

Outcome after treatment of cerebral aneurysms

Akademisk avhandling

Som för avläggande av 2024 doktorexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentlig försvaras i Hjärtats aula, vita stråket 12, den 8/3 2024, klockan 9:00.

av Jennifer Samuelsson Råmunddal

Fakultetsopponent:

Professor Mikael Svensson

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Avhandlingen baseras på följande delarbeten

- I. Samuelsson, J, Jakobsson, H, Rentzos A, Jakola AS, Nilsson D. 2021. Neurological Outcome, Mental Fatigue, and Occurrence of Aneurysms >15 Years After Aneurysmal Subarachnoid Hemorrhage. *World Neurosurgery* vol. 151: e122-127.
- II. Samuelsson, J, Sunila M, Rentzos A, Nilsson D. 2022. Intra-arterial nimodipine for severe cerebral vasospasm after aneurysmal subarachnoid haemorrhage - neurological and radiological outcome. *The Neuroradiology journal* vol.35:213-219.
- III. Samuelsson, J, Rentzos A, Rawshani A, Karlsson A, Ståleby M, Nilsson D. Risk of de novo aneurysm formation in patients previously diagnosed with a ruptured or unruptured aneurysm: 18-year follow-up. 2023. *Clinical neurology and neurosurgery* vol.233: 107980.
- IV. Ceder E, Samuelsson J, Nilsson D, Björkman-Burtscher IM, Rentzos A. Long-term follow-up of flow diverter treatments – a single center experience. 2024. Manuscript.

SAHLGRENSKA AKADEMIN



Outcome after treatment of cerebral aneurysms

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Abstract

A cerebral aneurysm is characterized by a saccular or tubular deformation of the arterial vessel wall. The rupture of a cerebral aneurysm, leading to an aneurysmal subarachnoid haemorrhage (aSAH), is associated with high morbidity and mortality rates. Treatment options, either surgical or endovascular, aim to isolate the aneurysm from the normal blood circulation. The decision to proceed with treatment takes into account several factors, including the aneurysm's size, location, and shape, as well as the patient's age, existing co-morbidities, and potential risks associated with the treatment.

The aim of this thesis has been to report the long-term outcomes, both neurological and radiological, in patients that have been treated for a cerebral aneurysm, both ruptured and unruptured.

In study I, the neurological long-term outcome in patients that have previously suffered an aSAH was good, despite this; more than 60% of the patients still reported mental fatigue of some degree.

Study II assessed the neurological and radiological outcome in patients with refractory cerebral vasospasm that received intra-arterial nimodipine (IAN). The majority still suffered an ischemic cerebral infarction and a good clinical recovery was seen in almost half of the patients.

In study III, an 18-year follow-up in patients previously treated for an intracranial aneurysm (IA) was performed where we identified 13.6% of these with a de novo aneurysm.

In study IV, a follow-up of patients treated at our institute with a flow diverter where we identified three-quarters of the aneurysms treated to have an aneurysm occlusion and that patients >70 years had a lower occlusion rate.

Conclusion and implications: A longer neurological and radiological follow-up time is deemed necessary after having been diagnosed and treated for an intracranial aneurysm. A majority of the patients receiving intra-arterial nimodipine suffered a cerebral infarction; despite this, approximately half of all patients had a good neurological outcome after 6 months. Flow diverters have an acceptable occlusion rate in patients <70 years of age, and this treatment offers a reasonably safe alternative in patients with aneurysms posing a high risk of causing potential harm to the patients.

Keywords: Aneurysm, intra-arterial nimodipine, de novo aneurysm, flow diverter

ISBN: 978-91-8069-565-7 (TRYCK)

<http://hdl.handle.net/2077/79101>

ISBN: 978-91-8069-566-4 (PDF)