

Study/Objective: To explain the role of radiologists in unconventional CBRNE threats, highlighting the most critical, vital, and paramount role of military diagnostic imagers, being at the forefront of today's asymmetric warfare.

Background: Today, nation-states are engaged in 4th, 5th, and 6th generation warfare with non-state actors. The conventional and emerging CBRNE threats in this unconventional warfare pose significant challenges to both military and civilian medical planners and operators. This form of non-linear and unrestricted requires seamless and flawless communication, collaboration, and cooperation between the civil and military authorities of any nation state.

Methods: Introduction of First Generation linear Warfare (massed manpower). World War 1, 2nd Generation Warfare (massed firepower), and evolution of combat radiology. World War II, 3rd Generation Warfare, (armored-maneuver). Iraq and Afghanistan, 4th Generation Warfare, and imaging spectrum of trauma in non-linear battlefield. Radiologists as defenders in radiological, nuclear, and blast related threats in asymmetric 4th Generation warfare. Introduction of 5th Generation (unrestricted) Warfare, Inhalational Anthrax, and Radiology. Introduction of 6th Generation (distant no-contact systems versus systems warfare, cyber warfare, manipulation of sea-air-land-space and time), and 7th Generation (environmental) warfare.

Results: The civil and military medical responders previously trained in handling the casualties of 3rd Generation warfare have to start thinking out of the box, and steadfastly, and expeditiously adapt themselves to the asymmetric and unconventional CBRNE challenges of the modern day non-linear battlefield. The role of the diagnostic radiologist is more vital today than ever before.

Conclusion: The importance of the radiology community in preparation of emerging unconventional threats cannot be overstated. Whether it's a stolen industrial unshielded radiation source, hidden in a mall, a homemade IED, or detonation of a 1–10 Kiloton improvised nuclear device, radiology has to be, and will be, at the forefront of prevention, mitigation, preparation, response, and consequence management of such a catastrophe.

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Evaluation of Health Care Professionals Knowledge - Care of Patients with Radiological Exposure

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Study/Objective: Cross-sectional, multi-center study. To evaluate the knowledge of different groups of health care professionals concerning the priority of treatment and decontamination of critically ill patients exposed to cesium-137.

Background: Radiation injuries have been an infrequent occurrence; however, as careful as we may be, with the expanding use of radioactive materials in medicine, science, and industry have significantly increased the potential that under emergency conditions the medical professional may be presented with a patient who has been contaminated or exposed to radiation. Caesium-137 has been involved in several radiological accidents; the best-known case is the Goiania accident in 1987.

Methods: Cross-sectional, multi-center study. Research was carried out through a questionnaire with a fictional scenario about what to do if a patient contaminated arrived in shock at an emergency department. This questionnaire was administered to physicians, residents, medical students, nurses, nursing assistants, and technicians at three teaching hospitals; Clinicas's Hospital-Porto Alegre/Brazil, Kings County Hospital/SUNY Downstate Medical Center, Brooklyn, New York, and Northwestern Memorial Hospital, Chicago, Illinois. The results were analyzed. The difference was considered significant, $P < .05$.

Results: All 170 health care professionals responded to the question posed for the fictional scenario, and 29.41% of all responses was for "treatment." The responses in each group, for all three hospitals was: Emergency Physicians 46.42%, Pediatricians 38.46%, Medical Residents 20.93%, nurses 18.51%, technicians 27%, nursing assistants 58%, and medical students 33.33%. There was a significant difference between the total numbers of correct answers (ie, "treatment") of health professionals from hospitals groups.

Conclusion: Many health care professionals from three Hospitals did not respond correctly when posed with a question concerning patients with radiation exposure. Knowledge of radiation safety for patients and health care workers is limited, regardless of medical specialty. These findings emphasize the need for educational initiatives.

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Compare the Setup Time and Safety of Intraoperative (O ARM) with Traditional Intraoperative Fluoroscopy (C ARM), and Nursing Implications in Neurosurgery Over a 12 Month Period

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Study/Objective: To compare the setup time and safety of Intraoperative (O ARM) with traditional Intraoperative Fluoroscopy (C ARM) and nursing implications in Neurosurgery over a 12-month period.

Background: Radiation exposure remains a concern with traditional methods of Intraoperative (OARM) imaging's in spinal surgery. The use of OARM has been proposed for more accurate and efficient in spinal instrumentation. However, there are concerns with setup time and other nursing concerns.

Methods: Study Design: Comparative Study. Setting: Neurosurgery Operation Theater. Period of: January 1, 2015 to December 31, 2015 (12-month study). Data collected from Nurses Records: for the period January 1, 2015 to December 31, 2015.

The time duration for each case was collected separately from OARM and CARM cases.

Results: A total of operated cases under both C ARM and O ARM were 327 (Cervical-211, Dorsal-61, Lumbar-55). Mean time O-ARM required was x hours (range 2 hours 45 minutes to 12 hours). Mean time required for C-ARM was x hours (range 1 hour 10 minutes to 9 hours).

Conclusion: From the comparative study, both techniques resulted in accurate screw placement; images acquisition with the O ARM was consistently faster than with the C ARM. Additionally, radiation exposure to health care professionals (including nurses) was less with the O ARM.

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Diagnostic Imaging in Disasters: A Bibliometric Analysis

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Study/Objective: This study aims at analyzing recent articles depicting the roles of diagnostic imaging in disaster management.

Background: Disasters, natural or human-made, can cause significant mobility and mortality, leading to substantial economic and human loss. It is thus important to analyze how imaging has been utilized in disaster management and the lessons learned in order to develop future disaster management plans.

Methods: MEDLINE search was conducted via OVID to identify various natural and human-made disasters, and was restricted to articles published since 2000. Only original research articles depicting the roles of diagnostic imaging in the clinical diagnosis and management of patients in response to disasters were included. Review articles, meta-analysis, and studies without human subjects were excluded.

Results: A total of 67 articles were included in our analysis. The most studied disaster types were armed conflict (31 articles), earthquake (16 articles) and terrorist incident (10 articles). The most studied disasters were the Sichuan earthquake (China) in 2008 (13 articles), the War in Afghanistan, 2001-2014 (11 articles), and the Iraq War, 2003-2011 (7 articles). Countries producing the most articles were the United States of America (20 articles), People's Republic of China (16 articles), and the United Kingdom (6 articles). Thirty-three first authors were affiliated with the Radiology department (49.3%), and 2 affiliated with Nuclear Medicine (3.0%). Articles were published in 50 journals, including 19 Radiology journals and 1 Nuclear Medicine journal. Fifty-seven studies were retrospective (85.1%), and 10 studies were prospective (14.9%). Computed tomography (CT) was the most utilized modality (51.0%), followed by conventional radiography (25.5%) and ultrasound (16.7%). A list of the 20 most cited articles was also compiled.

Conclusion: Our results offer important insight into the roles of diagnostic imaging in disaster management and could

help guide future research in development of disaster management plans.

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Comparison between Two-Point and Three-Point Compression Ultrasound for the Diagnosis of Deep Vein Thrombosis

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Study/Objective: To examine the sensitivity and specificity of Two-Point Compression (2PLCT) versus Three Point Compression (3PLCT) ultrasound test, for the diagnosis of lower limb Deep Vein Thrombosis (DVT). Both tests would then be compared to Duplex ultrasound - the gold standard test.

Background: DVT is a major cause of morbidity and mortality, and a frequent cause of admission in emergency departments (EDs). Although the ultimate gold standard for diagnosis is Focused Duplex Compression test (FDCU) conducted by a radiologist; the current test for diagnosis of DVT in the emergency department (ED) is a compression ultrasound. To date no comparison has been made between the two and three compression point ultrasound and FDCU.

Methods: A prospective diagnostic study of patients coming to the ED suspected of having DVT. The ED physician performed the two and three compression tests, and then the patient was sent to radiology for a comprehensive FDCU. Sensitivity, specificity, Positive Likelihood Ratio (+LR), Negative Likelihood Ratio (-LR), Positive Predictive Value (PPV), Negative Predictive Value (NPV) were calculated.

Results: There were 200 patients admitted to the ED with DVT suspicion enrolled. Diagnosis of DVT was made by FDCU in 46/200 (23%) patients. Common femoral vein and popliteal vein were the most common sites (25/80 (31.2%). The 2plct diagnosed 43/46 patients with DVT and was falsely positive in 2/152. The 3plct diagnosed 45/46 patients with DVT and was falsely positive in 3/151. The sensitivity and specificity of 2PCL was 93.48%, 98.7%, respectively. The sensitivity and specificity of 3PCL were 97.83%, 98.05%, respectively.

Conclusion: The 3PLCT is superior to 2PLCT for diagnosis of lower limb DVT and both highly correlate to the results of the FDCU exam.

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Rad-Aid UTHealth Houston Chapter, in Morocco, 2017 Project

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