

Design and Validation of Two Predictive Models for Mortality and Readmission Following Surgery in Patients with Liver Cirrhosis

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Abstract

Cirrhosis is the 12th leading cause of death in the United States. By 2020, it is expected to affect more than 1 million Americans. Cirrhosis is a costly, chronic condition requiring frequent hospitalizations and unplanned readmissions. Patients with cirrhosis often require routine surgeries including hernia repair, coronary artery by-pass surgery and orthopedic hip or knee replacements. These procedures present a greater risk of morbidity and mortality for cirrhotic patients, including an 8-fold increase in risk of mortality and higher hepatic decompensation after surgery. Predicting post-operative mortality prior to surgery or post-operative readmission would allow patients and clinicians to make informed decisions that optimize survival and reduce readmission costs. Currently, the MELD score is often used, inappropriately, to assess risk of procedures in patients with decompensated cirrhosis. However, no models exist that predict mortality or readmission among patients with cirrhosis. This study aimed to develop and validate two predictive models; one for mortality among all patients with cirrhosis undergoing surgery; the other will predict readmission among cirrhosis patients discharged alive after the index surgery. Each two model was then compared to the MELD score. The NSQIP Mortality Model was significantly better than the MELD score at predicting mortality ($p < 0.001$) and had an area under the receiver operating characteristic (AUROC) curve of 0.84. The readmission model was also significantly better than the MELD score ($p < 0.001$), with an AUROC of 0.75. Both models provide the basis for developing two decision tools that can assist clinicians and patients in making informed decisions that optimize survival and reduce unplanned readmissions.

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