Effect of a Machine Learning-Based Severe Sepsis Prediction Algorithm on Patient Survival

Presented During:

Research Snapshot: Sepsis

Monday, February 26, 2018: 11:30 AM - 12:30 PM
Research Snapshot Theaters
Room: RST Theater 14

Poster No:

1430

Type:

Abstract

Authors:

Chris Barton[1,2], David Shimabakuru[2], Mitchel Feldman[2], Samson Mataraso[3], Ritankar Das[4]

Institutions:

[1]N/A, San Clemente, CA, [2]UCSF, San Francisco, CA, [3]UC Berkeley, Berkely, CA, [4]Dascena, Inc, Hayward, CA

First Author:

Chris Barton   - Contact Me
N/A|UCSF
San Clemente, CA|San Francisco, CA

Co-Author(s):

David Shimabakuru, MDCM   - Contact Me
UCSF
San Francisco, CA

Mitchel Feldman, MD   - Contact Me
UCSF
San Francisco, CA

Samson Mataraso   - Contact Me
UC Berkeley
Berkely, CA

Ritankar Das, MsC   - Contact Me
Dascena, Inc
Hayward, CA

AbsEPoster:

Chris Barton   - Contact Me
UCSF
San Clemente, CA

Introduction/Hypothesis:

Severe sepsis is a leading cause of death in the United States and costs health care systems up to $20 billion annually. Methods have been developed to electronically monitor patients for severe sepsis, but few have provided predictive capabilities to enable early intervention.
We hypothesize, patient length of stay (LOS) and in-hospital mortality rate decrease with the use of a machine learning-based severe sepsis prediction algorithm in the intensive care unit.

Methods:

A randomized clinical trial was conducted at two mixed medical-surgical intensive care units at UCSF from December 2016 to February 2017. This factorial, open label trial was designed to test whether InSight®, a machine learning-based severe sepsis prediction algorithm, was better than the current Electronic Health Record (EHR)-based severe sepsis detection system. All adult patients (18+) admitted to the participating

units were eligible for study. Enrolled patients were automatically assigned to a trial arm according to a random allocation sequence. Participants randomized to the experimental group were screened by InSight and the existing severe sepsis detection method. Using only the most commonly recorded measurements in the electronic health record, primarily vital signs and age, Insight predicted sepsis onset and alerted the appropriate care team. Upon receiving an alert from the prediction algorithm, the care team evaluated the patient for severe sepsis and initiated the severe sepsis bundle, if appropriate.

The primary outcome was LOS. The secondary outcome was in-hospital mortality rate.

Results:

Outcomes (75 control patients, 67 experimental) were analyzed. There was a significant (P = .04) decrease in hospital LOS (13 d vs. 10.3 d) and a 58.0% reduction in in-hospital mortality rate when using Insight (21.3% vs 8.96%), (P = .02). No adverse events were reported during this trial.

Conclusions:

A machine learning-based sepsis prediction tool may improve patient outcomes and decrease sepsis-related costs.

Patient Type:

Adult

Category:

Sepsis

Category Alternate 1 (optional):

Infectious Diseases

Category Alternate 2 (optional):

Sepsis

Keywords:

informatics

medical informatics
scoring systems
sepsis