# 377 Peer-Instructed Teleguidance Ultrasound in Undergraduate Medical Education: A Randomized Control Equivalence Study

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Study Objectives: The use of peer-instructed ultrasound teleguidance has the potential to provide high-quality, cost-effective clinical education to medical students. The COVID-19 pandemic has shifted focus to alternatives to in-person learning, and demonstrated the success of many such programs. Furthermore, there is increased demand for novel teaching modalities that are adaptable and broad in application, such as teaching techniques such as pulmonary ultrasound that have grown in popularity in the past decade and most recently in the pandemic. However, there is a limited amount of data evaluating the effectiveness of such methods in practice. Our primary aim is to evaluate how peer- taught teleguidance teaching compares to traditional in-person teaching of ultrasound in undergraduate medical students. Our secondary aim is to evaluate its application specifically in teaching pulmonary ultrasound during the COVID-19 pandemic.

Methods: In a single center study, 47 first year undergraduate medical students were recruited and randomized into either a traditional in-person teaching group or a peer-instructed ultrasound teleguidance group using the Butterfly iQ+ portable ultrasound probe. Sample size analysis was performed using ClinCalc, and the minimum sample size required to power the study with 90% power and 0.05 alpha was 42 students. Proficiency was assessed by change in knowledge score on pre and post-test, and objective structured clinical exam (OSCE). Change in confidence, overall experience, and experience with a peer instructor measured using a 5-point Likert scale. Two one-sided t-test (TOST) used to measure equivalency between the two groups (p < 0.05). Furthermore, this methodology was repeated with a new cohort using a novel subject topic of pulmonary ultrasound in the setting of growing clinical application during the COVID-19 pandemic.

Results: The teleguidance group performed as well as the traditional in-person group in terms of knowledge change, confidence change, OSCE time and OSCE scores (p = 0.010, p = 0.005, p = 0.005, p = 0.0015, respectively). The teleguidance group rated the experience highly overall (4.06/5), but less than the traditional group (p = 0.448). Peer-instruction was overall rated 4.35/5. Additional results from a follow-up study involving retention and cross-topic application in pulmonary ultrasound relevant to clinical COVID-19 education are pending and will be added upon acceptance.

Conclusion: Peer-instructed teleguidance is an effective method of teaching ultrasound to undergraduate medical students. With the increasing need for virtual education and growing evidence in teleguidance peer-education, this holds promising pilot data for future developments in its use in undergraduate medical education.

No, authors do not have interests to disclose

# 378 A Higher D-Dimer Threshold Can be Used to Predict Pulmonary Embolism in COVID-19 Patients Presenting to the Emergency Department

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Study Objective: While our understanding of COVID-19 has evolved, uncertainty remains regarding the utility of previously established pulmonary embolism (PE) screening guidelines in COVID-19 positive patients. Many studies have investigated the efficacy of D-dimer (DD) screenings for admitted COVID-19 patients, but few have looked specifically at patients in the emergency department (ED). While a DD value greater than 500 ng/mL can be used to guide further PE workup in non-COVID patients, a higher threshold should be considered in COVID-19 patients who often have an elevated DD at baseline. The purpose of this study was to investigate a higher DD threshold for PE screening and identify factors that predict risk for PE in COVID-19 patients presenting to the ED.

Methods: This was a retrospective cohort including patients who presented to our ED between March 1, 2020 and February 1, 2021 and who tested positive for COVID-19 during ED visit or just prior to presentation and had a DD ordered in the ED during their diagnostic workup. Exclusion criteria were as follows: direct admissions, transferred from another hospital, <18 years old, or pregnant. Patients were grouped by those who underwent computed tomography pulmonary angiogram (CTPA) to evaluate for PE and those who did not and descriptive statistics were

performed. Those who underwent CTPA were further divided into PE-positive and PE-negative groups. Single logistic regression models were fitted to examine the relationships between PE diagnosis and various individual predictors. We calculated sensitivity and specificity for predicting PE at various DD thresholds. The optimal DD cutoff to predict PE in this patient population was obtained from a receiver operating characteristic (ROC) curve using Youden's J statistic. Analyses were performed using the R statistical programming language, version 4.1.3.

Results: A total of 570 COVID-19 positive patients who had DD performed while in the ED were included in the study, of which 107 underwent CTPA to evaluate for PE. PE was diagnosed in 14 (13.1%) patients. Patients with PE were significantly more likely to have a history of diabetes and have initial labs with elevated glucose and lactate. They were also significantly more likely to be admitted to the ICU (64% of PE + patients vs 26% of PE - patients). Those with PE had a significantly higher mean DD value (29007 ng/mL) compared to the PE-negative group (3062 ng/mL). The optimal DD threshold for predicting PE was 1815 ng/mL (AUC was 0.91, [95% CI (0.84, 0.98)], sensitivity 93%, specificity 80%). Using this threshold would have resulted in 32 total CT scans with one missed PE and 19 false positives. A conservative threshold of 1089 ng/mL could be used with sensitivity 100% and specificity 58%. Using this threshold would have resulted in 53 total CT scans with no missed PEs and 39 false positives. Thus in our study of 107 patients, 54 CT scans could have been avoided with no compromise in diagnosis.

Conclusion: History of diabetes, elevated glucose, and elevated lactate were significantly associated with increased risk for PE in our patient population. Increasing the DD threshold could safely predict risk of PE in COVID-19 patients presenting to the ED while reducing unnecessary CTPAs.
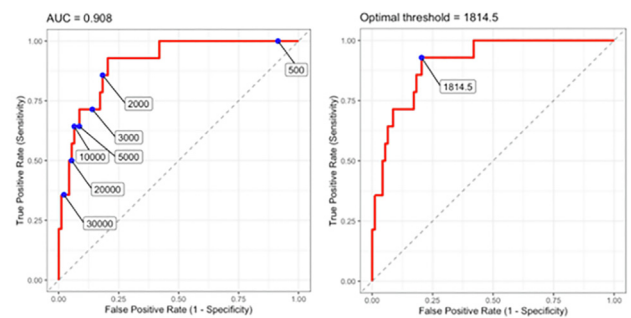


Figure 2: Receiver operating characteristic curve

No, authors do not have interests to disclose

# 379 Rural Emergency Medicine: The State of Rural Rotations in Residency Training Programs

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Study Objectives: As rural hospitals find it difficult to staff their emergency departments with residency trained emergency physicians (EPs), we theorize residents exposed to emergency medicine practiced in rural settings during training are more likely to seek careers in these communities. However, the current availability of rural rotations among EM residencies is unknown. This investigation aimed to describe the prevalence of rural experiences offered across EM training programs and characterize both benefits and challenges of providing these experiences. The study grew out of work done by the 2020 ACEP Rural Emergency Care Task Force and is the first step of a multi-phase project looking at factors that influence early career EPs' decisions to practice in rural settings.

Study Design/Methods: This was a mixed-methods study using a national survey of residency programs in 2020, sent through the Council of Residency Directors in Emergency Medicine (CORD) listserv, to determine the prevalence and characteristics of rural rotations offered. Survey respondents who volunteered to engage in further discussion participated in qualitative structured interviews to explore the attitudes of