

Research Project

Name of Institution and department: Emergency Radiology Department, Center for radiology, University Clinical center of Serbia

Link to website: <http://www.kcs.ac.rs/>

City and Country of Institution: Belgrade, Serbia

RESEARCH GROUP

Based at Emergency Radiology Department, the group bridges the gap between emergency neuroimaging and bedside clinical management. Our core team consists of senior attending neuroradiologists specializing in trauma triage, neurocritical care specialists, and dedicated research fellows. The group operates out of a high-volume, Level 1 Trauma Center, providing an optimal clinical environment and a robust database for high-impact longitudinal studies in neurotrauma.

By combining cutting-edge image interpretation with clinical prognostic metrics, the group has established a track record of translating complex imaging phenotypes into concrete, actionable clinical workflows that improve patient care at the front lines of emergency medicine.

TITLE OF PROPOSED RESEARCH PROJECT

Prognostic Value of the Rotterdam CT Score and Glasgow Coma Scale in Predicting In-Hospital Mortality Following Traumatic Brain Injury

OBJECTIVES

- The primary objective of this study is to evaluate and compare the individual and combined prognostic power of the Glasgow Coma Scale (GCS) and the Rotterdam Computed Tomography (CT) Score for predicting short-term clinical outcomes in patients presenting with acute traumatic brain injury (TBI) (Golubović et al., 2024; Mahmoodkhani et al., 2024).
- By integrating a clinical neurological assessment tool (GCS) with an objective neuroradioimaging classification system (Rotterdam CT Score), this research aims to optimize risk-stratification models for early neurocritical care triage (Charry, n.d.; Golubović et al., 2024).

Primary Outcomes

- **Surviving Patients: Evaluation of patients successfully stabilized and discharged from acute care.**
- **Fatal Outcomes: Assessment of all-cause mortality during the acute hospitalization window.**

Secondary Outcomes

- **Need for Neurosurgical Intervention: The rate of surgical decompression, hematoma evacuation, or intracranial pressure (ICP) monitor placement.**
- **Need for Mechanical Ventilation: Incidence and duration of airway protection requirements in the intensive care unit (ICU).**
- **Length of Stay in the ICU (ICU-LOS): Total days spent utilizing critical care resources.**
- **Total Length of Hospitalization: Overall duration of stay from initial emergency department presentation to discharge or death.**

APPLICANT'S DUTIES

The applicant will serve as the principal investigator/clinical coordinator for this project, taking responsibility for the lifecycle of the study. Duties include:

- **Protocol & Ethical Compliance:** Preparing and submitting data collection protocols for Institutional Review Board (IRB) approval, ensuring rigorous adherence to local patient privacy mandates.
- **Data Acquisition & Curation:** Reviewing electronic medical records (EMR) to pull baseline clinical metrics (post-resuscitation GCS scores, age, mechanism of injury) (Sewnarain, n.d.).
- **Neuroradioimaging Assessment:** Reviewing initial unenhanced head CT scans to calculate the Rotterdam CT Score—evaluating the state of the basal cisterns, degree of midline shift, presence of epidural hematomas, and signs of subarachnoid/intraventricular hemorrhage (Mahmoodkhani et al., 2024).
- **Statistical Analysis:** Conducting logistic regression and Area Under the Receiver Operating Characteristic (AUC-ROC) curves to measure the discriminatory power, sensitivity, and specificity of each scoring matrix (Charry, n.d.; Golubović et al., 2024).
- **Reporting & Dissemination:** Drafting a comprehensive final research report for Bracco and preparing a peer-reviewed manuscript for submission to high-impact radiology or neurocritical care journals.

APPLICANT'S BENEFITS

- Participation on scientific outcomes of the project i.e. presentations to congresses or publications of papers
- **Advanced Neuroimaging Subspecialization:** Deepening expert clinical competency in advanced neuroimaging interpretation, emergency radiology triage, and automated/semi-automated data metrics mapping.

- **Biostatistical & Research Methodology Mastery:** Developing robust, hands-on experience utilizing predictive modeling techniques, handling complex longitudinal clinical datasets, and publishing within academic frameworks.
- **Professional Visibility & Networking:** Elevating the applicant's research profile by aligning with Bracco's global clinical innovation network, creating avenues for ongoing collaboration with leading tutors, key opinion leaders, and industry experts (Grégory et al., 2025).
- **Institutional Resource Optimization:** Equipping the applicant's home institution with validated clinical triage workflows that can reduce ICU resource strains, lower mechanical ventilation overhead, and improve patient throughput pipelines.

- Project Leader: Novica Djukanovic
- Members: Katarina Trajkovic, Uros Mircic, Tatjana Antonic Trebovac, Natalija Spasojevic