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23rd SOCIAL RETURN OF THE RESEARCH
Strokes and traumatic spinal cord and brain injury

INFLUENCE OF TIME TO CONTROL OF ARTERIAL PRESSURE ON GROWTH OF THE HAEMATOMA IN PATIENTS WITH ACUTE INTRACEREBRAL HAEMORRHAGE

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1. Abstract

Spontaneous intracerebral hemorrhage (ICH) is the subtype of stroke with higher morbidity and mortality rates than other stroke subtypes. It represents 15-20% of all strokes. Only 10% of ICH patients who survive are able independently to perform daily activities after one month and 20% after six months. Despite its devastating effects and social burden, no proven treatment has been demonstrated to be effective in ameliorating ICH consequences.

High age and hypertension were reported as the main ICH risk factors. To start an antihypertensive treatment reduces the risk of ICH between 35% and 44%. However, when ICH occurs, there is no effective treatment for it.

Blood pressure is considered a good therapeutic target in acute ICH since the evidence shows that elevated blood pressure is common during the first 6 hours after stroke onset. High BP values are associated with hematoma growth, imminent cognitive impairment and an increased risk of death or dependence. Thus, several studies have looked for the best BP strategy to improve BP lowering outcome. Recent studies have highlighted the key influence of time to achieve blood pressure (BP) control in the potential benefit of intensive blood pressure reduction on attenuating hematoma expansion.

Objective

The main objective of the present project is to evaluate the association of time from antihypertensive treatment initiation to achievement of BP target (systolic BP <140 mmHg) with hematoma expansion at 24 hours in patients with acute ICH (<6hours).

Secondarily, we investigate the influence of the presence of spot signs in multiphase CT angiography and of APOE genotype in the relationship between time to BP control and hematoma expansion.

Methods

A multicenter, prospective, observational cohort study was done. The study was undertaken in two Comprehensive Stroke Centers in Barcelona (Spain) during a 4-year

period (2018-2021). Patients with acute ICH (<6 hours) confirmed in CT scan and systolic BP >150mm Hg on hospital admission were included in the study.

Patients underwent a baseline and 24-hour computed tomography (CT) scans for ICH volume measurement and multiphase CTA for the detection of spot signs; a blood sample to APOE genotype detection; a non-invasive automated BP monitoring over the first 24 hours; a neurological exploration at 24 hours as well as a functional evaluation at 90 days.

Time of the first SBP determination below the target was recorded, as well as the SBP target achievement during the first hour from antihypertensive treatment onset (main objective). Significant hematoma expansion at 24-hour CT was defined as the composite of an ICH absolute growth greater than 6 mL or relative enlargement of more than 33% from baseline CT.

2. Results

During 4 years of recruitment, 274 patients with acute ICH (<6 hours) and SBP> 150 mm Hg were included in the study. An initial cranial CT scan without contrast was performed in all cases, while multiphase CT angiography was performed in 270 patients.

During the first 24 hours, patients received an automatic and non-invasive BP monitoring. BP was recorded frequently in all the cases. Time of the first determination of SBP below the target (<140 mm Hg) and the SBP target achievement at 60 minutes were recorded (main outcome). The blood sample extraction to evaluate the APOE genotype was performed in 270 patients, all the patients included in the study.

At 24 hours, a clinical evaluation and a follow-up CT scan were performed in 266 (98.5%) of the surviving patients. Thus, at 90 days of follow-up, the functional situation was recorded in all cases.

Now, we are working on the rest of the planned analyses.

3. Future implications

The overall poor prognosis of intracerebral hemorrhage (ICH) makes this disease a major public health issue. The present project addresses a frequent disease with devastating effects and social burden for which there is a desperate need for effective therapies.

The main clinical implication of this study is offer a "proof of concept" approach that may help in the design of future therapeutic strategies focused on the acute management of ICH. Further, because intravenous treatment of lower blood pressure is relatively straightforward, not hazardous, and of low cost, if applied widely these effects could translate into major absolute benefits. This project has contributed to optimize ICH protocols management, focusing on the time targets during BP lowering. This value could be considered as a parameter of quality of care in ICH patients.

Additional trials where patients with acute ICH are randomized to early, rapid, intensive, and maintained BP lowering are warranted. Such data could confirm that BP lowering attenuates hematoma expansion and improves clinical outcomes in patients with acute ICH.

4. Scientific bibliography generated

Two articles of this project are expected to be published during 2022.