ENDOVASCULAR TREATMENT OF SMALL RUPTURED INTRACRANIAL ANEURYSM AT ANTERIOR CEREBRAL CIRCULATION

Thesis

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Dedication

This work is dedicated to . . .

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List of Abbreviations

Abb.	Full term
ACA	*Anterior cerebral artery*
AchA	*Anterior choroidal artery*
Acom	*Arterior communicating Art.*
AICA	*Anterior inferior cerebellar artery*
BA	*Basilar artery*
CCA	*Common carotid artery*
CN II	*Cranial nerve II*
DSA	*Digital subtraction angiography*
ECA	*External carotid artery*
FDD	*Flow diversion device*
Front Br	*Frontal branch*
ICA	*Internal carotid artery*
L.P.	*Lumbar puncture*
LSA	*Lenticulostriate artery*
LtICA	*Left internal carotid artery*
LtPcom	*Left posterior communicating artery*
MCA	*Middle cerebral artery*
MRS	*Modified Ranken score*
OA	*Ophthalmic artery*
OLF-Tr.	*Olfactory tract*
PCA	*Posterior cerebral artery*
PcoA	*Posterior communicating artery*
PED	*Pipeline embolization device*
PICA	*Posterior inferior cerebeller Art.*
Rec Art	*Recurrent artery huebner*
SAH	*Subarachnoid haemorrhage*
SCA	*Superior cerebeller artery*
VA	*Vertebral artery*
VA	*Vertebral artery*

INTRODUCTION

An intracranial aneurysm is a cerebrovascular disorder in which weakness in the wall of a cerebral artery or vein causes a localized dilation of the blood vessel. Intracranial aneurysms are common, with a prevalence of 0.5% to 6% in adults. Most intracranial aneurysms are asymptomatic. Some are discovered incidentally in neuroimaging studies and some produce symptoms due to compression of neighboring nerves or adjacent brain tissue. Others are detected only after they have ruptured and caused subarachnoid hemorrhage, a devastpating type of stroke associated with 32% to 67% case fatality and 10% to 20% morbidity ***(Caranci et al., 2012).***

Almost all aneurysms rupture at their apex. This leads to hemorrhage in the subarachnoid space and sometimes in brain parenchyma. Minor leakage from aneurysm may precede rupture, causing warning headaches. About 60% of patients die immediately after rupture. Larger aneurysms have greater tendency to rupture, though most of ruptured aneurysms are less than 10 mm in diameter. Also, vasospasm can occur secondary to subarachnoid hemorrhage following a ruptured aneurysm. This is most likely to occur within 21 days and is seen radiologically within 60% of such patients. The vasospasm is thought to be secondary to the apoptosis of inflammatory cells that become trapped in the subarachnoid space ***(Willinsky et al., 2009).***

Once suspected, intracranial aneurysms can be diagnosed using (CT3D) cerebral angiography, conventional angiography, magnetic resoning imaging. Currently there are two treatment options for securing intracranial aneurysms: Surgical clipping or endovascular coiling. If possible, either surgical clipping or endovascular coiling is usually performed within the first 24 hours after bleeding to occlude the ruptured aneurysm and reduce the risk of rebleeding. Surgical clipping was introduced by Walter Dandy of the Johns Hopkins Hospital in 1937 ***(Klompenhouwer et al., 2011).***

Endovascular coiling refers to the insertion of platinum coils into the aneurysm, the coils expand and initiate a thrombotic reaction within the aneurysm that. In the case of broad-based aneurysms, a stent may be passed first into the parent artery to serve as a scaffold for the coils ***(Plowman et al., 2011).***

Small aneurysms, compared to larger ones are more difficult to embolize, as there is a smaller margin for error with microcatheter placement, and the forces applied by the coil existing into aneurysm are distributed across a smaller surface area, increasing the risk of perforation, particulary in recently ruptured lesions ***(Sluzewski and van Rooij, 2003).***

An aneurysm may grow or recanalize after coil embolization. This may occur even in aneurysms that appear completely occluded after initial treatment. Further embolization is possible and may be required to prevent growth

and potential subarachnoid hemorrhage. Catheter angiography has been the preferred imaging modality for follow-up after coil embolization. Although MR angiography can identify a residual aneurysmal neck, platinum coils are associated with artifacts that preclude reliable imaging of treated aneurysms with MR and CT angiography ***(Willinsky et al., 2009).***

The most significant factors in determining outcome are the Hunt and Hess grade, and age. Generally patients with Hunt and Hess grade I and II on admission to the emergency room and patients who are younger within the typical age range of vulnerability can anticipate a good outcome, without death or permanent disability. Older patients and those with poorer Hunt and Hess grades on admission have a poor prognosis. Generally, about two thirds of patients have a poor outcome, death, or permanent disability ***(Caranci et al., 2012).***

AIM OF THE WORK

Evaluate the efficacy of the endovascular treatment of small ruptured intracranial aneurysm at anterior cerebral circulation as regard radiological and clinical outcome. This study will be conducted during the period between December 2013 to December 2015.