3D system costs limit access. Low-cost point-of-care 3D ultrasound (POC 3DUS) can augment any 2D ultrasound. This system previously had near-perfect agreement for fetal measurements between novice and expert operators. We hypothesized that carotid assessment would not differ between novice-acquired 3DUS interpreted by novices and experts and CT angiography (CTA) interpreted by radiologists.

Methods: We adhered to STARD criteria. Enrollment was by prospective convenience sample at a single medical center; any patient with recent/upcoming head and neck CTA was eligible. 2D B mode US acquisitions used a linear probe coupled to a screen capture device or smartphone, plus an orientation sensor and 3D reconstruction software. Scans were displayed as 2D stacks and intersecting cardinal planes (Figure). 3DUS were interpreted by medical students (novice), US fellowship trained emergency physicians, and radiologists (expert). CTAs were interpreted by neuroradiologists. Readers described NASCET stenosis, plaque, intimal-medial thickness, and minimum luminal cross-sectional area. Inter-reader reliability was measured by intraclass correlation coefficient (ICC)/kappa. We determined a sample size of 50 subjects for ICC 0.7 (alpha 0.05, power 0.8) and kappa 0.8. 3DUS sensitivity/specificity/LRs were estimated with CTA as the reference standard. Anonymous patient satisfaction surveys were administered.

Results: Due to COVID-19, enrollment ended after 30 subjects (144 3DUS, 33 CTAs). Of the 60 arteries imaged, 21 had plaque on clinical CTA interpretation. Analysis is still in process. Mean 3DUS acquisition and reconstruction times were 13.1 sec (median 12.7, IQR 9.1-17.3) and 7.9 sec (med 8.0, IQR 5.0-10.3). Mean 3DUS interpretation time was 3m, 52s (med 3:06, IQR 2:14-4:49) for the first 497 3DUS reads. 13 patient surveys were completed. Mean subject willingness to repeat 3DUS was 8.1/10 (med 10, IQR 6.1-10). 2 subjects reported increased discomfort during the exam (mean change 0, med 0, IQR 0-0). 9 of 11 (81.8%) perceived a shorter scan time for 3DUS than for CTA, MRA, and/or 2DUS (2 declined to answer). CTA inter-reader agreement on plaque presence is 11/14 (0.79, 95% CI 0.52-0.92). Expert interpretations of the first 120 3DUS agreed on 55 (0.45, 95% CI 0.37-0.55), disagreed on 35 (0.29, 95% CI 0.22-0.38), and one or both readers were "unsure" on 30 (0.25, 95% CI 0.18-0.33). Of 90 3DUS where both readers answered with certainty, there was 61% raw agreement (95% CI 0.51-0.71). For the first 264 expert 3DUS interpretations, sensitivity is 0.77 (95% CI 0.66-0.87), specificity 0.59 (95% CI 0.50-0.67), +LR 0.47, -LR 0.84, using the original CTA read as reference standard (excluding 42 "unsure").

Conclusion: POC 3DUS is time-efficient with good patient satisfaction and promising sensitivity. Potential applications include initial diagnostic evaluation for neurologic symptoms or carotid bruit in low-resource settings.

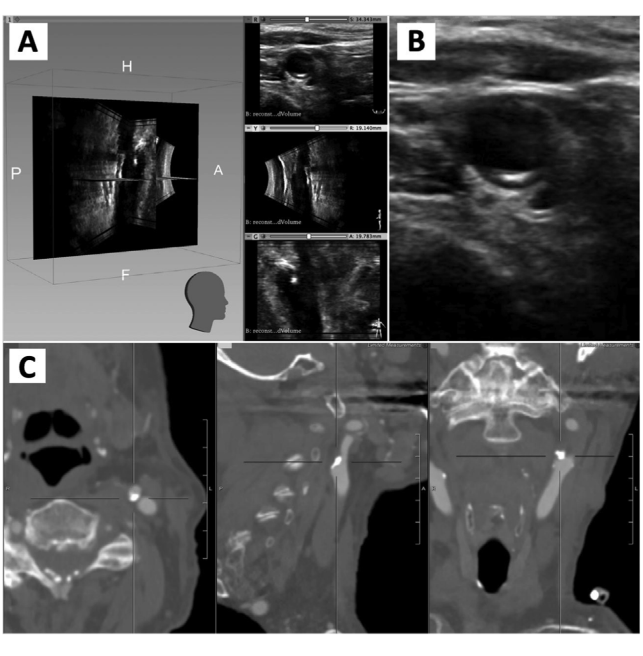

Figure. A: 3DUS with axial, sagittal, and coronal 2D images. B: Source 2DUS. C: Axial, sagittal, and coronal CTA.

167 Changes in Patterns of Community Mortality during the SARS-CoV-2 Pandemic

Walker LE, Heaton HA, Mullan AF, Reichard RR, Monroe RJ, Kendall M, Goyal DG/ Mayo Clinic, Rochester, MN; Mayo Clinic, Rochester, MN; BlueTree Consulting, Madison, WI

Study Objectives: We aimed to analyze causes of death during the SARS-CoV-2 pandemic as a way to quantify the relationship between reduced emergency department visits during spring 2020 and community mortality rates and causes. Our focus was on the eight-county area served by Southern Minnesota Regional Medical Examiner.

Methods: Chi-squared and Fisher's Exact tests were applied to compare deaths between time periods. All tests were two-sided and p-values less than 0.05 are considered significant. We compared the causes of death from 2/9-3/16 and 3/17-4/21 for the years of 2018 and 2019 to establish a baseline for comparison to the causes of death during these same periods in 2020. These dates were determined by taking the four weeks prior to a statewide stay at home order and the first four weeks of the order.

Results: The causes of natural death in 2018 and 2019 did not have any significant difference. When comparing the baseline with the same periods of time in 2020 there was no significant difference between the earlier time period, 2/9-3/16 (2018 = 227, 2019 = 203, 2020 = 204, p=.56), but there was a significant increase in the number of non-COVID reported deaths between 3/17-4/21/20 (2018 = 195, 2019 = 212, 2020 = 251, p = .029). There was no change in the proportion of natural versus unnatural deaths. Distribution of the cause of death remained stable as far as attributed organ system. There was a significant overall increase in the number of out of hospital deaths between 3/17-4/21/20. In 2018 there were 60, in 2019 there were 76 and this increased sharply to 128 in the same period during 2020 (p=<.001).

Conclusion: No single natural cause of mortality is identified as having a disproportionate impact on outpatient cause of death. Rather, all medical etiologies contributed to an overall increase in deaths during the early part of the SARS-CoV-2 pandemic in Southern Minnesota. News media has reported concerns about decreased ED visits during this time period, and our data show that in conjunction with a significant decline in emergency department visits of approximately 50%, there has been a correlating increase in out of hospital death. We do not have enough information to draw a conclusive relationship, however, it will be important to fully understand the public health implications beyond pandemic disease burden that contribute to overall mortality during public health crises to target interventions to promote appropriate use of the emergency department for urgent conditions.

168 Insights on Ultrasound Training for Ultrasound Naive Flight Paramedics and Nurses

Kaplan JH, Panebianco NL, Kramer J, Centeno C/University of Pennsylvania, Philadelphia, PA; University of Pennsylvania, Philadelphia, PA

Study Objectives: While ultrasound is standard of care in the Emergency Department, out-of-hospital use of ultrasound is in early stages. With the proliferation of low-cost ultrasound machines, expansion into the out-of-hospital setting has broadened and a demand to teach these novel learners has emerged. How this technology can be applied, out-of-hospital providers' ability to use ultrasound, and the best approach to teach these providers need to be determined. The aim of this study was to evaluate what needs ultrasound can fill in the out-of-hospital flight setting and how to teach this technology effectively to flight paramedics and nurses.

Methods: This study was conducted with the flight EMS services for two tertiary care academic centers. An ultrasound curriculum was designed for flight paramedics and nurses to be incorporated into their care before and during helicopter transports. The ultrasound training included a 25 minute didactic lecture, including ultrasound physics, knobology, indications, anatomy, pathology, and interventions following abnormal exams. Didactics were followed by one-hour hands-on practice sessions in small groups led by ultrasound trained physicians on human models. The focus of the training was to correctly acquire 3 views "within the box". Scans were performed on the upper chest, simulating in-flight conditions of a patient with clothing on. Views taught were parasternal long view of the heart to evaluate for cardiac activity, pericardial effusion, and tamponade, anterior lung windows to evaluate for pneumothorax, and anterior neck view to verify ETT placement. A test was given before and after the session to evaluate knowledge and image interpretation. The test included multiple choice, true/false, and open ended questions.