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Undergraduate radiology in low- and middle-income countries (LMICs)

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Category: Other

Purpose: LMICs have limited access to the undergraduate educational resources of more developed countries. The Global Medical Education Collaborative (gmecollab.org) provides virtual teaching to LMICs. We conducted a needs assessment of our students to gauge radiology teaching.

Methods and materials: An online survey with subjective questions and a 21-question objective test were created. Responses were collected over two months and analysed.

Results: 75% (n=45) of active students responded, from years two to six across ten LMICs. Students reported learning common systematic interpretation (n=37) and common pathology (n=34) on chest radiographs (CXR) and selecting appropriate imaging (n=34). The median composite confidence score of interpretation of radiographs, ultrasound and computed tomography (CT) was 2 (‘slightly confident’) on a five-point Likert scale, with the highest score for CXR interpretation [3, ‘somewhat confident’]. The mean test score was 38% (pass mark 50%). Questions on selecting imaging were poorly answered (22%). A positive correlation existed between confidence score and test score (r coefficient 0.3, 0.04, 0.58 95% CI, p<0.05), though not with student year.

Conclusion: This is the first formal assessment of LMIC undergraduate radiology education. All respondents had radiology exposure but confidence interpreting most modalities was low. Test performance was poor, showing further teaching is vital, even on commonly taught areas (CXR interpretation and selecting imaging). Students need involvement in curriculum development, as the correlation between confidence and test scores implies awareness of their learning needs. From our data, a focus on modality selection and systematic interpretation will be useful for any intervention.

Diagnostic accuracy of chest X-ray for diagnosis of COVID-19

Authors: Chukwuemeka Igwe, Mohammed Nabi, Mohamed Nasr, Hassan Mahmoud, Ali Abougazia, Jayant Vanjari, Constantine Fragkoulakis, Susan Geary

Category: Other

Purpose: To identify the diagnostic accuracy of chest X-ray for diagnosis of COVID-19.

Methods and materials: A retrospective analysis of electronic patient records from radiology picture archiving communications system (PACS) and integrated clinical environment (ICE) databases at Kings Mill Hospital. We identified chest radiographs of 119 patients who presented and tested positive for reverse transcriptase polymerase chain reaction (RT-PCR) results were recorded. One observer scored CXRs for the interclass correlation coefficient (ICC) for intra-observer agreement was 0.99 (0.98–0.99), while the coefficient of variation (CV) was 5%. The ICC for the inter-observer agreement was 0.89 (0.8–0.934) and CV was 17%. For test-retest repeatability, the ICC was 0.916 (0.85–0.95) and CV 14.5%. ICCs were similar between focal lesions (0.83) and diffuse lesions (0.80), while CVs were 12% and 19% respectively.

Conclusion: This is the first study to our knowledge to assess the repeatability of apparent diffusion coefficient (ADC) measurements of myeloma lesions using test-retest of diffusion-weighted imaging of the whole-body magnetic resonance imaging (MRI) of myeloma lesions using 3T-MRI. The Global Medical Education Collaborative (gmecollab.org) provides virtual teaching to LMICs. We conducted a needs assessment of our students to gauge radiology teaching.

Methods and materials: An online survey with subjective questions and a 21-question objective test were created. Responses were collected over two months and analysed.

Results: 47 regions of interest were identified (23 focal lesions and 24 diffuse lesions) through different bed positions (pelvis=6, thorax=5, head and neck=1). The interclass correlation coefficient (ICC) for intra-observer agreement was 0.99 (0.98–0.99), while the coefficient of variation (CV) was 5%. The ICC for the inter-observer agreement was 0.89 (0.8–0.934) and CV was 17%. For test-retest repeatability, the ICC was 0.916 (0.85–0.95) and CV 14.5%. ICCs were similar between focal lesions (0.83) and diffuse lesions (0.80), while CVs were 12% and 19% respectively.

Conclusion: ADC measurements of diffuse disease and focal lesions in patients with multiple myeloma are repeatable and reproducible. This supports future research of the role of ADC measurements as a potential objective tool in the assessment of disease status, response to interventions and prognosis in multiple myeloma patients.

Incidence of indeterminate CTPA examinations during first wave of COVID-19 pandemic in a tertiary centre

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Category: Thoracic

Purpose: To compare the incidence of indeterminate computed tomography pulmonary angiograms (CTPA) between COVID-19 and pre-pandemic periods.

Methods and materials: Consecutive CTPAs from emergency/inpatient settings were evaluated in two periods: from 1 March 2019 to 15 April 2019 and from 1 March 2020 to 15 April 2020. Positive SARS-CoV-2 reverse transcriptase polymerase chain reaction (RT-PCR) results were recorded. One observer scored CTPAs for presence/absence of pulmonary embolism (PE), motion artifact and attenuation of the main pulmonary artery (MPA). Motion artifact was recorded when it was deemed detrimental to diagnostic accuracy. A Pearson Chi-squared test was performed to compare motion artifact in COVID-19 versus non-COVID-19 groups.

Results: In the pre-pandemic period, there were 158 CTPAs (n=158, 60 male, median age=59). 17% had PE (n=27/158). Motion artifact and inadequate contrast enhancement were documented in 11.4% and 12% respectively. In the pandemic period, there were 238 CTPAs (n=238, 122 male, median age=57). 47.1% had positive PCR tests. 25.6% had PE. Motion artifact and inadequate contrast opacification were recorded in 39.9% and 5.9% respectively.

Conclusion: There was high demand for CTPAs with a higher incidence of PE during the COVID-19 pandemic. Acquiring diagnostic CTPAs in severe COVID-19 situations can be challenging and the high incidence of indeterminate CTPAs