



USE OF A MACHINE LEARNING ALGORITHM TO PREDICT REBLEEDING AND MORTALITY FOR ESOPHAGEAL VARICEAL BLEEDING IN CIRRHOTIC PATIENTS

Matheus Machado Rech (PIBIC-CNPq), Jonathan Soldera, Fernanda Tomé, Andressa Daiane Ferrazza, Alana Zulian Terres, Bruna Teston Cini, Louise Zanotto Eberhardt, Juline Isabel Leichtweis Balensiefer, Rafael Sartori Balbinot, Ana Laura Facco Muscope, Morgana Luisa Longen, Bruna Schena, Gilberto Luis Rost Jr., Raul Angelo Balbinot, Silvana Sartori Balbinot, Leandro Luís Corso (Orientador(a))

Esophageal variceal bleeding (EVB) is one of the most common complications of cirrhosis (15%-20% of patients). Given EVBs high rates, optimized risk stratification is important to allocate resources into treatment properly. The purpose of this study is to use a machine learning algorithm to predict rebleeding and mortality for EVB in cirrhotic patients and to assess its performance. A retrospective study was conducted, analyzing data from hospital charts from Jan 2010 to Dec 2016. Patients were found by searching every use of terlipresin in the period. Patients over 18 years old with laboratory and imaging data supporting the diagnosis of cirrhosis and with a definitive diagnosis of EVB were included. This analysis used data from 74 cirrhotic patients, taking into account 36 variables, which had EVB as a complication. Firstly, Pearson Correlation analysis was conducted. Subsequently, an Artificial Neural Network (ANN) was utilized to recognize patterns of the outcomes through supervised learning. A Receiver Operating Characteristic (ROC) curve analysis was performed. Electronic search retrieved 177 hospital admissions with use of terlipresin. 101 were due to EVB. All-cause mortality was 36%, 41.5% and 50.4% for 30-, 90- and 365-day, respectively. Mean age was 56 years-old, 79% were male. Most common cause of cirrhosis was alcohol abuse, followed by hepatitis C. The Pearson Correlation analysis showed of variables presented values of linear ranging from -0.34 to 0.30 to mortality and -0.31 to 0.21 to rebleeding. For mortality outcome, the specificity value shows that the ANN was able to identify 95.0% of it. The overall accuracy was 97.4% and the Area Under the curve ROC (AUROC) was 0.993, which demonstrates a high performance of the network. For patients who had a rebleeding outcome, the specificity value shows that the ANN was able to identify 66.7% of them. The overall accuracy was 97.4% and the AUROC was 0.942. Conclusion: The ANN could more accurately predict mortality by EVB when compared with two other assessment tools, CLIF-SOFA and MELD Score. Therefore, Machine Learning could be a useful tool in order to improve clinical practice, perhaps outperforming the current tools.

Palavras-chave: Gastroenterology, Artificial Inteligence, Machine Learning

Apoio: UCS, CNPq