Abstract Type : Oral Presentation
Abstract Submission No. : F-002590

Development of Korean lung allocation system using machine learning

Hye Ju Yeo[1], Jin Ho Jang[1], Woo Hyun Cho[1], Dohyung Kim[2], **Taehwa Kim[1]**

[1]Department of Internal Medicine, Pusan National University Yangsan Hospital, Republic of Korea
[2]Department of Thoracic and Cardiovascular Surgery, Pusan National University Yangsan Hospital, Republic of Korea

Introduction: The shortage of donor lungs in Korea has raised ethical demands to optimize organ allocation. We developed a Korean lung allocation system (LAS) that maximizes the transplant benefit using the Korean Network for Organ Sharing data.

Methods: Transplant benefit was defined as a high probability of dying within 1 year of the waiting list and a high probability of surviving at 1 year after transplantation. From 2010 to 2020, 1587 registered patients for lung transplantation aged 12 years and older and 760 lung transplant patients in Korea were included in the analysis. Through elastic net cox regression, each model was created to predict death within one year on waitlist, and one year death after transplantation, and the two models were combined. The final model was validated through the validation cohort and compared with LAS score in US.

Results: The waitlist mortality model included hospitalization at registration, ventilator, extracorporeal membrane oxygenation, gender, age, body mass index, first status at registration, diagnosis, and blood type, and the C index of training cohorts was 0.801 ($p<0.001$) and c index of test cohorts was 0.858 ($p<0.001$). The transplant mortality model included hospitalization at registration, ventilator, age, body mass index, first status at registration, status at transplantation, diagnosis, and blood type, and the C index of training cohorts was 0.645 ($p<0.001$) and c index of test cohorts was 0.814 ($p<0.001$). In the weighted sum model, AUC was 0.655 in training cohorts ($p<0.001$) and AUC was 0.630 in test cohorts ($p<0.001$).

Conclusion: Compared to the existing LAS score in US, the newly developed Korean lung allocation system showed better performance for predicting transplant benefit. Prospective validation of this model and further refinement of the model are needed.