Microsurgical Brain Aneurysms

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Illustrated Concepts and Cases

Springer

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This book is for the residents and young neurosurgeons deciding to embark upon vascular neurosurgery, which is a life-long journey with an uncertain destination.

Preface

Microsurgery of cerebral aneurysms has gone a long way since the publication of the first book on the topic by Walter Dandy in 1944. Development of aneurysm surgery coincided to a large degree with the development of microsurgical techniques in general. Accumulation of detailed technical knowledge and also pathophysiological understanding led to the publication of a monumental three-volume text by John Fox in 1983. Aneurysm microsurgery was special, it was difficult, and it was not for everyone. It was challenging. The advent of endovascular coiling in 1990 had a deep impact on the microsurgical landscape. It was realized long before the publication of the ISAT results (International Subarachnoid Aneurysm Trial) in 2002 that the endovascular approach could treat aneurysms of the basilar apex with much less risk than microsurgery. Publication of the ISAT results involved a number of consequences. Microsurgery has become the second choice for cases in which the endovascular therapist encounters difficulties. Depending on the local team, more difficult aneurysms could be left for surgery. On the other hand, the neurosurgeon does not need to operate on all difficult aneurysms. Surgery can avoid risky cases. The team interaction is certainly critical for the balance between the two disciplines. There are currently large differences across Europe with regard to the proportion of aneurysms being coiled and clipped. These differences are essentially a consequence of the competitive nature of coiling and clipping. To eliminate factors of competition among disciplines, the neurovascular surgeon competent with microsurgical and endovascular techniques emerged in the United States and Japan, among others. In Europe, attempts were made to establish such a system in a few places but without much success. Therefore, the interdisciplinary team approach remains the European standard. The current average relation between clipping and coiling is quite balanced (around half and half) in Europe.

Aneurysm microsurgery remains special and challenging. Microsurgical techniques are innate to the current generation of neurosurgeons. As such, a modern book of aneurysm microsurgery can avoid repeating basic microsurgical techniques. This was the basis when we decided to analyze our experience of the last decades and summarize essential clues for success.

Technical development of aneurysm microsurgery was largely stunned by the advent of endovascular therapy. Since it is becoming quite clear that microsurgical techniques for brain aneurysms will be needed at least for the next decades, we are convinced that technical development must be intensified.

At our center, the traditional large openings resulting in stigmatizing disfigurations have been replaced by small targeted craniotomies. It is a main focus of the present book to introduce the targeted approaches and the resulting specific clipping techniques.

Management of subarachnoid hemorrhage and the technical act of clipping a brain aneurysm requires a deeper understanding of pathophysiology and hemodynamics because these factors determine the typical constellations, configuration, and consequently approach and clipping techniques. Therefore, the hemodynamic principles and resulting types of aneurysm are depicted in the first part of this book.

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Abbreviations

A1	Precommunicating segment of anterior cerebral artery
A2	Postcommunicating segment of anterior cerebral artery
ACA	Anterior cerebral artery
AChA	Anterior choroidal artery
Acom	Anterior communicating artery
AICA	Anterior inferior cerebellar artery
AVM	Arteriovenous malformation
BA	Basilar artery
CCT	Cranial computed tomography
CIRS	Critical incident reporting systems
CSF	Cerebrospinal fluid
DSA	Digital subtraction angiography
EC-IC	Extracranial to intracranial
EVD	External ventricular drainage
HHU	Heinrich Heine University, Düsseldorf
ICA	Internal carotid artery
ICG	Indocyanine green
ICP	Intracranial pressure
ICU	Intensive care unit
M&M	Morbidity and mortality
M1	Proximal segment of middle cerebral artery
M2	Main branches of middle cerebral artery
MAP	Mean arterial pressure
MCA	Middle cerebral artery
MTT	Mean transit time
OR	Operating room
PCA	Posterior cerebral artery
Pcom	Posterior communicating artery
pCT	Perfusion CT
PICA	Posterior inferior cerebellar artery
SAH	Subarachnoid hemorrhage
SCA	Superior cerebellar artery
STA	Superficial temporal artery
TCD	Transcranial Doppler
VA	Vertebral artery
WFNS	World Federation of Neurosurgical Societies