Lung ultrasound score predicts outcomes in COVID-19 patients admitted to the emergency department

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Abstract

During the COVID-19 pandemic, creating tools to assess disease severity is one of the most important aspects of reducing the burden on emergency departments. Lung ultrasound has a high accuracy for the diagnosis of pulmonary diseases; however, there are few prospective studies demonstrating that lung ultrasound can predict outcomes in COVID-19 patients. We hypothesized that lung ultrasound score (LUS) at hospital admission could predict outcomes of COVID-19 patients.

This is a prospective cohort study conducted from 14 March through 6 May 2020 in the emergency department (ED) of an urban, academic, level I trauma center. Patients aged 18 years and older and admitted to the ED with confirmed COVID-19 were considered eligible. Emergency physicians performed lung ultrasounds and calculated LUS, which was tested for correlation with outcomes

The primary endpoint was death from any cause. The secondary endpoints were ICU admission and endotracheal intubation for respiratory failure. Among 180 patients with confirmed COVID-19 who were enrolled (mean age, 60 years; 105 male), the average LUS was 18.7 ± 6.8. LUS correlated with findings from chest CT and could predict the estimated extent of parenchymal involvement (mean LUS with < 50% involvement on chest CT, 15 ± 6.7 vs. 21 ± 6.0 with > 50% involvement, $p < 0.001$), death (AUC 0.72, OR 1.13, 95% CI 1.07 to 1.21; $p < 0.001$), endotracheal intubation (AUC 0.76, OR 1.17, 95% CI 1.09 to 1.26; $p < 0.001$), and ICU admission (AUC: 0.71, OR 1.14, 95% CI 1.07 to 1.21; $p < 0.001$).

Introduction

In the DEXA-ARDS trial (published in February 2020)[1], 277 mechanically ventilated patients with established moderate-to-severe ARDS from multiple etiologies were randomized within 24 h of diagnosis to receive conventional treatment or conventional treatment plus intravenous dexamethasone for 10 days (20 mg/day during the first 5 days followed by 10 mg/day from day 6 to day 10). Patients in the dexamethasone group had a greater mean number of ventilator-free days (between-groups difference 4.8 days, $p<0.001$) and lower 60-day mortality (between-groups difference 15.3%, $p<0.005$) than patients in the control group. These findings suggested that early therapy with dexamethasone could change the pulmonary and systemic immune responses, and thereby could reduce the duration of mechanical ventilation and overall mortality.

In the RECOVERY trial (release of results on June 16, 2020)[2], 6425 hospitalized patients with coronavirus disease 2019 (COVID-19) were randomized to 6 mg/day of dexamethasone for 10 days or usual care. Overall, dexamethasone resulted in an absolute reduction in 28-day mortality of 2.8% (22.9% vs. 25.7%).

Biography:

Julio Cesar Garcia de Alencar, MD, is an Emergency Physician in the Emergency Department at Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo. He has published 6 books and more than 10 papers in reputed journals and has been serving as an editorial board member of repute.

Recent publication data:

1. The Annals of Intensive Care article "Lung ultrasound score predicts outcomes in COVID-19 patients admitted to the emergency department" (doi: 10.1186/s13613-020-00799-w) by Julio Cesar Garcia de Alencar, Julio Flavio Meirelles Marchini, Lucas Oliveira Marino, Sabrina Correa da Costa Ribeiro, Cauê Gasparotto Bueno, Victor Paro da Cunha, Felippe Lazar Neto, Rodrigo Antonio Brandão Neto and Heraldo Possolo Souza.

2. The PLOS ONE article "Mortality and other outcomes of patients with coronavirus disease pneumonia admitted to the emergency department: a prospective observational Brazilian study" (doi: 10.1371/journal.pone.0244532) by Rodrigo A. Brandão Neto, Julio F. Marchini, Lucas O. Marino, Julio C. G. Alencar, Felippe Lazar Neto, Sabrina Ribeiro, Fernando V. Salvetti, Hassan Rahhal