Physiological Changes Due to Bloodstream Infection in ICU Patients Differ According to Transplant Status

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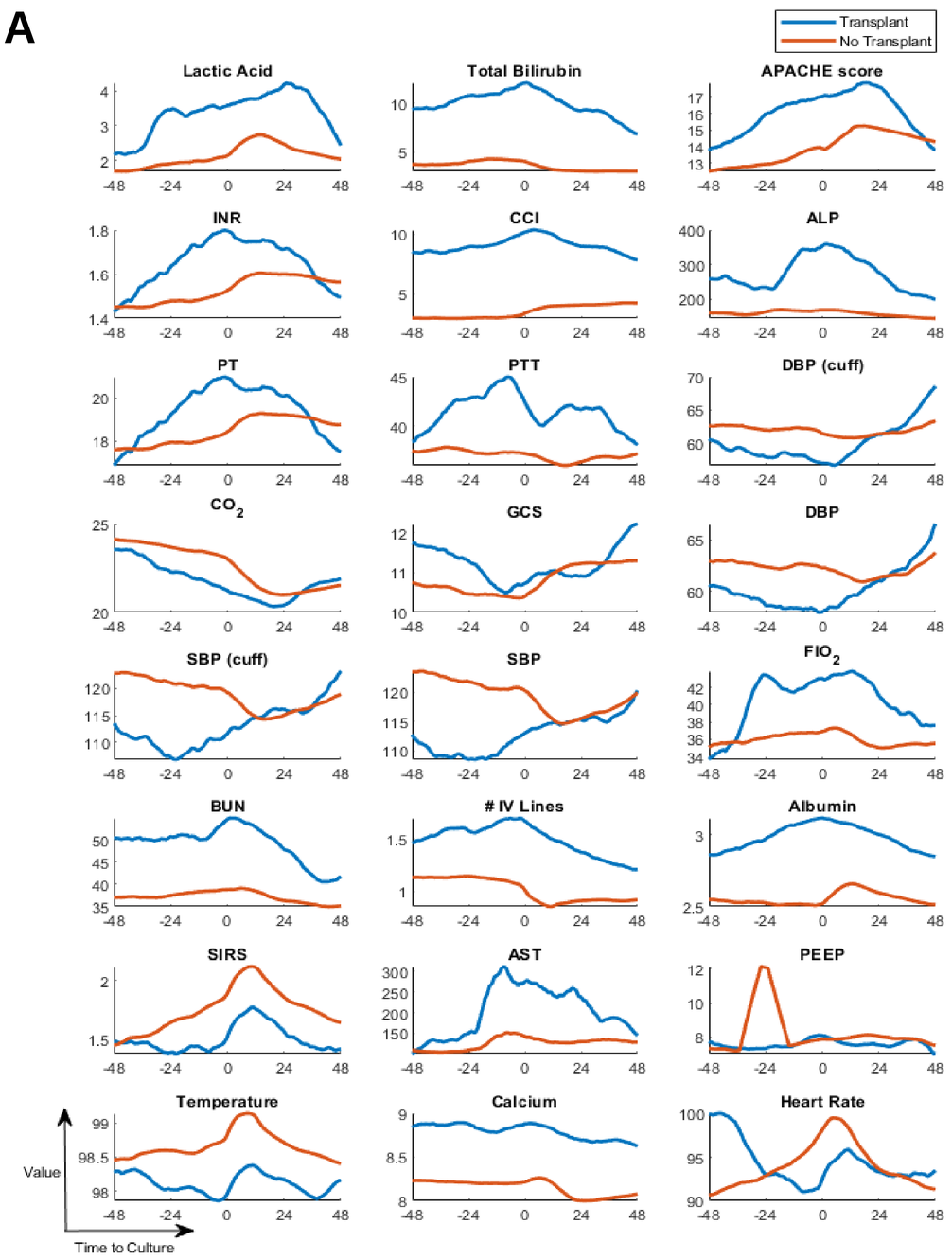
Introduction

- Transplant recipients (TRs) are at increased risk of bloodstream infection (BSI), which often leads to critical illness.
- It is thought that infection manifests with different pathophysiology in TRs - *e.g.* less systemic inflammatory response (SIRS) criteria - due to immune compromise.
- We aimed to identify trends in the pathophysiologic abnormalities characteristic of BSI in TRs versus non-transplant recipients.

Methods

- We reviewed blood culture, vital sign, laboratory, and continuous monitoring data from patients admitted to the medical and surgical/trauma ICUs at the University of Virginia Medical Center from February 2011 to June 2015.
- We performed univariable logistic regression to evaluate trends in physiological features in both TRs and non-TRs in the 96 hours surrounding a positive blood culture.
- We performed multivariable logistic regression to identify the abnormalities most strongly associated with a positive blood culture in the next 24 hours in TRs.

A



B

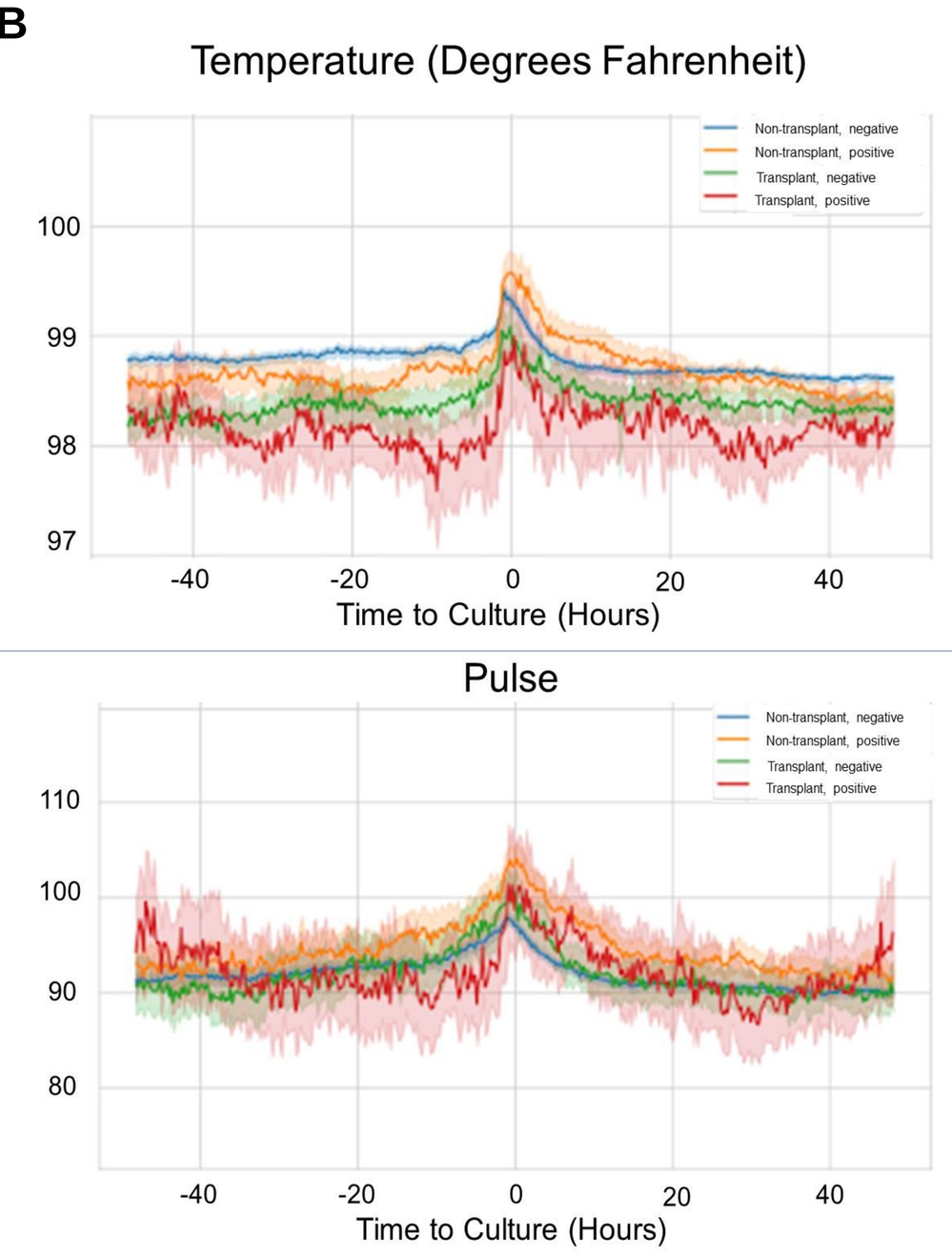


Figure 1. *Trends in pathophysiological abnormalities of 9,954 critically ill patients in the 96 hours surrounding blood cultures based on transplant status, 2011-2015.* ***Panel A*** *demonstrates the mean value of the physiological variable over time relative to a positive blood culture for TRs vs non-TRs.* ***Panel B*** *depicts the trends for mean temperature and pulse in TRs and non-TRs with BSI versus without BSI.*

Results

- We analyzed 9,954 ICU admissions with 144 patient-years of data (1.3 million hourly measurements), including 15,577 blood culture instances (1,068 in TRs).
- Compared to non-TRs, TRs with BSI had more pathophysiological abnormalities that had different trends over time (*i.e.* systolic blood pressure) (Fig. 1A).
- SIRS in TRs showed similar patterns in response to BSI compared to non-TRs (Fig. 1B).
- The multivariable model of BSI in TRs included, in decreasing strength of association: total bilirubin, systolic blood pressure, fraction of inspired oxygen, number of intravenous lines, and Charlson Comorbidity Index.

Conclusions

- Critically ill TRs have different pathophysiological manifestations of BSI compared to non-TRs.
- TRs demonstrate a SIRS response to BSI similar to non-TRs, though pre-infection baseline values differ.
- This challenges the classic conception of how the pathophysiology of infection differs in immunocompromised patients.

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