Predicting severely depressed left ventricular ejection fraction in the intensive care unit

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**Abstract**

Echocardiography is a frequent and important investigation for cardiac output in intensive care units. Real time management decisions are made dependent on measurements of cardiac output, herein more specifically detailed as left ventricular ejection fraction (LVEF). Assessment of LVEF is resource intensive and most often requiring specialist echocardiography equipment and technicians. We explore the use of routinely and easily acquired variables in the intensive care unit (ICU) to predict severely depressed LVEF as a proxy for echocardiography. We extracted clinical physiological variables derived from ICU monitoring and available within the public domain MIMIC II dataset. We then use a feature selection technique to evaluate several combinations of variables and to develop classification models for predicting severely impaired LVEF. We develop a model that can predict LVEF with high performance (0.87 AUC). We observe maximal predictive performance 6 hours after admission to an ICU. The identified core variables are heart rate, systolic non-invasive blood pressure, respiratory rate, blood urea nitrogen, carbon dioxide blood gas, glucose, hemoglobin, potassium, sodium, weight on admission and gender. We recommend inclusion of these findings into triaged management plans that balance urgency with resources and clinical status.