

CONTINUOUS AUTOMATED MODIFIED SOFA SCORE IS A GOOD EARLY PREDICTOR OF OUTCOME IN PATIENTS WITH HEMODYNAMIC INSTABILITY

I M Pessach^{1,2}, A M Lipsky², M Matlis², A Meilik³, A Nimrod⁴, M O'Connor⁵, I Matot⁴, E Segal^{2,6}

- 1. Sheba Medical Center, Pediatric Critical Care, Tel-Hashomer, Israel
- 2. Intensix, Predictive Critical Care LTD, Netanya, Israel
- 3. Tel Aviv Medical Center, Chief Quality Officer and the head of clinical performances research unit, Tel-Aviv, Israel
- 4. Tel Aviv Medical Center, Anesthesia, Pain and Intensive Care Division, Tel-Aviv, Israel
- 5. University of Chicago Medicine, Department of Anesthesia & Critical Care, Chicago, IL, USA
- 6. Assuta Medical Centers, Department of Anesthesia, Intensive Care and Pain Medicine, Tel-Aviv, Israel

INTRODUCTION

The SOFA score is a useful tool for stratifying and predicting outcomes in critically ill patients. The SOFA score has been validated as a once-daily measurement, using the worst recorded parameters from the prior 24 hours. Its possible utility for real time management using more frequent updating has not been fully explored. The change in SOFA scores from emergency department evaluation until 72 hours after ICU admission have been shown to predict survival in patients with septic shock. We hypothesized that a computerized system which continuously calculates the SOFA score would be able to differentiate survivors from non-survivors of septic shock early in the course of their illness.

METHODS

A computerized system was developed to calculate continuously a modified SOFA score, which was used as part of a larger model to predict patient outcomes in the ICU. The system was developed using a cohort of 8220 patient stays in a general, tertiary-care ICU between 2007-2014, and validated in 1026 patient stays during 2015.

For this study, we included the subset of patients who experienced septic shock events that occurred >8 hours following admission to the ICU and who survived at least 8 hours following the event. 630 patients in the initial cohort and 63 patients in the validation cohort met the inclusion criteria.

POPULATION DEMOGRAPHICS

GENERAL POPULATION

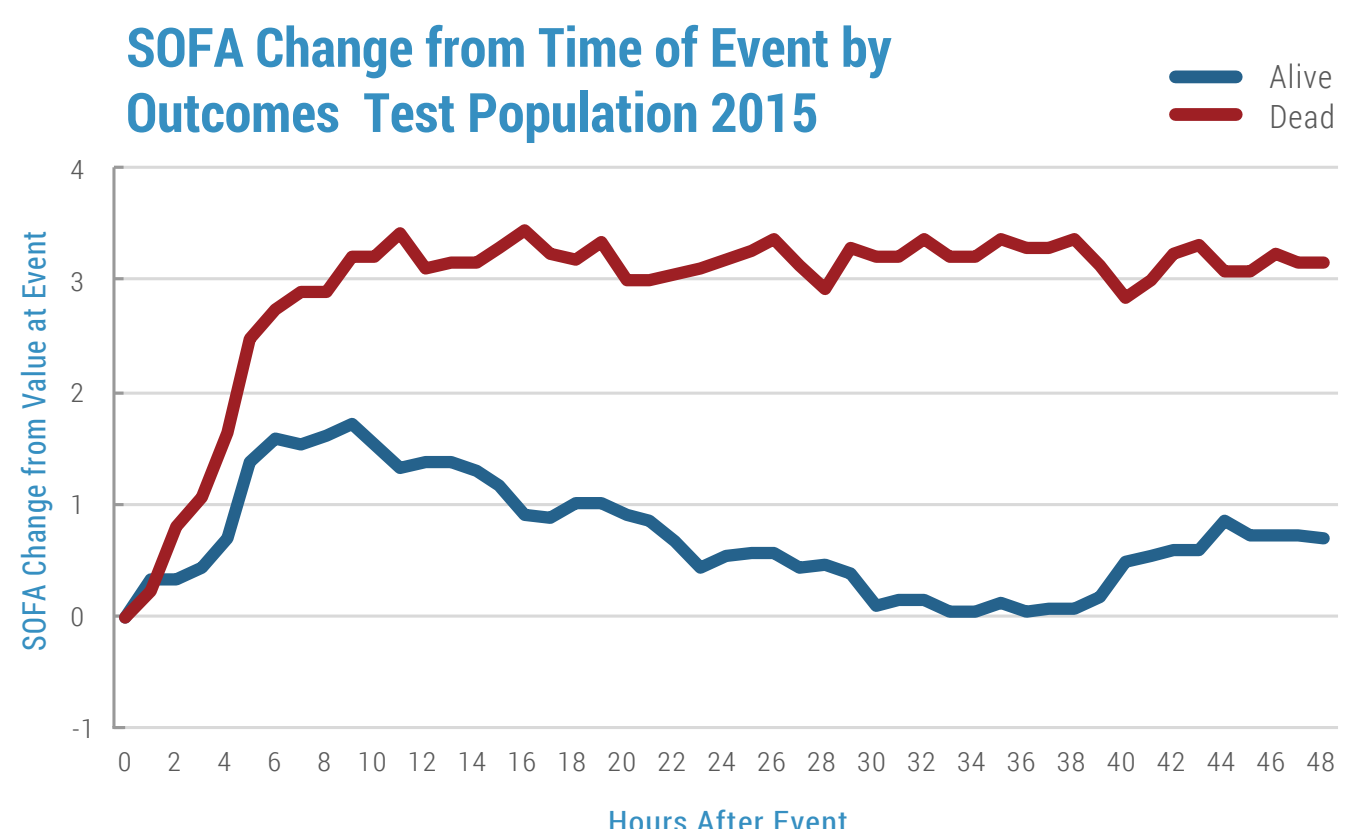
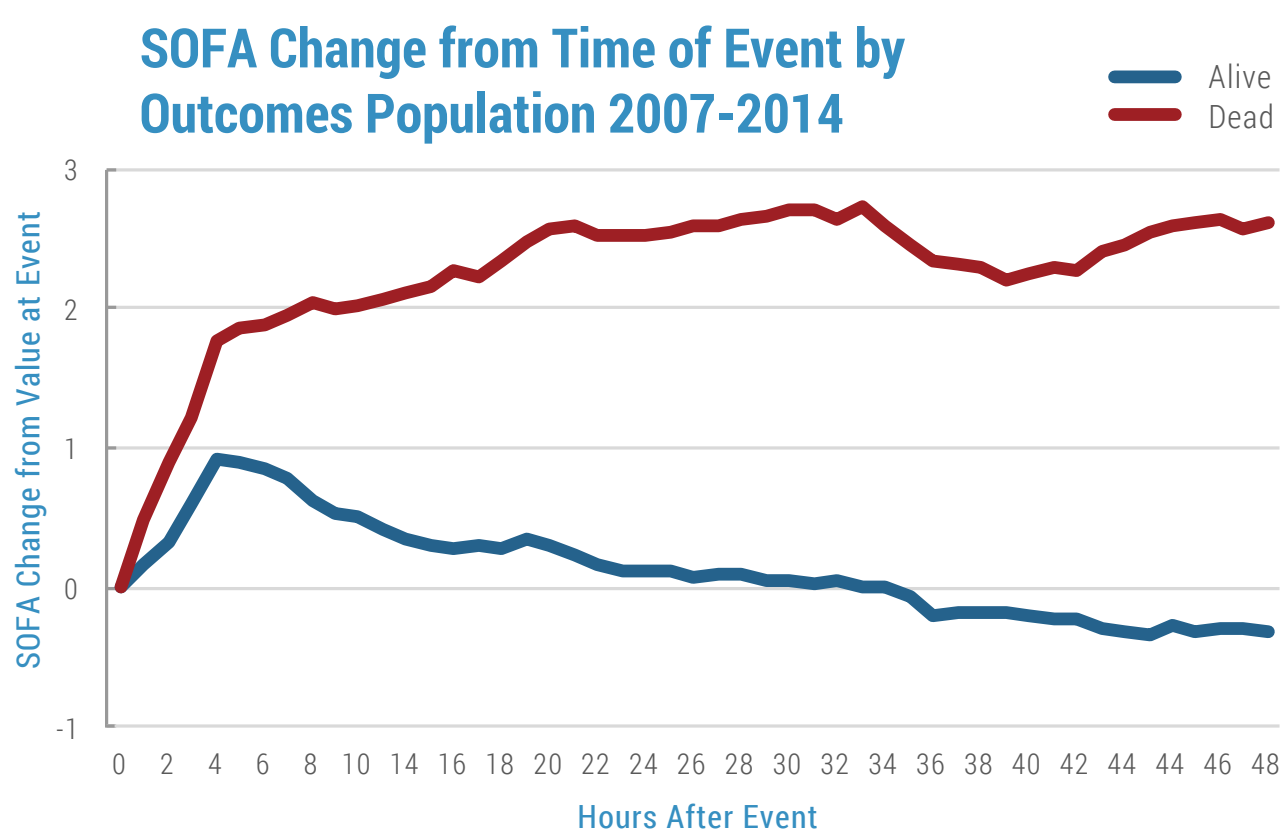
	DERIVATION (2007-2014)	VALIDATION (2015)
Number of Stays	8220	1026
LOS (hours)	119 ± 187	123 ± 167
Age (years)	56 ± 20	58 ± 19
Male (%)	49%	50%
ICU Mortality (%)	11%	10%
SOFA Score at Time of Event	2278	274
Number of stays included in the study*	630	63

STUDY POPULATION

	DERIVATION (2007-2014)	VALIDATION (2015)
Number of Stays	630	63
LOS (hours)	339 ± 324	330 ± 239
Age (years)	62 ± 18	63 ± 14
Male (%)	59%	59%
ICU Mortality (%)	36%	30%
Average SOFA	8.21 ± 3.37	7.52 ± 3.25

RESULTS

Continuous analysis of modified SOFA score segregated survivors and non-survivors following a septic shock event. There was a clear pattern of behavior of the continuous SOFA in survivors versus non-survivors (Figure). Following an episode of severe hemodynamic instability, patients whose continuous SOFA scores decreased after an initial increase had a significantly lower mortality risk than those who maintained a steady increase in the continuous SOFA score. The difference in behavior of the score between survivors and non-survivors was evident and statistically significant as early as 4 hours following the initial event.



CONCLUSIONS

Continuous analysis of the modified SOFA score by an intelligent automated system can detect and predict significant clinical outcomes early in the course of the event. The potential impact on clinical practice should be evaluated in a prospective manner.