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Editorial

Artificial Intelligence Is Time To Use For Predicting The Severity Of Acute Pancreatitis.

Dortya Taján and Peer Heyi .

Faculty of Medicine, University of Prishtina.

Abstract

Depending on the severity of the condition, the clinical course of acute pancreatitis (AP) might vary, and it is essential to estimate the likelihood of organ failure in order to start appropriate treatment and care as soon as possible. As a result, individuals who may be at high risk ought to be admitted to a high dependence unit. Three choices are available to us for risk assessment: (1) Severe AP can be predicted using univariate biochemical indicators. One of their primary traits is that the results of AP are impacted in a dose-dependent manner by the presence or lack of these variables. Sadly, due to their poor accuracy, none of these measures can be applied in clinical settings. (2) Score systems that use four to twenty-five parameters have been created to predict severity. They typically call for a number of parameters that are not measured every day, and they frequently take longer than twenty-four hours to complete, wasting crucial time. However, because these scores only use binary values, they lose information even though they potentially predict specific organ failure or severity. Their application in therapeutic settings is therefore restricted. (3) Complex nonlinear correlations between many biochemical indicators and disease outcomes can be identified by artificial intelligence.

Recently, we created EASY-APP, the first user-friendly tool that makes use of several continuous variables that are accessible at the moment of admission. The web-based tool can be used quickly and easily upon admission because it does not require all of the parameters for prediction. Artificial intelligence should be used in the future to create prognostic scores in order to prevent data loss and offer a more customized risk assessment.

Keywords : *machine learning; albumin; CRP; WBC; BISAP; mortality; severity.*

INTRODUCTION

One of the most prevalent gastroenterological conditions that commonly manifest in emergency rooms is acute pancreatitis (AP). The majority of people only experience mild to moderate AP. In contrast to the overall death rate of 2–5%, around 5–10% of patients will develop severe acute pancreatitis (SAP), which has a fatality rate of 10%–50% [1,2].

Predicting the severity of the disease, various organ failure, or infected pancreatic necrosis is crucial because the clinical course of AP is heavily reliant on early care. Numerous single and multiparametric ratings have been released recently to forecast the disease's course. As a result, we thought it crucial to compile the state of our understanding in the area.

UNIVARIATE BIOMARKERS

Although they have a relatively low AUC (0.681), the on-admission values of white blood cell count (WBC) and C-reactive protein (CRP) were found to be linked with SAP [3,4]. Additionally, it has been demonstrated that TG levels can predict mortality, SAP, respiratory and cardiac failures, and local complications in a dose-dependent manner [5]. SAP was also predicted by other metabolic variables, including hyperglycemia, hypertonia, and obesity [6,7]. A reliable predictor of respiratory failure and the local consequences that increase the risk of SAP and death is hypoalbuminemia [8]. Additionally, the indications of renal failure at admission may be predictive. Poorer AP results are also linked to elevated BUN or creatinine [9]. In the early stages of AP, hemoconcentration—that is, a high hematocrit level—also has a prognostic role [10]. Anamnestic information, such as a history of alcohol or tobacco use, has predictive value in addition to laboratory parameters [11]. SAP has also been linked to age, comorbidities, and on-admission discomfort [12–16]. All of these indicators, however, have low accuracy (AUC 0.5–0.7); as a result, these biomarkers cannot be utilized exclusively in clinical settings.

***Corresponding Author:** Peer Heyi, Faculty of Medicine, University of Prishtina.
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MULTIVARIATE SCORES

Score methods that use four to twenty-five parameters have been created to predict the severity. In order to forecast early severity and mortality during the first twenty-four hours following admission, the Bedside Index of Severity in Acute Pancreatitis (BISAP) was created [1]. Although it is typically unavailable at the time of admission, the modified computed tomography severity index (mCTSI) score offers an equivalent choice to predict severity and mortality [17]. The Acute Physiology and Chronic Health Examination (APACHE) II score is not unique to AP because it was initially developed to predict patient outcomes in the intensive care unit [18].

The Ranson and Glasgow score was created especially to forecast AP severity and fatality [19]. Nevertheless, these score systems have two significant drawbacks: One of these is that they need more than just the variables that are typically assessed; the other is that they need to collect these parameters twice in a 48-hour period. As a result, they are also not very useful.

ARTIFICIAL INTELLIGENCE (AI)

The intricate nonlinear correlations between several biochemical indicators and the course of disease can be identified by artificial intelligence. As a result, it can be applied to develop healthcare system programs. An application of artificial intelligence is machine learning, which trains algorithms to make predictions using statistical techniques. It enables an autonomous computer system to keep learning and developing through experience. In other domains, such as diabetic treatment or radiological diagnosis, artificial intelligence has shown promise [20,21]. This year, we created two new scores: EASY-APP to assess the severity of acute necrotizing pancreatitis (AP) and NECRO-APP to predict ANP [22, 23]. Several variables that are available at the time of admission are used by the EASY-APP. Based on a training dataset created and validated by a study including nearly 5000 patients from several nations, this score's algorithm built a model. EASY-APP can explain the machine-learning model's forecast while calculating a risk score for severe AP that ranges from 0 to 1. The web-based tool can be used quickly and easily upon admission because it does not require all of the parameters for prediction. It goes without saying that giving EASY-APP additional characteristics will improve its ability to forecast the severity of AP [23].

HERE, WE PROVIDE THREE AP CASES

Case No. 1: A 75-year-old woman arrives at the emergency room complaining of epigastric pain that has persisted for 10 hours. She was found to be afebrile, with a heart rate of 85 beats per minute, blood pressure of 142/77 Hgmm, and a respiratory rate of 18 beats per minute. CRP 6 mg/L, WBC 14.5 G/L, amylase 1621 U/L, potassium 4 mmol/L, natrium 141 mmol/L, glucose 8 mmol/L, GOT 111 U/L, BUN 9.5 mmol/L, and creatinine 65 umol/L were the results of her laboratory tests upon admission. She did not have any medical history of alcoholism or smoking (Figure 1).

Her Easy Score Was 0.19 (Ci: 0.129–0.299) Based On These Parameters

The BISAP score was 2.

Lastly, the patient experienced minor AP.

Case No. 2: A 71-year-old lady who had smoked in the past arrived at the emergency room complaining of stomach ache that had started 20 hours earlier. She was afebrile upon physical examination, with a heart rate of 110 beats per minute, blood pressure of 141/76 Hgmm, and a respiratory rate of 17 beats per minute. CRP 83 mg/L, WBC 23 G/L, amylase 1285 U/L, natrium 141 mmol/L, glucose 9.5 mmol/L, GOT 120 U/L, BUN 9 mmol/L, and creatinine 70 umol/L were the results of laboratory testing (Figure 2).

Her EASY score, based on these parameters, was 0.49 (CI: 0.424–0.62)

The BISAP score was 3.

Lastly, the patient experienced minor AP.

Case No. 3: A 31-year-old man who had smoked and abused alcohol in the past reported having excruciating stomach pain that had begun seven days earlier. He has 943 U/L of serum amylase, 274 mg/L of CRP, 13 G/L of WBC, 138 mmol/L of natrium, 5 mmol/L of glucose, 201 U/L of GOT, 8.3 mmol/L of BUN, and 328 umol/L of creatinine. He was afebrile upon physical examination, with a heart rate of 135 beats per minute, blood pressure of 116/96 Hgmm, and a respiratory rate of 25 beats per minute (Figure 3).

His EASY score, based on these parameters, was 0.77 (CI: 0.606–0.822)

The BISAP score was 1.

Lastly, the patient's AP was severe.

In conclusion, compared to previously employed technologies, artificial intelligence offers a number of benefits.

By backloading the severity prediction results, (i) the prediction value is continuously improving; (ii) it is simple to use; (iii) it is not restricted by binding parameters; (iv) it additionally displays the scoring's confidence interval; and (v) no information is lost because the variables are continuous rather than dichotomous.

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