

PHD THESIS SUMMARY

The study on the importance of pro-inflammatory factors as prognostic factors in the evolution of polytraumatized patients

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Introduction: In today's society, trauma is the most common cause of death in people over 40 years of age and is most often due to road accidents. At the moment, there are a number of scores in the medical literature that can be used to figure out how well polytraumatized patients will do. Limitations of these prognostic scores are represented by the fact that they are identical between hospitals of different competencies and do not differ according to the anatomical region affected by the trauma or according to the age of the patients. One of the main factors that can affect the clinical evolution of polytraumatized patients, apart from the emergency treatment of these cases, is the occurrence of the systemic inflammatory syndrome.

General objectives: In the framework of this doctoral thesis, I wanted to research the associations and correlations between inflammatory markers and the severity of the trauma, the evolution of the patients, and mortality.

General methodology: The general research methodology consisted of the selection of patients for inclusion in the studies, the analysis and extraction of paraclinical data from the observation sheets of the patients, as well as the statistical analysis of the obtained data.

Study 1: In the first study, of a retrospective observational type, we investigated patients with splenic trauma, and we investigated the role of the ratio of neutrophils to lymphocytes (NLR) as a prognostic factor for the evolution of these patients. For this, we included 126 patients admitted to all surgery clinics within the Mureș County Emergency Clinical Hospital with the main diagnosis of splenic trauma. We followed the relationship between the inflammatory markers determined at admission and the severity of the trauma, to identify an association between these parameters.

Study 1 conclusions: The study confirmed the research hypotheses that were established and highlighted the importance of inflammatory markers in patients with splenic trauma. An elevated neutrophil-lymphocyte ratio (NLR), determined on the basis of the blood count at presentation, in the case of patients who have suffered trauma, has a high predictive power for the severity of the trauma. Patients with an NLR value greater than the cut-off value of 6.075 have a high probability of suffering severe trauma, and thus a greater risk of having a poor prognosis.

Study 2: The second study was designed as an observational, analytical, and retrospective type and included all patients over 18 years of age with a diagnosis of abdominal trauma confirmed by a computer tomography who were admitted to the Târgu County Emergency Clinical Hospital in Mureș, Romania, between January 2017 and December 2021. The primary endpoints studied were the risk of developing acute renal failure, the in-hospital mortality rate, and a composite endpoint of AKI and mortality. Results were stratified for all optimal cut-off values of inflammatory biomarkers at baseline.

Study 2 conclusions: Elevated levels of systemic inflammatory biomarkers at admission, according to our data, strongly predict AKI risk and mortality. In addition, myocardial infarction, obesity, renal impairment, peripheral arterial disease, and chronic renal failure were independent predictors of all

outcomes in all hospitalized patients. In addition, CIC, tobacco use, and hemoperitoneum have a predictive role in mortality and the composite endpoints but not in the risk of ARF, while atrial fibrillation has a predictive role in the composite endpoint. Given the ease of use and low cost of these reports, as well as the high risk of developing AKI and mortality in trauma patients, they can be used to stratify at-risk groups for admission, improve patient treatment, and create predictive models.

Study 3: The third study was designed as a cohort study, an observational retrospective, in which we included all patients over 18 years of age who presented, were diagnosed with chest trauma, and were admitted to the Emergency County Clinical Hospital in Târgu-Mureș, Romania, between January 2017 and December 2022. All patients included in the study had a radiological examination, either conventional radiography or computed tomography, and all were diagnosed with chest trauma as the main diagnosis. Patients were excluded who: died in the first 24 hours, suffered severe bone fractures and required specialized orthopedic care, had a history of hematological or oncological diseases, had thromboembolic events in the last two months.

Study 3 conclusions: Patients with chest injuries who show elevated inflammatory biomarkers on admission, have a high probability of developing pneumothorax and are likely to have a long course with a long hospital stay. In addition, we demonstrated that tobacco use and obesity are strong predictors for the development of post-traumatic pneumothorax in these patients.

Study 4: The fourth study of the doctoral thesis was designed as a cohort study, retrospective observational, in which we included all patients over 65 years of age who presented, were diagnosed with chest trauma, and were admitted to the County Clinical Hospital of Emergency in Târgu-Mureș, Romania between January 2017 and December 2022. All patients included in our study had a radiological examination, either conventional radiography or computed tomography, and all were diagnosed with chest trauma as the main diagnosis. In this study, we determined IL-6 in all included patients in order to identify its associations with patients' prognoses.

Study 4 Conclusions: According to statistical analysis, patients over 65 years of age who have suffered chest injuries, who have higher levels of inflammatory biomarkers on admission and IL-6, are more likely to suffer from pneumothorax and will probably follow a long course with a long hospital stay.

General conclusions: The systemic inflammatory markers determined at the presentation of the traumatized patient in the emergency unit are particularly strong prognostic factors for the patient's evolution, the risk of complications, the evolution, and the duration of hospitalization of these patients.