

Prediction of Postoperative Length of Stay in Hospital Following Repair of Aortic Dissection by Machine Learning

Objective: Predicting patients' postoperative length of stay in hospital may facilitate resource planning. There are many clinical, surgical, and logistical factors that influence patients' postoperative length of stay in hospital. The purpose of this study was to develop a machine learning model to predict postoperative length of stay in hospital for patients undergoing repair of type A aortic dissection.

Methods: Perioperative data from all patients who had undergone repair of type A aortic dissection between 2006 and 2019 with complete data in the National Surgical Quality Improvement Program database was used to develop this predictive model. The model included 22 perioperative variables and used the xgboost machine learning method. A training set of 1584 patients and a test set of 660 patients were used in development of the model. The performance of the model was evaluated using root mean squared error (RMSE).

Results: The final RMSE for the predictive model of postoperative length of stay in hospital for patients undergoing either repair of type A aortic dissection was 3.189578. This reflects a margin of error of approximately three days.

Conclusions: In this study, machine learning methods were used to predict postoperative length of stay in hospital for patients undergoing repair of type A aortic dissection. The unavailability of hospital beds restricts the ability of hospitals to provide services including surgery. Therefore, use of predictive models to accurately estimate postoperative length of stay may contribute to optimal allocation of hospital resources and minimal surgical cancellations.

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Additional Resources

- https://files.aievolution.com/prd/aat2101/abstracts/abs_2936/AATSAortic2022Slides.pptx