
Foreword

In this fourth volume of surgical vascular entities, Dr. Michael Lawton tackles cavernomas. As in his previous three textbooks in this series of *Seven* pathologies, one is immediately fascinated with the quality of the illustrations and the easy-to-read and readily comprehensible prose. There is no similar publication in our neurosurgical literature that represents the surgical approach to brain cavernous malformations with such perspective and beauty. Michael has curated an impressive compendium of 65 surgical videos and 8 animations to accompany the text and illustrations.

This work begins with 10 tenets for the neurosurgical management of brain cavernous malformations. The first chapter describes a taxonomy that classifies cavernomas by their location and surface presentation into 7 types and 35 subtypes. The taxonomy established preferred surgical approaches to reach and resect targeted cavernomas safely. This framework uses natural corridors and vascular landmarks to navigate the subarachnoid space to lesions. The following chapters describe the brainstem and cerebral anatomy and dissection techniques in detail, with chapters on the triangle concept, arterial landmarks, hotspots of brain eloquence once thought to be noneloquent, recurrence, and patient selection. With Chapter 10 (Neurosurgical Cartography), Michael delves into his

philosophical approach to his concept of the brain and our role as neurosurgeons in patient care. The next 7 chapters describe the 7 types and 35 subtypes of cavernomas and precisely how to approach them for resection. Finally, in Chapter 18 (Seven Cavernomas: Project Connectomunculus and the Mind), he comes full circle back to the future of neurosurgery's role in defining how the brain creates emotion, memory, neural plasticity, intelligence, and consciousness, noting that "These amazing facets of the mind make us human, and nothing is more important than understanding that."

I deeply admire Michael's commitment to the endless hours and meticulous attention to detail it took to compile this volume, the great deal of introspection and study that led him to discover what cavernomas have taught us, culminating in his taxonomy schema and vision into the future.

This volume belongs on the shelf of every vascular neurosurgeon, and the surgical lessons and the illumination contained in the taxonomy make it mandatory reading for anyone who practices our art.

It is a privilege to write the foreword to this volume, written by a former pupil who has fulfilled the goal of every dedicated teacher, which is to advance our specialty and to surpass the teacher. Michael Lawton has certainly achieved that!

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Foreword

It was July 1994. I was starting my year as Robert Spetzler's Fellow at Barrow Neurological Institute in Phoenix, Arizona. No sooner had I arrived than I was told that a standout senior resident in the program was enamored with cerebrovascular surgery, intensely focused on learning all there was to learn from his iconic mentor, and he was fueled by a unique drive to excel. His name was Michael T. Lawton. The first time Mike and I scrubbed together, we discussed specifically how Spetzler might want us to carry out the cranio-orbito-zygomatic approach. Mike was full of inquisitive questions. Thirty years on, they never stopped.

Socrates stated: "The unexamined life is not worth living." I could paraphrase: "The unexamined craft is not worth practicing." Very few neurosurgeons have dissected and reported on the underpinnings of the craft of cerebrovascular microneurosurgery to the depth that Mike has. He is the embodiment of what becomes of a surgeon when he or she is blessed with or fosters a few key characteristics: curiosity, passion, ambition, courage, surgical skill, unquenched thirst for excellence, relentless self-assessment, an uncanny ability to analyze, then synthesize, then express thoughts and techniques to peers and students. Mike's major in college was engineering, and it shows very clearly in the constitution of the masterful surgeon he has become. His precise and analytical mind is evident throughout his writings. As he matured as a top-tier cerebrovascular neurosurgeon, he began to recognize a strong urge to describe, analyze, and classify every surgical lesion he tackled and every surgical move he made. He also discovered that the best way to learn was to teach. Thus began his remarkable "Seven Series" of books on aneurysms, AVMs, bypasses, and, now, this latest work of art, *Seven Cavernomas: Tenets and Techniques for Resection*.

This latest rendition of his thoughts and experience on the topic is illustrated in 18 chapters. Not surprisingly, Mike's obsession with order and structure compels him to start his book by developing a taxonomy to classify cavernoma locations into 7 categories that are further subcategorized into 35 locales. He goes on to describe the essence of subarachnoid dissection for each location and the "triangle" concept for the surgeon as the target is approached. In a Rhoton-esque manner, he allocates an "arterial address" to each cavernoma and further considers the useful concept—though debatable and in need of subtle analysis—of "safe entry zones." He goes on to discuss general techniques of cavernoma resection, the treachery of their blind spots in those deep dark holes, and the nebulous concept of "eloquence" and "eloquent noneloquence." He presents extensive outcome results from the combined Spetzler-Lawton surgical series and uses those results to propose a grading system for brainstem cavernomas that

predicts surgical morbidity. In a touching segment, he pays posthumous tribute to Lisa Hannegan, his former nurse practitioner, who had long realized that not all things are measurable, verifiable, or even describable; "gut feelings" and that "je ne sais quoi" inner voice of an experienced surgeon still matter as much as if not more than all the grading systems, taxonomies, and predictive scales. If you have to study the scan of a patient with a brainstem cavernoma for more than 5 minutes, Lisa surmised, then perhaps there is no safe surgical approach to it.

By the time Chapter 10 comes along, it is very clear that if one were to choose a metaphor for the surgery of cavernomas, "cartography"—along with its rich history and visual appeal—is the perfect choice. Mike uses the metaphor to its full extent to demonstrate that the purpose of writing is a clear depiction of the complex rather than a complex depiction of the simple. The seven cavernoma locations are then each assigned a chapter, with links to superb surgical videos for each cavernoma location. It is most revealing and interesting, but not surprising, that only one chapter is dedicated to the cerebrum, even though it is by far the most voluminous portion of the brain. This conception is entirely appropriate, as Mike's analysis is commensurate with the surgical challenges and variables encountered rather than the prevalence of cavernomas at various locations. One can debate whether the "insula" should have been part of the cerebrum rather than lumped with the "putamen," but again, this book is written through a surgeon's lens, not an anatomist's.

The last chapter stands in clear contrast to the rest of the book. It is the only chapter that illustrates that our work as surgeons and thinkers is never done. Mike was clearly hoping to reach a definitive solution to the problem of reconciling "localization" and "connectomics." One can feel his intense need to have reached the neurosurgical equivalent of a "unified theory" for all surgical approaches to intra-axial lesions—what Mike named "connectomunculus." It was not meant to be, as our current understanding of the paths and interdependence of all those trillions of synaptic connections is highly rudimentary and does not allow proper synthesis—yet. In other words, the brain has first to understand itself fully before it can describe itself. Thus, Mike leaves an open door for future generations to persevere.

This book also demonstrates the sublime synergy that can be achieved when a brilliant surgeon collaborates with a superb medical illustrator. Peter Lawrence's artistry in every drawing is exquisite and almost stands by itself as a microneurosurgical storyline. The "Netterian" style of Kristen Larson Keil in depicting every brainstem syndrome and clinicopathological model is equally stunning and informative.

“The most powerful weapon on earth is the human soul on fire,” said Ferdinand Foch. Passion without determination is but a dream or a state of mind; determination without passion is sterile or short-lived. It has been my distinct pleasure to watch the author’s inquisitive, passionate, determined mind, which I first encountered in

1994, blossom into the making of a world authority on cerebrovascular neurosurgery. I have cherished our discussions and debates in private settings and conference halls. I have no doubt this latest fruit of his mind will entice legions of students to enter the field that Yaşargil heralded 60 years ago. If that is not a legacy, then I don’t know what is.

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