and tactics is presented.

Results: Recognition (detection) requires a radiation area monitor (\$6,000) to alert CH-ED staff that external contamination exists, prior to patients entering the treatment area. Staff then activate the emergency operations plan, notify the authority handling jurisdiction emergency services, and initiate the hospital incident command system. Hospital emergency response team members protect themselves by donning appropriate PPE (universal precautions) commonly used in

CH-ED. Contaminated patients are isolated in the decontamination room or placed into a decontamination corridor and individually scanned for the exact location, type, and severity (current dose rate) of radiological contamination; using a hand-held pancake-type survey meter (\$600 each x 2) by mid-level providers (MLPs) who have completed the Advanced Hazmat Life Support course (\$500 each x 5). Decontamination is performed by nurses who have received in-house training using basic equipment and supplies which already exist in the decontamination room. Sustainment costs focus on educational needs and drills.

Conclusion: CH-ED capability to screen, detect, and decontaminate patients externally contaminated by radiation can be implemented for as little as 10 thousand US dollars and can be sustained for a fraction of the start-up cost.

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Comprehensive Disaster Medical System to Threat of Nuclear Emergency and Disaster

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Study/Objective: To develop a new comprehensive disaster medical system.

Background: The Government has developed the National Radiation EMS.

Methods: EMS for nuclear disasters were reviewed and re-organized.

Results: The primary emergency medical system around the nuclear plants was considered to be good, but there are problems during nights or holidays, for severe injury, and for many injured victims. The systems for decontamination in receiving facilities were not prepared enough. Personal protection devices for medical teams are less equipped. So, the new system is based on the assumption of nuclear disaster anywhere, any situation. It includes scenario of urban radiological material leakage, nuclear contamination from neighboring region, and mass panic state after perception of nuclear threat. National Radiation EMS developed a survey, an evaluation index of infrastructure, a prediction program for medical demand according to radiation disaster scenarios, and development plans. Evaluation indicators were composed of the seven domains: on-site response, ER, psychiatric support, radiation burn, bone marrow transplantation, internal contamination, and acute radiation syndrome. Each domain was measured by six grade levels. If 1,000 patients occur in the situation of combined disasters, according to the simulation analysis, the medical demand exceeds the capacity of the national radiation emergency medical response system. If 250 patients occur in case of a radioactivity leakage accident, it is expected to have some difficulty within the capacity of the regional response system, but it would be possible to respond within the national level.

Conclusion: The current level can be evaluated by comprehensive indicators and it is possible to plan the further development. For the adequate response to newly emerging threat of

various nuclear disaster, new concept and new comprehensive disaster medical system is necessary as well as effective utilization of pre-existing resources.

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The New Radiation Emergency Medical System in Japan: Lessons from the Fukushima Nuclear Plant Accident

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Study/Objective: Our aim was to clarify the new radiation emergency medical system in Japan, and the related activities at our hospital after the Fukushima No. 1 Nuclear Power Plant accident.

Background: The radiation accident at Fukushima No. 1 Nuclear Power Plant occurred on March 11, 2011. After this accident, the Japanese radiation medical system was in a state of confusion because health care workers had no knowledge about radiation emergencies and there was no appropriate organization to handle the control of a radiation disaster.

Methods: The Japanese government created two special radiation medical centers after the accident. First was a Radiation Disaster Medical Care and general Support Center comprised of four hospitals, with the role of coordinating the radiation emergency medical assistant teams, treatment of radiation exposure patients, and training of the hospital staff in Radiation Emergency Medicine (REM). Second was an Advanced Radiation Emergency Medical Support Center comprised of five hospitals with an advisory role in dispensing advice about professional REM dissymmetry for internal exposure, special training for professional research, and knowledge about REM. Our hospital was designated as a member of the above two centers, and we investigated our related activities.

Results: Since our designation, we have rebuilt the REM system in our hospital. Our achievements mainly include education, the development of training contents for activities in our hospital, and lectures on REM for the hospital staff including the doctors, nurses, radiologists, laboratory technicians, and office employees. Hands-on training and lectures were given on REM for medical students. We have also participated in REM training on the national and prefectural levels.

Conclusion: It is important for us to educate all of the health care workers in our hospital about radiation emergencies, and to train professional staff who are familiar with both general disaster medical care and radiation emergency medical treatment.

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Development and Effect of Personal Protective Equipment, Train-the-Trainer Program for Hospital Nurses

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Study/Objective: To develop a standardized Personal Protective Equipment (PPE), Train-the-Trainer Program for hospital nurses and to investigate the effect of the program.

Background: Despite the importance and perception of nurses in preparation for contaminated and/or infectious crisis, a standardized program to develop competencies is still lacking in Korea. Many hospitals train for protective equipment through large group lectures. Some institutions conduct hands-on training, but the educational contents and assessment tools are not standardized. PPE training is needed for all hospital personnel that has the potential to be in contact with patients. The number of hospital personnel mounts to more than 1,000, and it is very difficult to train everyone in a single place by few trained instructors. Therefore, it is important to train trainers to be competent in training PPE.

Methods: Staff from the Office of Infection Control, Office of Quality Improvement, Department of Emergency Medicine, Department of Nursing, and Center for Disaster Training gathered to develop a standardized training content and assessment tool. The tools were validated through the content validity index. After pilot testing, 44 nurses from five different departments were selected to become trainers. The educational intervention consisted of a 2-hour workshop. A pre- and post-survey was conducted to evaluate the differences in perception and performances in personal protection (paired t tests). The statistical level of significance was set at 0.05.

Results: Pre- and post-survey differences in perception for PPE knowledge and confidence were 5.3 to 8.4 and 5.3 to 8.3, respectively. Average performance points out of 10 was 9.1, and the observed points in the role of trainers was 9.0 out of 10. All 44 participants passed the minimum passing score of 90 percentage.

Conclusion: A standardized train-the-trainer program for PPE was successfully developed, and the newly trained trainers will be performing their roles as trainers for PPE.

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Middle East Respiratory Syndrome Coronavirus (MERS-CoV) Outbreak and National and Hospital Response in Korea

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Study/Objective: The study objective is to understand the MERS-CoV outbreak outside the Middle East.

Background: The outbreak of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) infection in the Republic of Korea started from the index case who developed fever after returning from the Middle East. He infected 26 cases in Hospital P, and consecutive nosocomial transmission proceeded throughout the nation. The author provided an epidemiologic description, the hospital response, and the first case of mortality from the outbreak.

Methods: Epidemiological research was performed by direct interview of the health care professionals, and reviewing medical records in the hospital where the first mortality occurs in Korea.