Introduction:
Most clinical trials conclude the ineffective use of anticoagulation for sepsis-induced coagulopathy [1]. However, post hoc analyses of randomized control trials report positive results [2], suggesting anticoagulation is effective in specific populations exhibiting coagulopathy. Further, anticoagulants should be administered in the early phase [3]; however, methods for precisely predicting the progression of sepsis-induced coagulopathy are not established. This study aimed to create and evaluate a prediction model of coagulopathy progression using machine-learning techniques.

Methods:
We performed a subgroup analysis of data from a retrospective cohort study involving adult septic patients in 40 Japanese institutions from January 2011 to December 2013 and used the Japanese Association for Acute Medicine disseminated intravascular coagulation (DIC) score as a DIC severity index test. The predictive ability of ΔDIC ([DIC score on Day 3] – [DIC score on Day 1]) was evaluated using various statistical methods. Using variables available at the outset, we compared the predictive ability of Random Forest (RF) and Support Vector Machine (SVM) with that of multiple linear regression analysis.

Results:
A total of 1110 adults with sepsis were included in the analysis. The Root Mean Square Error in ΔDIC score for the multiple linear regression analysis model was 2.1168 compared with values of 1.6508 and 1.9394 for RF and SVM, respectively. Thus, the RF method predicted the progression of sepsis-induced coagulopathy more accurately than multiple linear regression analysis.

Conclusion:
RF, a machine-learning technique, was superior to multiple linear regression analysis in predicting the progression of sepsis-induced coagulopathy. This prediction model might enable us to use anticoagulation in an early phase.

References: