Proteases and antiproteases new potential biomarkers/variables for polytrauma survival modeling? a pilot research

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Abstract:

Background: Despite big progresses in early management of trauma patients, traumas still represent an actual subject at international scale being the main cause of death for persons younger than 44 years. Polytrauma is the most unexplored and unsearched category of traumas. There is no international consensus according the most efficient scale, many of them returning different results in estimating the patient's condition complications and patient's mortality risk in case of trauma. The described situation makes us to search some solutions inclusively new factors with a higher predictive power in estimating the polytrauma patient's outcomes. We supposed that such an instrument could be different protease/antiprotease system's components. Objectives: The aim of this research was to estimate the predictive potential of proteases and antiproteases by polytrauma population survival rate modeling. Methods: In a prospective pilot study, 65 polytrauma patients admitted in acute period of trauma were analyzed. Plasma samples were collected at 3, 6, 12 and 24 hours after traumatic impact. We measured the values of two antiproteases concentration and enzymatic activity of six proteases. In order to identify the potential biomarkers for survival rate, we have compared proteases/antiproteases system components between survived and non-survived patients. The evidenced potential biomarkers were used for regression analysis modeling, discrimination, determination and calibration characteristics being estimated. In addition, the resampling procedure for model's stability estimation was applied. Results: The comparative evaluation among evidenced molecular phenotypes in survived and non-survived patients allows to consider a seria of primary outcome potential biomarkers/predictors. The outcome modelling by regression analysis used these potential predictors. Finally, five parameters, especially α2M3, CDEA3, ARDS, α2M6, CHEA6, EEA3 and CGEA12, were the components (efficient variables) from models that predict the survival rate using their values at 3, 6 and 12 hours after the trauma, results being adjusted to age, gender and ARDS diagnosis. Conclusions: In our research, we estimated the predictive potential of different protease/antiprotease system's components for polytrauma population. Using this data, three predictive models were obtained. Without any doubts, they can be used in clinical practice after validation and improvement by including more variables in equation. The identified survival prediction biomarkers could be used as base stones of potential therapeutic strategies