

Topic: Treating early brain injury after a subarachnoid haemorrhage – a systematic review and meta-analysis of animal studies

Background

Intracranial aneurysms (IAs) are pathological dilatations of intracranial arteries that may have an abnormally weak wall prone to rupture. IAs occur in about 2% of the population and account for approximately 85% of the non-traumatic subarachnoid haemorrhages, which can have devastating consequences such as permanent neurological damage and even death.

When a subarachnoid haemorrhage occurs, pathophysiological processes such as decrease of cerebral blood flow and cerebral perfusion pressure, an increase of the intracranial pressure, cerebral edema, inflammation and cell death occur. These pathophysiological processes combined -within the first 72 hours of the subarachnoid haemorrhage- can lead to *Early Brain Injury*.

Although many different pathophysiological processes have been described to play a part in *Early Brain Injury*, it has not led to any interventions that can be applied clinically. We therefore want to perform a systematic review of animal studies that have investigated interventions to prevent or reduce the severity of *Early Brain Injury* after a subarachnoid haemorrhage. The outcome of this systematic review might offer clinical possibilities to attenuate injury after a subarachnoid haemorrhage.

Departments: this project is a collaboration between the Dept. of Neurosurgery and the Dept. for Anaesthesiology at the Raboudumc. It is possible to partially work from home, but we welcome you to (also) work in the department.

Duration: flexible, e.g. 3 months for BSc internships, or 6-9 months for MSc internships.

Research question

Can any intervention reduce the severity of early brain injury in animal models of subarachnoid haemorrhage?

Research objectives (“*what will I be doing?*”)

1. Develop and perform a systematic literature search. Gather, assess and select all relevant studies.
2. Extract study characteristics and relevant outcome measure data.
3. Define, extract and interpret indicators of study quality and risk of bias.
4. Perform meta-analysis on extracted data, assess effect modifiers and publication bias.
5. Interpret the results and formulate directions for future research based on your findings
6. Write your report in publication format, prepare and give an oral presentation

Learning objectives (“*what will I learn from this?*”)

In brief, you'll join a specialist group of worldwide experts on evidence synthesis of animal studies and have unique knowledge about what makes animal research reliable!

In more detail, you'll learn:

1. How to design and perform a systematic literature search based on a specified review question
2. How to define in- and exclusion criteria for a specific review question
3. To extract study characteristics and data for relevant outcome measures
4. To critically reflect on a broad range of study designs and to identify risk of bias
5. To interpret the results and present these data in clear figures and tables
6. To write a scientific report in English and prepare and give an oral presentation in English

If you are interested, please contact kim.wever@radboudumc.nl and rene.aquarius@radboudumc.nl