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Authors

Pourmand, A
Shokoohi, H
Armstrong, P

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Pourmand A, Shokoohi H, Armstrong P/George Washington University, Washington, DC

Background: Accurate identification of intra-abdominal free air consistent with a critical illness will prompt an early surgical intervention with an improved patient outcome. Historically, plain radiography has been used to diagnosis free air in the peritoneum, but the lack of sensitivity, as low as 38-46%, reduces its utility. CT is a very sensitive for free air, but can be very time-consuming, and utilizes an even greater degree of ionizing radiation. With current widespread use of bedside ultrasound (US) in patients with abdominal pain, it is increasingly likely that patients presenting with an acute abdomen will have a bedside ultrasound performed by an emergency physician (EP) or surgeon as part of their evaluation. In this project we present an interactive online Case Based Reasoning (CBR) module for the training of medical students and residents through: increasing sensitivity of diagnosing free air, decreasing complications of CT scans, and decreasing miss rate by detecting cases in patients who might otherwise not receive imaging.

Methods: The learners will be randomized to four cohort groups (multimedia-based training, practical training, combination training using both multimedia-based + practical training, no training [control group]).

Multimedia-based training is composed of illustrations of pneumoperitneum and methods of ultrasound identification of a perforated viscus. This is an interactive multimedia module that consists of audio, bedside ultrasound video capture, and also combines animation with bulleted learning points. Participants will be measured based upon 1) Ability to execute after multimedia-based training, 2) Ability to execute after practical training, 3) Learner-s knowledge retention, 4) Comfort level applying concepts, and 5) General satisfaction.

Future direction: Upon completion of module, it will be available free online for:

1) Medical Student education
2) Medical Resident education
3) Continuing medical education