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Admission Bedside Lung Ultrasound Reclassifies Mortality Prediction in Patients With ST-Segment–Elevation Myocardial Infarction

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Lung Ultrasound in Cardiac Intensive Care

Abstract

Background:

Early risk stratification is essential for in-hospital management of ST-segment–elevation myocardial infarction. Acute heart failure confers a worse prognosis, and although lung ultrasound (LUS) is recommended as a first-line test to assess pulmonary congestion, it has never been tested in this setting. Our aim was to evaluate the prognostic ability of admission LUS in patients with ST-segment–elevation myocardial infarction.

Methods:

LUS protocol consisted of 8 scanning zones and was performed before primary percutaneous coronary intervention by an operator blinded to Killip classification. A LUS combined with Killip (LUCK) classification was developed. Receiver operating characteristic and net reclassification improvement analyses were performed to compare LUCK and Killip classifications.

Results:

We prospectively investigated 215 patients admitted with ST-segment–elevation myocardial infarction between April 2018 and June 2019. Absence of pulmonary congestion detected by LUS implied a negative predictive value for in-hospital mortality of 98.1% (93.1–99.5%). The area under the receiver operating characteristic curve of the LUCK classification for in-hospital mortality was 0.89 (P=0.001), and of the Killip classification was 0.86 (P<0.001; P=0.05 for the difference between curves). LUCK classification improved Killip ability to predict in-hospital mortality with a net reclassification improvement of 0.18.

Conclusions:

In a cohort of patients with ST-segment–elevation myocardial infarction undergoing primary percutaneous coronary intervention, admission LUS added to Killip classification was more sensitive than physical examination to identify patients at risk for in-hospital mortality. LUCK classification had a greater area under the receiver operating characteristic curve and reclassified Killip classification in 18% of cases. Moreover, absence of pulmonary congestion on LUS provided an excellent negative predictive value for in-hospital mortality.

Footnotes

The Data Supplement is available at https://www.ahajournals.org/doi/suppl/10.1161/CIRCIMAGING.119.010269.

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