Building Radiology Residents’ Confidence in Managing Contrast Reactions: The Navy’s First Ever High-Fidelity Contrast Reaction Simulations

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Background

Intravenous contrast is administered to our patients countless times throughout the day, typically without event. However, although rare, adverse reactions to contrast media do occur and can be life threatening. Radiology residents have little to no experience in identifying and managing such reactions, but they are likely the first ones to be notified and arrive on scene. The goal of this project was to integrate simulation training to focus not only on knowledge, but also enhance residents’ comfort level in managing contrast reactions.

The overarching principal is building a Culture of Safety within the Radiology Department through educating trainees, staff, and technologists on methods to reduce harm to the patient. Additionally, teamwork is promoted as simulations are performed in a group setting, a rarity in the realm of radiology. This patient-centered initiative succeeds in educating providers and building their comfort level so that the standard of care may be provided safely and efficiently.

In partnership with the Simulation center, we created our Radiology Department’s first ever High-Fidelity Contrast Reaction Simulation, in which three scenario algorithms were created to simulate real-life adverse contrast reactions. Learners were first given a short brief on potential reactions, and how to identify and respond to such patient presentations. They were then separated into three groups, rotating through each simulation. The simulations ranged from mild to severe reactions, with the latter evolving into a full code.

During the simulations, the residents were challenged to interpret vitals, perform physical examinations, and determine next steps and management. The addition of bronchospasm reaction deliberately extends beyond the ACLS algorithm to challenge learners to identify a reaction that is more specific to contrast reactions, and may occur with asthmatics, particularly children.

Each scenario was followed by a discussion emphasizing the salient points of the specific reaction, its safe management, and what could be done going forward to enhance overall comfort level.

Individually Designed Simulation Algorithms

- Objective
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- Methods
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- Results
  Rather than test on specific treatments which are generally looked up and consulted during a live event, our algorithms were dedicated to specific patient care steps and the post-simulation assessment focused on comfort level and confidence.

  Using a 10-point scale, participants were asked several questions surveying their comfort and knowledge level regarding the identification and management of contrast reactions as demonstrated below. All measures yielded statistically significant improvements. Prior to the simulation, the average was 4.3 out of 10. After the simulation, the average was 8.3 out of 10!

Discussion

Reactions to contrast media are uncommon but do happen, and often the radiology resident is the first physician to assess the patient. Acting out the management of such reactions is more effective than reading how to do so, and this simulation proved to be a useful endeavor in building the residents’ competency. Moreover, it encouraged teamwork within a group of residents that are more accustomed to operating alone.

Our intention is to continue this simulation with future classes, and expand the participation to staff radiologists and technologists, all of whom may be the first provider in saving an anaphylactic patient’s life.

If you are interested in integrating this simulation training into your program and/or department, please contact LCDR DeMarco at kara.m.demarco2.mil@health.mil as we are happy to share algorithms and methodology.

Reference: ACR Manual on Contrast Media. ACR Committee on Drugs and Contrast Media, 2022.

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