ACUTE-PHASE TREATMENT

Coordinadores:
Joan Martí-Fàbregas i Natalia Pérez de la Ossa

Objectives

Ischemic stroke

- Improving the selection of and access to optimal health care services to provide adequate treatment
- Clinical, radiological and biological factors related to the response to reperfusion treatment either at baseline or during the endovascular treatment
- Development of imaging processing automated systems and prediction tools of clinical prognosis
- Development of new modalities and routes of administration of thrombolytic drugs
- Mechanisms involved in the appearance of medical complications in stroke patients

Hemorrhagic stroke

- Development and validation of tools to predict clinical prognosis
- Factors associated with certain types of hemorrhage, such as those associated with anticoagulation or subarachnoid hemorrhage
- Role of hypertension on the outcome after intracranial hemorrhage
- Mechanisms associated with secondary damage after hemorrhage

Covid-19 infection

- Relationship between covid infection and vaccines, and the appearance of thromboembolic events

Workpackages

WP1: Improvement of reperfusion rates and patient selection

WP2: Improvement of the benefit/risk balance for iv thrombolysis and mechanical thrombectomy

WP3: Management of acute intracerebral hemorrhage and acute subarachnoid hemorrhage

WP4: Prevention and management of complications during acute stroke

WP5: Stroke and COVID-19

WP1 Improvement of reperfusion rates and patient selection

Pre-hospital identification of patients with acute ischemic stroke with a large vessel occlusion

Several clinical tools have been designed and validated by investigators (RACE scale)

Large and multi-territorial cohort to validate and improve pre-hospital triage tools by adding relevant clinical variables and biomarkers assessment using point-of-care technology.

Optimal imaging protocol to select patients that benefit from an endovascular therapy

Clinical study including a large imaging database to determine the optimal neuroimaging protocol and predictive radiological factors related to clinical response to reperfusion

Role of multivoxel MR spectroscopy in acute ischemic stroke

Clinical, biological and genetic factors related to the degree of collaterality

Development and validation of automated software to identify infarct volume and collateral circulation compared to conventional techniques

Machine learning algorithms using clinical variables will be developed and validated, to improve patient selection to reperfusion therapies.

WP2 Benefit/risk balance for iv thrombolysis and mechanical thrombectomy

Reperfusion injury: pathways involved in the vascular response to ischemia-reperfusion damage, including neuroimaging, collaterality, clinical and hemodynamic factors, glycemia and circulating biomarkers.
Role of **circulating mRNAs** in the development of hemorrhagic transformation (in vitro models and clinical studies)
Role of **neutrophil phenotype and neutrophil extracellular traps (NET)** to identifying possible therapeutic targets.
Role of **microcirculation** both in vivo model and in a clinical study by analyzing the retinal vascularization as a surrogate of the cerebral microvasculature.

Multicenter randomized clinical trial comparing two different strategies to optimize **hemodynamic perfusion** during the intervention.
Role of the **type of anesthesia** in clinical outcome and its relation to serum protein biomarkers.

Development of **new thrombolytic drug encapsulation systems** (nanotechnology-based tools) to increase the efficacy, safety and time of action of thrombolytic drugs.

Analysis of the thrombus: association between macroscopic and radiological image, thrombus composition and blood biomarkers (specifically focused on key proteins of inflammation and thrombosis), and different clinical outcomes and etiological mechanism.
Analyze the Mediterranean diet with thrombus composition.

WP3 Acute intracerebral hemorrhage and acute subarachnoid hemorrhage

Development of prognostic scales of ICH. Prognostic variables to be able to predict 30-day mortality and 90-day functional recovery. Validation in prospective series.

Early and **intensive blood pressure control** may be beneficial for the prognosis of these patients
Study the mechanisms underlying this hypertensive reaction, the associations with clinical, radiological, plasma and epigenetic data, and the response to lowering blood pressure therapy

Study **secondary injury mechanisms** (considered potential therapeutic targets): disruption of the blood-brain barrier, perilesional edema, apoptosis, inflammation or thrombin toxicity.
Role of dimethylarginines and other mediators in perihematoma damage
Role of exosomes as prognostic biomarkers in acute cerebral hemorrhage and their therapeutic potential.

Subarachnoid hemorrhage accounts for 5% of all strokes (80% caused by intracranial aneurysm).
Investigate biomarkers, clinical and neuroimaging data related to **complications and prognosis of patients with SAH.**
Biobank of serum samples and genetic samples.

WP4 Prevention and management of complications during acute stroke

Evaluate the implementation of **innovative models of integrated stroke care.**
Improve the comprehensive care and quality of life of stroke patients.
New data analysis technologies, creation of a permanent network that allows professionals, authorities and even the public to share information, experiences and best practices that can be adapted and replicated.

Study of brain and lung mechanisms related to the development of **stroke-associated pneumonia (SAP).**

Remote ischemic conditioning (brief and controlled episodes of transient limb ischemia) as neuroprotective treatment.
Multicentre blind randomized study of RIC at a pre-hospital level (REMOTE-CAT).
Mouse and a pig model of brain ischemic to investigate different cycles of late repeated RIC vs isolated RIC.
Omic technology (lipidomic and metabolomic) and miRNA analysis to detect biomarkers related to the RIC response.

Complications after angioplasty/carotid stenting (hyperperfusion syndrome and restenosis)
Multicenter study to verify blood biomarkers predictive of complications.

WP5 Stroke and COVID-19

Covid and stroke

Frequency of stroke in COVID-19, functional recovery, quality of life and care indicators (recanalization rate, HT, cerebral edema, early recurrences).

To analyze whether a history of stroke, according to subtypes (TIA, AIS, SAH, and ICH) is associated with greater mortality due to COVID-19.

Immunothrombosis, infections and COVID-19.

Genetic factors in post-COVID-19 stroke patients.

Vaccines and stroke

Analyze the cerebral ischemic risk of vaccines in in vitro and animal models.