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Maintaining Training with Self-Ultrasound During COVID-19

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Dear Professor Dunnick,

We read with interest the article "COVID-19 Impact on Well-Being and Education in Radiology Residencies: A Survey of the Association of Program Directors in Radiology" published in June 2020 describing the impact of COVID-19 on radiology education (1). Like many radiology departments worldwide (2–4), our department has also converted to using webinars and video platforms for teaching purposes. In addition, we have tried using self-ultrasound to maintain ultrasound training for our radiology residents and hope to share our experience with this aspect of radiology training.

COVID-19 pandemic disrupted the training of radiology residents with the requirement to minimize human contact, particularly ultrasound training which is usually conducted with patients. Self-ultrasound was introduced to maintain ultrasound training during this period, using ultrasound machines already available in the radiology department. Ultrasound rooms were available for this as non-urgent ultrasound scans had been postponed on account of the COVID-19 situation.

A list of body parts of the human body to be imaged was supplied for the resident to scan, including bowel (pylorus, appendix, and terminal ileum), colour Doppler imaging of vessels (abdominal aorta, renal vessels, coeliac trunk, superior mesenteric artery, carotid artery, and internal jugular vein), neck ultrasound (hyoid bone, thyroid gland, salivary glands, and cervical lymph nodes), and musculoskeletal ultrasound (sternocleidomastoid muscle, tendon, and nerve). Structures were chosen as these structures are encountered in regular practice and the feasibility of these structures to be imaged on self-ultrasound had been established by a senior pediatric radiologist on herself. Scans were performed using clinical ultrasound machine (EPIQ 7, Philips Healthcare, Bothell, Washington) with the low frequency 1–5 MHz convex transducer (C5-1) used to obtain images of the abdominal and pelvic structures and the high frequency 5–18 MHz linear transducer (L18-5) used to image superficial structures.

Ultrasound assessment scores of current residents exposed to self-ultrasound were compared to the previous batch of residents who were not exposed to self-ultrasound. Both batches of residents had undergone department's ultrasound orientation at the start of the posting and were assessed at baseline and mid posting across three ultrasound domains (scan competency, making a diagnosis, and patient communication) by senior sonographers. For each domain, residents were scored on a scale of 0–5 with 5 indicating excellent performance. All residents gave signed consent for the data to be used for education and research purposes and institute review board approval was not required.

Current and previous residents were similar in terms of gender distribution and years of radiology experience. Current residents had lower ultrasound scores across all three components at baseline (2.0/5.0 for scan competency, 2.6/5.0 for making a diagnosis, and 2.6/5.0 for patient communication) compared to previous group (who scored 2.8/5.0, 2.9/5.0, and 3.6/5.0 respectively at baseline). Scores of current residents improved by mid posting (to 3.1/5.0, 3.1/5.0, and 3.2/5.0 respectively compared to the previous group's mid posting scores of 3.0/5.0, 3.1/5.0, and 3.7/5.0) and showed no statistical difference from the previous batch at mid posting ($p > 0.06$).

Self-ultrasound sessions can be used to maintain ultrasound training during periods requiring reduced human interaction. The range of body structures assigned for self-ultrasound allows residents to be exposed to a variety of human anatomy and can highlight areas of deficiency residents may have, serving as a useful method of objective assessment of competency and identification of weakness as ultrasound simulators have been proposed to do (5). The advantage of self-ultrasound over a simulator is that the residents get to also experience what is requested of the patient during ultrasound such as holding breath to obtain ultrasound images free from motion artefact and maintaining a full urinary bladder for ultrasound of pelvic structures and can help residents empathize with their patients. No additional resources are required as radiology departments doing ultrasound teaching are already equipped with ultrasound machines. However, there is limited exposure to significant pathology with self-ultrasound and it supplements rather than replaces the regular ultrasound training program. We plan to incorporate self-ultrasound into our teaching curriculum even after the restriction on human interaction has been lifted. Radiology departments providing ultrasound training may also wish to consider incorporating self-ultrasound into their training program.

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