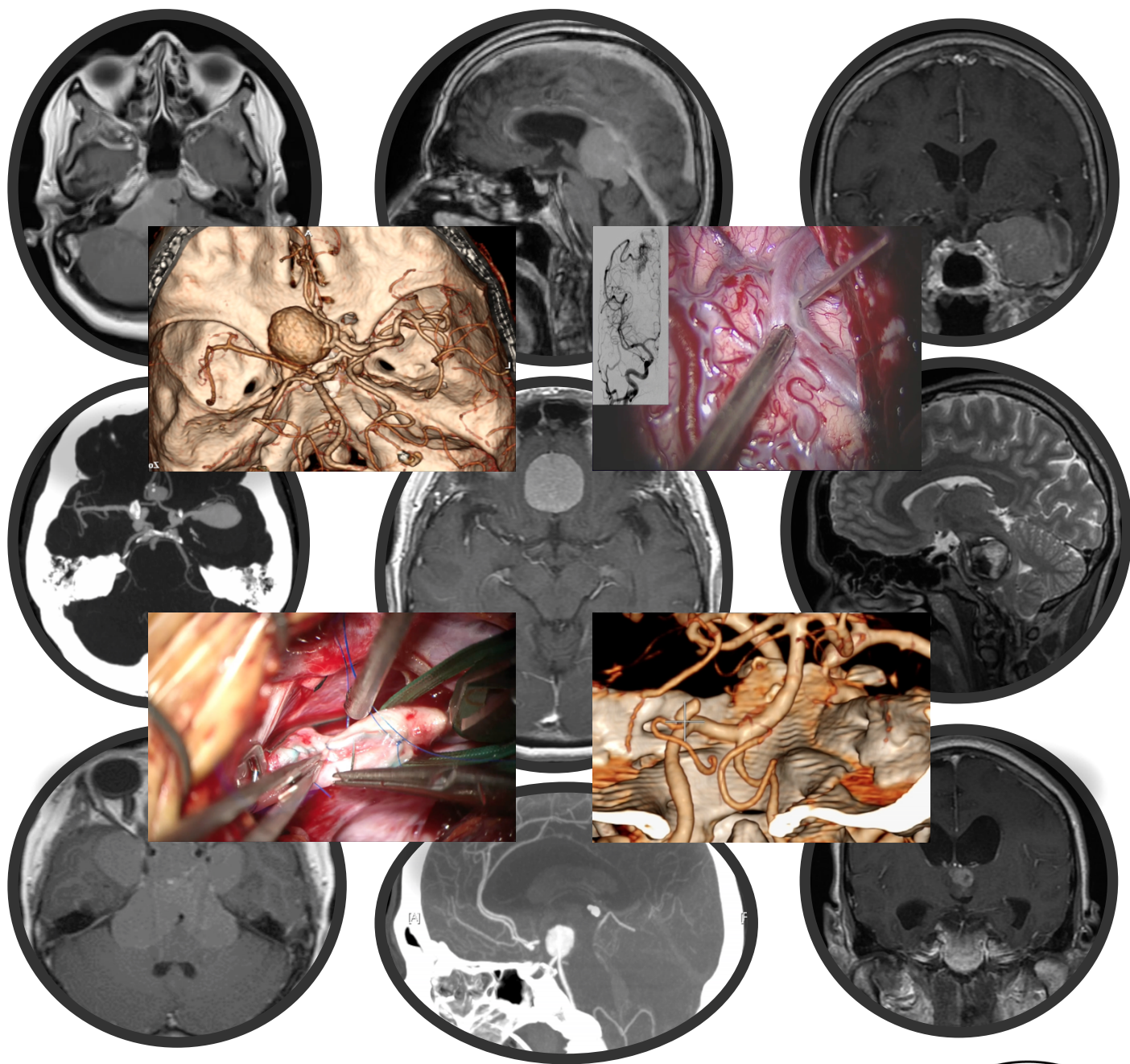
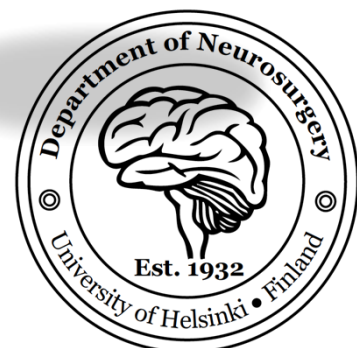


HERNESNIEMI'S 1001 AND MORE MICRONEUROSURGICAL VIDEOS

Videobook of Neurosurgery



JUHA HERNESNIEMI
JOHAM CHOQUE-VELASQUEZ
DANIL A. KOZYREV
PEERAPHONG THIARAWAT



HERNESNIEMI'S 1001 AND MORE MICRONEUROSURGICAL VIDEOS

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Author contact information

Juha Hernesniemi M.D., P.h.D.

Emeritus Professor

Email: juha.hernesniemi@icloud.com, juha.hernesniemi@hus.fi

Tel: +358-50-427 0220

Joham Choque-Velasquez M.D., Neurosurgeon

Email: johchove@hotmail.com, johchove@icloud.com

Tel: + 51-964-338-823

Danil A. Kozirev M.D., Neurosurgeon

Email: danilkozyrev@gmail.com

Tel: +7-950-035-05-18

Peeraphong Thiarawat M.D., Neurosurgeon

Email: peeraphongt@gmail.com

Tel: +66-834-966-321

Department of Neurosurgery

Helsinki University Hospital - University of Helsinki

Topeliuksenkatu 5

00260 Helsinki, Finland

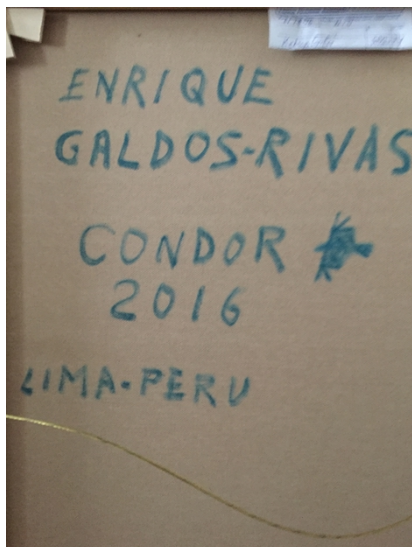
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Galloso Reyes

In every profession we should fly high. Even we can not reach "El Condor", we should come close!



"El Condor" by Enrique Galdos-Rivas
Lima Peru, 2016



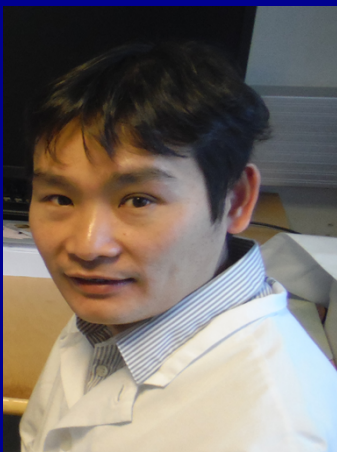
JUHA HERNESNIEMI



JOHAM CHOQUE-VELASQUEZ (Peru)



DANIL A. KOZYREV (Russia)



PEERAPHONG THIARAWAT (Thailand)

COLLABORATORS

Isaac Aguirre-Carreño
Roberto Colasanti
Giulia Di Ventura
Ahmed Elsharkawy
Kléber E. González Echeverría
Ferzat Hijazy
Tarik Ibrahim († 2016)
Masahiro Indo
Behnam R. Jahromi
Jiang Jiang
Jane Lau
Ricardo Lopez
Kenneth Lopez-Gutierrez
Makhkam Makhkamov
Ahmadreza Rafiei
Joseph Serrone
François Sharafeddin

Fellows Department of Neurosurgery HUH between 1997 and 2016

George Fotakopoulos
Peeraphong Thiarawat
Patcharin Intarakhao
Danil Kozyrev
Tarik Ibrahim († 2016)
Ricardo Lopez
Ahmadreza Rafiei
Joham Choque-Velasquez
Jane Lau
Fransua Sharafeddin
Hidetsugu Maekawa
Rosalia Duarte
Ahmad Hafez
Mardjono Tjahjadi
Nicolas Moliz Molina
Antonio López González
Hanna Lehto
M. Martinez-Madrigal
Aruma Jimenez O'Shanahan
Jianjun Sun
Chaiyot Siangprasertkij
Makhkam Makhkamov
Johan Marjamaa,
Ranjan Jena
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Francisco Muñoz
Felix Göhre
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Serge Marbacher
Amit Chakrabarty
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Essam Abdelhameed
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Rossana Romani
Christian N. Ramsey III
Esa-Pekka Pälvimäki
Ana Maria Millan Corada
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Kraisri Chantra
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José Peláez
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Joonas Varis
Jari Siironen
Antinheimo Jussi
Mika Niemelä
Avula Chakravarthi
Munyao Nzau
Leena Kivipelto
Hu Shen

Some Prominent Guests:

Prof. M. Gazi Yaşargil, MD Switzerland
Prof. Vinko Dolenc, MD Slovenia
Prof. Alexander Konovalov, MD, PhD Russia
Prof. Robert F. Spetzler, MD USA
Prof. Rokuya Tanikawa, MD Japan
Prof. Uğur Türe, MD Turkey
Prof. Madjid Samii, MD Germany
Prof. Ali Krisht, MD USA
Prof. Fady Charbel, MD USA
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Prof. David Langer, MD USA
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Prof. Ling Feng, MD China
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For strong believing in us and for the hard pressure given many times, we thank specifically Professor James Ausman.

In the same way, our thanks go to MD Behnam Rezai for his invaluable help at many stages.

FOREWORD 1

Professor Juha Hernesniemi from Helsinki Finland has assembled more than 1100 videos specially edited for the reader into short and some longer versions which cover a wide spectrum of the surgical techniques he perfected over his long career. These videos have been carefully edited by his dedicated team of fellows and assistants to highlight the work he has done. These are masterpieces of surgery done by a master surgeon. Note how ever move he makes is planned and not wasted. His movements are simple and directed toward the goal of achieving a good result in each patient. This book, which he and his colleagues produced, "Hernesniemi's 1001 and more microneurosurgical videos" that can be downloaded FREE under the Toolbar or Menu under "POSTS" is a great supplement to this work. His operations, although edited, take about 1 hour to perform or perhaps some additional time for more complex cases. This information alone at a time, when the world is becoming overwhelmed by technology, is a testimony to developing the Art and Science of Surgery to the point that it can be done anywhere in the world with a surgical microscope and irrigating bipolar and a limited number of instruments. These facts alone indicate that any neurosurgeon, who works diligently understanding surgical anatomy and becoming a skilled microsurgeon, can repeat what Professor Hernesniemi has done. That is his message to all the readers. He has spent hours in the laboratory, worked with masters to learn their techniques and then adapted all of this information to achieve excellent results.

These 1001 Hernesniemi Videos will be his legacy to the world of neurosurgery for decades to come. That is also his

goal to teach neurosurgeons all over the world what he learned.

It will take you time to see all these videos which should probably be viewed as the particular case you have is presented to you. Work on his approaches in the laboratory is invaluable or if you have no laboratory, working in the night after everyone is gone on the microscope in the operating room on animals to perfect your techniques of hemostasis and tissue dissection will give you a quantum leap in your skills used clinically. It all can be done if there is a will to learn excellence!

What you are seeing is excellence and actually an exceptional Artist who is performing his work. These are priceless additions to your knowledge. Surgical Neurology International is honored and pleased to bring them to you.

James I. Ausman, MD, PhD

Editor in Chief

SNI Publications

<http://surgicalneurologyint.com/1001-hernesniemi-videos/>.

FOREWORD 2

Like any religion, neurosurgery also has its own Holy Places. These are places neurosurgeons must visit in order to observe and learn the most advanced techniques to stay abreast of changes in their field. However, unlike Religion, neurosurgical Holy Places change overtime in relation to exceptional leaders and phenomenal teams. For the past two decades, Helsinki Neurosurgery in Helsinki, Finland has been one of those Holy Places which any neurosurgeon interested in cranial Neurosurgery, particularly Vascular Neurosurgery, had to visit to be at the cutting edge of the field.

The words “fast, clean and respecting normal anatomy” have resonated in operating rooms around the world based on the example set by Juha Hernesniemi and his team. Early in the 2000’s, I started hearing, mostly from my European neurosurgical friends, legendary tales about this phenomenal place and this fantastic surgeon. Recounts sounded to be too good to be true so, in February 2006, (one of the very first US trained neurosurgeons) I ventured myself to go and check it out. During my one week stay in Helsinki, I was able to witness first-hand the veracity of the legendary tales. Consequently, that week in Helsinki changed my professional life.

Juha Hernesniemi is one of those rare individuals able to achieve excellence and world class achievements in all of the three pillars of Medical Sciences: Clinical Practice, Research and Teaching. In Clinical Practice, he and his team have been able to dissect a surgical operation (especially for intracranial aneurysms) into the different single components, eliminate any waste, push the limits, and create a product that is nothing short of perfection. Such phenomenal achievements in clinical

practice have been paralleled with an impressive number of publications on cerebrovascular diseases and benign tumors. The beautiful monographs produced by his residents for their PhD theses have become “classic” and a favorite in my library collection. Juha’s commitment to the “...education of those who come after us” is unparalleled and illustrated by over 3000 international visitors and fellows practicing all over the world and many former residents who have become neurosurgical leaders of their own under his guidance and tutelage.

Since my visit to Helsinki in 2006, a great friendship developed. I have been able to appreciate the man behind the great surgeon and teacher. I have been particularly impressed, among many other personal qualities, by Juha’s generosity, which I experienced overwhelmingly during my first visit. He spent great deals of time discussing cases and was genuinely interested in my opinion and the opinion of other visitors and trainees. His autographed copy of the book on posterior circulation aneurysms, which he co-authored with Drake and Peerless is one of the jewels of my collection. Over the years, I have often witnessed selfless and incredible acts of generosity toward his residents, fellows and even the occasional visitors who may have been experiencing difficult times. The incredible collection of videos which form the basis of the “1001 Videos” is yet another selfless and magnanimous act from this neurosurgical giant and his team for the benefit of neurosurgeons and, indirectly, countless patients worldwide.

Giuseppe Lanzino, M.D.
Rochester USA, June 2016

FOREWORD 3

Juha Hernesniemi of Helsinki Neurosurgery (Juha.Hernesniemi@icloud.com) is one of the great microneurosurgeons, a minimalist developer, teacher and inspirator, known to the ENTIRE (rich and unrich) neurosurgical world through his live microneurology courses and site visits as well as through his *Hernesniemi Fellows* and intraoperative videos edited by them. Along the tradition of famous instrumentalists in history, he had world leader mentors (Yasargil, Drake and Peerless) like Cushing (Halsted and Osler) and Yasargil (Krayenbühl) had, and he became (epigenetically?) an amazingly tireless performer, with sleep as his most leisure time.

After observing Yasargil while a medical student in Zurich, he specialized at Helsinki Neurosurgery but then had to conclude: I will not become *Hernesniemi* here. In 1980 he crossed the Rubicon into the vacuum of then postnatal (unlikely) Kuopio Neurosurgery in Eastern Finland, starting to serve a population of 851.000. They were pestered by saccular intracranial aneurysm (IA) disease, so he also dedicated to IA microsurgery. Luck stroke with the creation of the now famous Kuopio IA Database: a casually added variable 'familial disease' later proved highly significant (1).

Juha Hernesniemi self-made himself *Hernesniemi* at Kuopio Neurosurgery between 1980 and 1997. In the path to fame, *his 1st stroke of genius* was to MINIMALIZE microneurology, with a Contraves Zeiss microscope (arid to present eyes) as his aid. With more than cushingnesque fervor and attention to the smallest of details, he analyzed / excluded / adopted / modified / standardized / repeated-repeated-repeated EVERYTHING in and around his physical and mental

conduct of microneurosurgery (2). The honed art of repetitive minimalism resulted that his microneurosurgeries became amazingly fast – as the press and outsiders would (naively) note. Truly, his minimalist and ceaseless performances look seducingly simple – but it would be unwise to try to imitate him without thousands of repetitions behind. There was also a cushingnesque price to pay: immersion in the (lonely) microcosmos of microneurosurgery, transparent but to a few outside. He was not to be found in the Tarina Golf Club terrace celebrating a 10-meter put in the 17th hole.

Juha Hernesniemi became Professor and Chair of Helsinki Neurosurgery in 1997. Along the tradition (Cushing, Yasargil), he had tried his hand in medical textbook writing with Drake and Peerless in Florida (3) but found it time-demanding and demanding ('to start writing is hell') along with Cushing: 'The pen is more difficult than the scalpel'. With this only Magnum Opus, *his 2nd stroke of genius* was to realize that live presence and Open Access video presence are far superior means to exhibit his art of minimalism. *The next three strokes of genius* were: *Hernesniemi Fellows*; *the annual Helsinki Live Demonstration Course in Operative Microneurosurgery*; and *invitation of international stars* to act (naturally in tail coats) as Opponents in the PhD Dissertations of Helsinki Neurosurgery.

Along with the spreading fame, young male and female neurosurgeons (over 3000 Hernesniemi visitors and 80 Fellows by now) from all corners of the world started to flock to Helsinki to observe, record, close and discuss his microneurosurgeries. He accepted them no matter matter how shaky their English was in faxes and later in emails. They spent awake hours in his OR and the adjacent library, essentially editing his intraoperative videos from now huge

Helsinki Neurosurgery Video Archive. Unlike the tradition, he was very gentle to his Fellows who became to adore him and went to spread the word and resume their careers in their home countries.

The annual Helsinki Live Demonstration Course in Operative Microneurosurgery has been given 16 times by now, with more than 1 000 observers from all continents. The live course – arguably the most appreciated in the neurosurgical world – was signed by Yasargil in the early years. Greatness in microneurosurgery is not measured by medals or honorary doctorates – but the willingness of colleagues from anywhere to come to observe live surgeries, even in the northeast corner of Europe.

Microneurosurgery – purposeful action in (a) stereoscopically visualized, magnified and illuminated small confined spaces with (b) abnormally small bimanual movements of microinstruments and (c) coming spectral tissue analysis and (d) use of fluorescenating biologically targeted molecules – would deserve the status of **APPLIED SCIENCE** in addition to being **ART**. But it is difficult to identify **ANY UNIVERSITY DEPARTMENT**, which comprehensively studies such human microaction, in terms of, say, cognition and haptics, or optimal microinstrumentation or microergonomics.

Juha E. Jääskeläinen
Kuopio Finland, June 2016

FOREWORD 4

'Simple, clean, while preserving normal anatomy' Clean is fast and effective. Surgery is art – you should be one of the artists' – Juha Hernesniemi

As Prof. Spetzler wrote in this foreword in the 'Helsinki Microneurosurgery, basics and tricks' book (freely available on the internet and as an app) 'fortunate are the neurosurgeons who have the opportunity to visit the Department of Neurosurgery at Helsinki University Hospital with thousands of visitors over the last 20 years.

World has become smaller and traveling easier but at the same time with the internet also access to all data, old and new, has become available to all neurosurgeons and residents in the world. Publishing operative videos has become a science of its own and can serve as an option to learn basics and tricks in surgery instead of traveling and seeing especially when more experienced and then can appreciate also the nuances. Watching and editing your own videos is highly recommended to all as then you see your own hands work like with the eyes of others and you may be surprised in both in the positive and negative. However, after analyzing your every movement in your recordings your surgeries will become better.

The 1001 and more videos from Helsinki Neurosurgery will certainly become a classic learning tool for those interested in refining their techniques to the finest form of neurosurgical art. Prof. Hernesniemi's techniques first spread into the whole staff at the Helsinki Neurosurgery, and thereafter to all over the world with frequent and welcomed visitors who have challenged him and other the neurosurgeons to perform their very best each time with a bilateral learning experience. The

fruits of hard work, personal and collective experience after thousands and thousands of cases is now available to all in shorter and longer versions depending on the needs and level of expertise of those watching. This way one may cut some years or even decades of training by ‘stealing’ the experience of others for the maximum benefit to the patients. Even if speed can’t be preferred over good results and quality of treatment it is an eye-opening experience to see for the first time aneurysm surgery to be performed in less than 30 minutes skin-to-skin with an excellent result. By learning anatomy and following the principles of the Helsinki book to leave every unnecessary step out, and watching the 1001 videos it may become a reality to many.

As a former Fellow of Prof. Hernesniemi and his successor as a Chairman I warmly recommend you to watch and learn – during my Fellowship I was often truly amazed and it was a life-changing experience. Watching the videos may change your life, too.

Mika Niemelä MD PhD
Helsinki Finland, July 2016

PREFACE

The idea of 1001 project came in early 2014, when we were thinking about second edition of Helsinki book and the way to improve it. At that time the name “1001 videos” came to our mind based on collection of Middle Eastern stories “One Thousand and One Nights”. Few years before Prof. Michael Lawton published his excellent book – “Seven Aneurysms. Tenets and Techniques for Clipping”. So we came to the idea also to name our project according to the classic literature. It is our thinking that in future completely new generation of video books will replace the classic written handbooks.

We selected hard and skillful video editors to fulfill a process that many doubted as impossible. All of senior author operations have been recorded but because of the fast development in quality of videos mainly HD videos were selected for this project. Some earlier videos that we were considered excellent were also included. Besides neurovascular lesions, this project includes surgical videos of tumors, cysts, and spinal disorders as well. These clips could be interested for many neurosurgeons of over the world in spite of their age or experience. Apparently, in the current time there is no one capable to perform all possible neurosurgical procedures. The senior author is using ten to eleven different approaches in his surgeries and this collection of videos may be biased by the present subspecialization in neurosurgery. Our main principle is a simple, clean, fast and safe surgery. It requires be consistent with protocolized steps. With unedited videos included, we are showing that this philosophy clearly and honestly.

As the surgery was clean and fast, all cases were performed inside one operating room. It shows also the strength and high

working moral of the whole TEAM. Our record was six aneurysms patient in a day; two of them were basilar tip aneurysms. In Helsinki we have not the possibility to use anesthetic induction room causing some delays in delivering new patient in operating room.

This kind of efficacy not only depends on the neurosurgeon but also on the excellent TEAM around him/her. The walls are not doing surgery, but the TEAM does. Our TEAM has given a big number of Live Courses in Helsinki but also around the world in three continents close to one hundred times. This was our effort to bring principles and surgeries in front of those who had no resources or other reasons to travel. During these live courses, we participated in a lot of lectures and teaching events. We feel that this is by far more effective way to learn as compared to big congresses. Naturally in these Live Courses the number of participants may be reduced but we have been operating on also in front of one thousand people. Edited videos of operations may give a wrong impression of the length and difficulty of operations and many complications may be hidden.

Like LATE Mohamed Ali said: “It is different to talk the talk than to walk the walk”, in this way we opened the doors since 97’s to more than 3000 visitors for learning and to learn from them. This proved to be an excellent bilateral concept, and we recommend this concept to all of us. These videos can be freely downloaded form SNI website. We have to pay back what we have learned from others abroad and from those who visited Helsinki.

Surgery is not sport and we are not trying to beat times or records. However, as fact, in Helsinki the fastest aneurysm surgery ever has been performed, from skin to skin, in 25 min,

the next one in 28 min. Nowadays, when emerging intraoperative ICG and microdoppler, we can not get this figures and of course it is not our goal. The goal of the surgery is to give maximal safety with high efficiency. With these principles, we can operate on a big number of cases in a very economical way.

This project is about microneurosurgical style developed by the senior author and his TEAMS in Kuopio and later since 1997 in Helsinki. This is a part and major effort to save the legacy for future generations who certainly in future will do better.

Finally, I thank my main teachers and heroes who gave me a lot and showed me the way in the highest heights like El Condor is flying: Prof. M.G. Yasargil, Prof. C.G. Drake, and Prof. S.J. Peerless.

Juha Hernesniemi
Helsinki Finland, June 2016



Hernesniemi's family, Kuopio Finland, winter 1994
By Joselito Sabogal, Cajamarca Peru.

While watching the microneurosurgical videos, we kindly recommend you to listen music performed by Martha Galdos. Music at Helsinki Neurosurgery operating room of Professor Hernesniemi is also available online.

❖ Links are placed in the supplementary content (Appendix)

For direct access click on the number of the page

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1 LETTERS FROM NEUROSURGEONS AROUND THE WORLD

1.1 ROBERT F. SPETZLER

It is a privilege and pleasure to make a few comments about my friend, colleague, and neurosurgical giant, Juha Hernesniemi. His contributions, especially to vascular neurosurgery, not only through his personal surgical brilliance but also because of his many superbly trained and published disciples, have created an enviable Finnish school of neurosurgery. The daily menu at his school in Helsinki includes surgery, discussions, results, questions, and research with the purpose of minimizing complications while achieving the surgical goal. His demonstrated surgical virtuosity is as close to flawless surgery as is humanly possible.

Those of us fortunate enough to have observed his surgical skills can testify how much a student of this collection of videos can learn. Yes, it is true that watching a brilliant surgeon's videos will not make you one, but recognizing what is possible and seeing it done will inspire you to be a better surgeon and to achieve that goal.

I personally have learned immensely from watching others or their videos that I insist all of my trainees record, edit, and display their accomplishments. The information gleaned from editing one's videos reveals how much time we waste, how we could have enhanced our exposure, how we could have avoided a complication, and how by applying these lessons,

we can improve our results for the next patient. When studying Professor Hernesniemi's videos you can set a goal of achieving the same excellence. Regardless of your success, improving your skill is the "Holy Grail" and the goal of each and every one of us on behalf of the patients that have entrusted their care into our hands.

Professor Hernesniemi's surgical prowess is matched by his generosity. He has welcomed countless aspiring surgeons to his clinic, trained a legion of followers, published superb articles, and culminated his generosity by sharing his surgical mastery with the rest of the neurosurgical world. To make use of his videos will further your education, improve your surgical skills, and ultimately afford your patients better results. Enjoy, learn, and aspire!

Barrow Neurological Institute
Phoenix Arizona USA, June 2016

1.2 ALEXANDER KONOVALOV

Professor Juha Hernesniemi, no doubt, is an outstanding neurosurgeon, one of the best, a bright personality with a wide sphere of interests. He is an honorary professor of Burdenko Neurosurgical Institute, our good friend who is always welcome here. My first opinion about him was as of a self-reserved person concentrated on his work only but later on I understood that Juha is a great teacher and at the same time a philosopher with a special attitude towards life, nature and, common human problems.

His professional experience is really impressive: More than 16.000 operations on vascular pathology, brain tumors and other kind of neurosurgical lesions. The most difficult neurosurgical operations performed by Juha Hernesniemi seem to be clear and simple. I visited the clinical hospital in Helsinki twice and saw Juha and his team operating as a single whole in a calm and precise manner with every step strictly tailored and anatomically approved. It is the technique of a master who perfectly knows how to achieve success.

A number of decades earlier, before a wide use of microsurgery, at every conference or congress Video sessions demonstrating most complicated and unique operations were mostly popular. The auditorium was always full.

Previously, I had a chance to see operations by G.Yasargil and to get acquainted with his video materials – it was an unforgettable school. A similar impression from dealing with something important and perfect was during hours of scrutinizing watch of video films of Juha's operations, difficult and simple, and as a rule successful.

It is important that this unique material is available to a large number of neurosurgeons.

Burdenko Neurosurgical Institute
Moscow Russia, June 2016

1.3 VINKO V. DOLENC

Dear Juha, my friend,

Welcome to our club of retired friends and colleagues. Personally, I am not happy to have received an invitation to write on the occasion of your retirement, since you could work with full speed and capacity for many more years to come.

On the other hand, I am happy for you to be in good shape. I am somehow both sad and surprised that the system and the administration are forcing you out of the profession. I believe that individuals like you, with such a valuable expertise resulting from years of serious work, long days and nights dedicated to the profession, should be kept as an added value in the system. You should be placed in a special position from which you could continue to contribute to your field, to teach and to help to keep the standards of the profession at your Institution at the highest level.

I have witnessed how in the last two decades you and your team added an incredible scientific and educational work to your daily practice for which your Institution became unique around the World.

Your many young colleagues from Finland and abroad became top experts in various topics of neurosciences. Not only this, your live microneurosurgical courses in June every year have been the unique way of teaching. Personally, I was privileged to be participating in this »ONLINE« teaching which was so well attended that the registration was needed to be done well in advance for the next year(s).

Besides the fact that the tailoring of the results is excluded in such Meetings, the cutting edge surgeries were performed and

shared in all of the cases. Equally important fact to the highest possible surgical techniques presented, was your interaction with participants - before, during and after the surgeries - in all cases. This was possible only because you are in possession of immense amount of theoretical and practical knowledge, accumulated by doing continuously the most complicated surgeries.

Neurosurgery has not been your job; neurosurgery has been your kind of living. You have not been working for glory; you have been working for patients to help them to get rid of their sufferings.

Through very many surgeries you realized that the surgery is not the ultimate answer in treatment of aneurysms, AVMs and brain tumors. This was the reason why you stimulated younger colleagues so much to do the research on these diseases. With the accumulated knowledge on these pathologies and with understanding the real cause of the diseases it will be possible to prevent the disastrous events.

You are aware that the prevention is far superior to the treatment. In meantime, you were constantly improving the surgical modality of treatment in order to reach the ultimate perfection. You know that surgery has little if any effect on biology. However, the bloodless and non-traumatizing surgeries will bring us closer to the understanding of biology.

You know very well that Neurosurgery has to do its part of refinement towards the complete understanding of the origin of these diseases. Neurosurgery has to be dealing with smaller and smaller structures, possibly to reach the surface of the

cells in order to meet other modalities of treatment - pharmacological, immunological and others - on the surface and/or in the cell for the joint actions against the disorders which are resulting in what we know as aneurysms, AVMs and brain tumors.

Neurosurgery has to contribute its part in advancement in neurosciences to be parallel to the other contributors.

With your daily practice in the OR, in the outpatient's clinics, in the lecture rooms you did your best possible for the patients, for the students and for Neurosurgery in general. In research and international education your contribution has been immense. You did everything possible for your patients and for Neurosurgery in your country, as well as globally. Your activity in neuro-research and teaching has been well above the required.

Though you work in our profession, you have been helping the others to become better and to improve the world we are living in.

I do wish you many more creative and productive decades of work!

University Medical Centre Ljubljana
Ljubljana Slovenia, July 2016

1.4 EVANDRO DE OLIVEIRA

I am delighted to have the opportunity to write about my friend, Professor Juha Hernesniemi.

I have known Juha very closely for a number of years and since then I have attended with him numerous international neurosurgery meetings and had opportunities to exchange scientific knowledge and deepen mutual understanding.

I know also he has enthusiastically helped and trained younger neurosurgeons to obtain basic anatomical knowledge and surgical skills. Through this effort, he has produced several talented excellent young colleagues in Helsinki University Hospital, Finland, where I had a great chance to participate in the Live Surgeries in the last years.

Thus, as a person who is able to communicate across cultures, as a distinguished neurosurgeon who has made innumerable contributions to the advancement of modern neurosurgery, Professor Hernesniemi is one of the most respected people in international neurosurgical society and his influence on all of us has been immeasurable.

Through my long contact with him, he has impressed me as a dynamic, creative, cooperative and diligent person with firm determination and strong personality.

Instituto de Ciências Neurológicas.
Sao Paulo Brazil, July 2016

1.5 ATUL GOEL

Bleeding and its control form an important component of neurosurgical life. One surgeon is differentiated from the other by the way he controls and responds to bleeding. Some surgeons prefer a bloodless field and like to deal with every

single bleeding point. Such surgery certainly provides an opportunity for fine dissection. However, this kind of attitude makes surgery difficult and sometime impossible in heavily bleeding situations like when one is dealing with a vascular brain tumor or an arteriovenous malformation. Operating within a bleeding surgical field and ignoring avoidable bleeding points is an advanced form of surgery. Experience teaches a surgeon the art of controlling bleeding without actually following the bleeding point. Whilst some surgeons need more than a thousand times bipolar coagulation for a large acoustic neurinoma, some may not need coagulation at all during the entire surgery. The later form of surgery can only be an outcome of clean and precise dissection within the tumor defined surgical planes and an in-depth understanding of the bleeding vessels. More importantly, bypassing every ignorable step of surgery saves surgical time and affects the ultimate outcome. The height of surgical expertise comes when one learns the art to achieve ‘hemostasis without hemostasis’. And surgery can be quick only when it is precise and perfect and where wasting of time is avoided.

Dr. Hernesniemi has inherited, learnt and perfected the art of tissue dissection, tumor dissection, subarachnoid dissection and most importantly the art of controlling bleeding. He is known worldwide for his quick and clean surgery. He has acquired this art only after long-term hard work, large experience and commitment towards the subject. His attitude towards neurosurgery and in teaching this art to young neurosurgeons can be clearly visualised in this compilation of selected videos. He has shown his skills to several keen eyes in the surgical demonstrations in his own Institution and in the large number of workshops that he has conducted throughout the world.

This compilation of surgical videos is certainly a work of art. Dr. Hernesniemi has a strong and positive personality. His persona stimulates. His confidence is infectious. His skills with knife, microscissors and other neurosurgical tools paint a smooth picture that is a treasure for future generations to learn and emulate.

My message for young neurosurgeons is that we need to work hard, observe and practice this great subject of neurosurgery. While good and successful neurosurgery can give a new life, any small or big complication can bring in a lifetime of misery to our patient. When the patient hands himself in our hands with all the trust, it is our responsibility that we do justice to the patient and to our profession. We have to observe and learn from giants in the field. Dr. Juha Hernesniemi has inscribed his name deeply into the neurosurgery world as a great educator and a skilled surgeon. He has shown by example the outcome of passion and talent.

K.E.M Hospital, Lilavati Hospital
Mumbai Maharashtra India, June 2016

1.6 MICHAEL MORGAN

In 2008 I embarked on a greater than 30,000 km quest to visit one of the greatest-ever cerebrovascular neurosurgeons. The quest was part a learning experience, and part pilgrimage. After entering the operating rooms at Helsinki University Central Hospital I was immediately filled with the same expectations as if entering the Sydney Opera House concert hall, in which the maestro and concert master, Professor

Hernesniemi, will shortly perform. There was a milling of Fellows and residents around the computer screens watching past performances of the maestro's surgery. There were television screens in the corridors outside the theatre, showing the stage and the patient being prepared for the upcoming surgery. There was the wry smile, characteristic of Professor Hernesniemi, from the pale man in white, warmly welcoming me. As the patient was made ready for Dr Hernesniemi the crowd of spectators grew larger. It was clear that some were local but many were, like me, travelling from afar to learn from the master. As we exchanged greetings between us I could appreciate the sense of anticipation amongst the audience.

With the patient prepared and ready, the maestro began. However, I quickly became aware that it was wrong to think that he was performing a concert for the benefit of an audience. He was more like an elite athlete competing with himself to perform at his best in the interest of the patient. There was no banter or interaction with the crowd around him. In fact, the anesthetic team and others could talk and create some noise that may have been a distraction to some but not to Professor Hernesniemi. He was oblivious to his surroundings and entirely focused upon performing aneurysm surgery. This he did with ruthless precision, calmness, and masterful execution with the minimal set of instruments and minimal fuss. His shoes went off and on. There was no embellishment, no sense that every movement was being watched, no theatrics. This was a masterful performance that was minimalist and efficient in action in which the only other competitor was Professor Hernesniemi himself with his expectations. This was clearly a tough competitor for having delivered a perfect surgery there was no celebratory smile or

self-congratulations. Instead, for the briefest time, he allowed himself a look of self-confidence, but no more than that.

This performance was delivered over and over again on the same day and subsequent day. At the end of each day, despite the flawless performance, he was clearly exhausted but I suspect only stopped performing out of respect for his colleagues, the anesthetic and nursing teams, who he exhausts to the point that they need to be exchanged.

This was a moment in my neurosurgical life that I will always remember both viscerally as well as cognitively. To be in the presence of a master who has inherited the mantle from his teachers, Drs Yasargil and Drake, to become a legend of neurosurgery.

Macquarie University
Sydney Australia, June 2016

1.7 ALI F. KRISHT

Professor Yasargil first introduced me to Professor Juha Hernesniemi in 2003. At that time, he advised that I visit with Juha and see what he's doing and Professor Yasargil mentioned that I would be meeting a "promising man". Since then I have had the opportunity to get to know Juha very well, both as a colleague, and as a close friend. I have been involved in the Helsinki course on a yearly basis since its beginning 12 to 13 years ago. I have also had the honor of inviting Juha to my workshops and courses in the US and several other locations around the world.

I witnessed Juha transform the University of Helsinki neurosurgery program to a world-recognized hub for

microneurosurgery. In Europe, he definitely carried the heavy torch of microneurosurgery, which was left without a carrying hand when Professor Yasargil left Europe and moved to Little Rock. Juha's welcoming spirit invited people from all around the globe. His courage and competency made him very comfortable to be operating on the most complex neurosurgical cases while being watched by his colleagues, irrespective of their experience level and fame.

During all these years Juha preserved his humbleness and continued to be easy to approach by any person, no matter the level of that person. Juha's character exemplifies the ideal surgeon as he is always prepared, focused, approaches his surgery with a winning attitude, and is never shaken under pressure. I have personally witnessed him operate when I knew he had tremendous social and administrative pressures going on but you could never tell he was under any pressure during his surgery; except the pressure of making sure that his surgery succeeds and his patients do well.

I am very privileged to have the opportunity to get to know Juha and have become a close friend with him. He is not a man of too many words but a lot of actions. He is the person who is committed to his promises, always trying to help young neurosurgeons and always ambitious to improve surgery to the best of his patients.

Juha made history in Helsinki and he made himself a place in the history of neurosurgery. His impact is not only felt today but will be felt in the years to come through all the neurosurgeons he has influenced and/or trained.

Arkansas Neuroscience Institute
Arkansas USA, July 2016

1.8 PETER VAJKOCZY

I came to Helsinki around 2002 as a young faculty member when the Finnish Doctors were on strike and only emergency cases were treated for several weeks. Thus, it were only me and one Neurosurgeon who were 'on call' all the time, and that I could follow 'one-on-one' day-in and day-out – Juha Hernesniemi. These 4 weeks changed my neurosurgical life and left persisting impressions on me.

First, I learned what it means if you fully commit yourselves to Neurosurgery and your patients. Always on the track, always informed, and always worrying about the results and the wellbeing of your patients.

Second, I learned what it means to perfect microsurgery: to streamline your techniques and your coworkers in order to make surgery more efficient, cleaner and safer – elegant like a panther, precise like a Swiss clockwork.

Third, I learned what it means to keep track of your patients. The motivation to list all your operations in databases, take care of proper follow-ups, and honestly report what you have done – where you succeeded and where you failed. This is driven by the obligation to create an academic legacy, a footprint of what you have done.

Forth, I have learned that young neurosurgeons stand on the shoulder of giants – they observe, analyze, and learn from their idols. With one aim, i.e. taking Neurosurgery to the next level. Young Neurosurgeons must strive to become better than their teachers. On the other hand, it has become clear that the big names are obliged to allow and support the next generation to become better neurosurgeons.

Fifth, I have learned about the value of modesty and humbleness in academic Neurosurgery. Both are indispensable when it comes to be responsible for a big department, to defend Neurosurgery, and to advance the field.

For me, Juha Hernesniemi has become a role model, mentor, advisor for difficult situations, and a good friend. His advice went far beyond neurosurgical issues. For example I owe him many tips and tricks when I moved to Berlin and set out to build our Department at the Charite. In the beginning, these shoes seemed to be far too big for me and Juha Hernesniemi gave me a perspective and encouraged me with his words 'only a few can run a marathon'.

Dear Juha, I owe you more than I can say and I am proud to be one of your pupils.

Charite Universitätsmedizin
Berlin Germany, June 2016

1.9 YING MAO & LIANG CHEN

Dr. Juha Hernesniemi is no doubt a top neurovascular surgeon in the world. About ten years ago, I was deeply impressed by his elegant surgical performance on the AANS meeting. I believed he deserves our respect and warmly invited him to visit China. His first lecture in China on an international conference was wonderful and successful. His "Simple and Fast" principle while preserving normal anatomy during microneurosurgery, and special techniques such as water dissection for opening dissection planes and dirty coagulation for stopping AVM bleeding, draw great interests from

Chinese audience. In 2012, he was temporally licensed to perform operation in China. He successfully did 4 complex aneurysm clippings in one day in our patients. The aneurysms had a wide neck, a giant volume or a difficult location. Dr. Juha Hernesniemi's superb performance impressed all the Chinese neurosurgeons and won wide respects in China. After that, he has been widely invited to give lectures, make live courses or perform operations in China. In 2011, "Helsinki Microneurosurgery Basics and Tricks", a great contribution by Dr. Juha Hernesniemi, was published. It is clear and elegant, just like his operation. Honorably, I translated this book and introduced it to China.

Another important contribution of Dr. Juha Hernesniemi is that he and his team well collected patient data in Finland and summarized the prevalence and natural history of unruptured intracranial aneurysms.

I personally learned much from his publications and surgery videos. It is a great opportunity that his unique material is available to all the neurosurgeons this time and I strongly recommend them!

Hua Shan Hospital, Fudan University.
Shanghai China, July 2016

1.10 ROKUYA TANIKAWA

My memory with Juha,

It was September 2008 in Sarasota, Florida, USA when I met Juha for the first time. At that time we had a neurosurgery

meeting there, which was organized by Professor Fukushima in Duke University. The invited guests were Dr. Kamiyama, Prof. Sano from Nagoya, David Langer from New York, and Juha. I saw the video about very quick clipping surgery by Juha, and I was so surprised by the 20 minutes skin-to-skin surgery. I presented distal sylvan approach, inter hemispheric approach and, vascular reconstruction for complex aneurysms including low flow and high flow bypass.

In next year 2009 in November we met again in Nagoya at International Cerebrovascular Congress organized by Prof. Sano. Juha and Ali Krisht were invited to the meeting. I talked about vascular reconstruction for the aneurysms in the last day of the meeting; Juha and Ali were also in the same session. After my presentation Juha commented that the vascular reconstruction in my lecture will be a goal of neurosurgery, his comment made me happy and I was surprised. One month after the meeting Juha sent invitation email for 10th Helsinki Microsurgery Live course in 2010, it was great honor for me to be invited Helsinki live course.

I went to Helsinki one week before the live course in order to demonstrate STA-MCA bypass for moyamoya disease during LINNC in Paris by broadcasting from Helsinki to Paris, because Juha asked me to demonstrate it. This was my first experience to demonstrate a live surgery in foreign country. I showed triple microanastomosis between STA and cortical MCA and ACA, and the surgery could be finished successfully. I remember that I felt I was so tired when I finished the surgery.

I have been participating Helsinki live course for this seven years, I could experience a lot of difficult cases of aneurysms which I had never experienced and I learnt so much from the

cases and other cases demonstrated by Prof. Dolenc, Ali, Fady, Ugur, Michael, Mika and Juha. The experience for these seven years in Helsinki changed my life in neurosurgery because I could learn so much, could see many friends from all over the world who have a passion for neurosurgery and they are visiting my hospital in Sapporo and also my previous work place Abashiri.

Thank you, Juha!

Teishinkai Hospital,
Sapporo Japan, July 2016

1.11 LUIS M. ALVAREZ SIMONETTI

Dear Professor Hernesniemi,

On behalf of my Peruvian neurosurgical colleagues I just wanted to thank you for everything you have taught us, neurosurgeons in Peru.

It has been a tremendous effort from you and the Helsinki Team to stay in Trujillo during several months, in difficult and in several times grim environment. Only persons with great honesty, generosity and altruism can stand it.

Observing you has permitted us to know better our professional level and where we can direct our efforts, in order to improve our performances in a daily care of patients.

The Live Course has been accomplished with great effort and dedication coming from you Professor Hernesniemi, Dr.

Joham Choque-Velasquez, RN. Maria Pasala, RN. Saara Pirkkanen, Dr. Humberto Elera, Professor Akitsugu Kawashima and, the invaluable contribution of the Aesculap Academy organizers. We will remember and apply so many tricks and technical aspects we have watched. Patients had tremendous help coming from people like this wonderful team.

For this reason I wanted to express you my gratitude and I hope to see you in a coming future, always as a giant neurosurgeon that came so closely to us!

With great respect,

Hospinal Nacional Edgardo Rebagliati Martins
Lima Peru, June 2016

1.12 RENATO SCIENZA & GIANCARLO PERRA

We thank you very much for sharing this videowork with us. This event in Helsinki was very well presented and recognises your role as Chairman of the Neurosurgical Department in Helsinki University Hospital. Finland is world-famous for its hospitals, for the correct follow up of its patients and for Neurosurgery. Because of you, *Neurosurgery in Helsinki University* is recognised as a ***Brand of Perfection***, reflecting the Finnish style of life and mentality.

Finland is a place where the correct management of the patient is paramount. In your hospital, you have had many colleagues and other visitors from all over the world and they all love you - ***“The legendary Last of the Mohicans”***. During

the Microneurosurgery live event, the best neurosurgeons in the world perform incredible operations with good results every year.

As you know, along with Renato in Italy, we created Brain House and we have organised the Micro Neurosurgery Live event for the last 11 years, since 2004 until now. You were the first neurosurgeon in the first event, doing a giant butterfly aneurism located in the vertebro basilar trunk of a young woman from Serbia. It was a success and like you, we still remember this occasion.

After talking with Renato, as President of Brain House and Aneia, he charged me, as President of Brain House during the events, with writing something about your surgery. Of course, he and our friends at Brain House share with me what I'm going to write.

EVOLUTION OF MICRONEUROSURGERY

Dear Juha,

I want to start this letter by saying a few words: ***“You’re the Evolution”*** of micro neurosurgery, first tailored by Prof. M.G.Yasargil in 1970s. I can say this because I have known you since 2002 and I realized that throughout your life you have been a man totally dedicated in this field, trying to do your best and achieving far more than that. Working very hard, sitting in a cold corner in Operating Rooms all over the world, you worked out how to advance the surgery of Yasargil and Drake.

I was in Helsinki when Prof. Yasargil was there in 2003 and I witnessed your conversations with him, so I know well the respect you have had for this exceptional surgeon and his work. Equally, I well know about your period with Profs.

Drake and Peerless. I think you were the only neurosurgeon able to do the impossible: optimize the micro neurosurgery invented and developed by Prof. Yasargil, combining the Yasargil and Drake philosophies.

How did this story begin?

First Steps in Modern Neurosurgery

Probably the first steps in modern Neurosurgery started in 1734, when Dr. Franciscus de La Boe changed his name to Sylvius and then became the first in history to discover, during his anatomical studies, that the Sylvian Fissure can be opened and you can expose both the Willis polygon and venous system at the base of the brain. This man was a genius and incidentally, probably he also discovered the original recipe of Gin.

What is the Revolution?

In the 1970s, Professor Yasargil used this particular aspect of the brain and tailored a surgery under microscope using the pterionale approach and opening the Sylvian fissure under a microscope; he was using micro instruments. He was a **Blue Collar** working very hard alone (walking the walk surgery), as opposed to **White Collar** - ready to talk about neurological surgery and not really making any contribution (talking the talk surgery).

Micro Neurosurgery was Born.

In this period, the surgeon would sit in a chair working, dissecting and exposing the vessel, doing clean surgery, respecting the anatomy to reveal the neck of an aneurism and clip it with less risk than before, in the epoch before micro

neurosurgery. Still now, with small differences, many surgeons and great surgeons use this technique.

What is the Evolution?

Evolution is to Minimize and Optimize the Yasargil System.

I have seen you many times (since 2002 until last week) operating difficult cases with your skill. Your operating methods are extremely elegant in the Pineal Region.

I can say that I know every single movement of your style: original, elegant, fast, clean, anatomically correct, and without increasing risk for the patient.

All your surgery is tailored and dedicated to optimising the time and the result of the operation.

You are a hard worker, a *Blue Collar* (walking the walk surgery) alone again, always fighting against *White Collars* (*talking the talk surgery*).

Why Evolution?

You made a Big Contribution to the techniques in Neurosurgery, **transforming the classic**

Yasargil pterional approach in latero supraorbital approach WHY? (say the White Collars)

Smaller means Faster! (Blue Collar) So you can do 1 or 3 more operations in 1 day, in the same time-frame, thereby avoiding problems with anaesthetics.

But with this minimally invasive approach, you have less room and it can be dangerous so **Smaller can be dangerous!** (say White Collars)

Yes, but the solution is to have more concentration and you also need skilled hands which move very lightly. We can ...”*fly over the brain respecting the anatomy*”, so smaller is possible but *Smaller needs to be clean, so with skilled and light hands, it is not dangerous!* (Blue Collar and artist)

Without blood, you don't lose time for coagulation to take place; the brain is relaxed and you can go fast to finalize a perfect clip at the base of the aneurisms, or other surgical actions.

Smaller means to be clean and clean means respect of brain anatomy and this is safer (Blue Collar).

Finally, this is the correct sequence of events in your surgery:

Small..... Essential Clean Fast..... Respecting the normal anatomy.

In the original Yasargil micro neurosurgery practices, you should open the Sylvian fissure and then following that, the sub aracnoidale space

In Evolution : A focused opening of the Sylvian fissure is more than enough: why lose time to open all Sylvian fissures, often damaging the brain and using spatula? (Blue Collar)?

It's the same idea (to expose the vessel), but in less space with less damage for the brain, with the same goal of clipping the aneurism. The final result is a surgery *sequential without death time*, which we in **Brain House** have called *Male surgery*: elegant, fast, clean, respecting the normal anatomy and this means respecting the memories and emotions of the patients. These results are possible only after a long training

dedicated to micro neurosurgery. Einstein said that to achieve the best skill in something, you have to train for at least 10,000 hours! I'm sure you did more.

The final result is that you don't touch the brain, you fly over whilst respecting the anatomy; it's a fast surgery, not because you are in a hurry, but just because in your surgery, death time doesn't exist. Everything is sequential and well projected, each movement is studied and validated by constant repetition, always doing better day by day, where perfection is the ultimate goal.

Like the famous pianists Horowitz or Pollini, you can play the most difficult cases in Neurosurgery similar to how they played Chopin or Rachmaninof. Like a pianist, you work with all your body with the music in your head. In your OR you work whilst standing, with no chair or armchair, so you can move very fast around the table, looking for the best position to continue the job at hand. I've even seen you using your clogs as a step to go up and down very fast. I've seen you using the instruments (scissor, bipolar sucker etc) in multipurpose actions, so *with less changes of instruments you can do it faster.*

With the pipe mouth always moving you always have *focus on the area where you are working, your hands inside the operative fields and this mean faster and continuous movement of the microscope to protect the brain from the hot light - and this mean safer.*

It's not enough, because all of which I have written must be considered in a global vision - I mean: hands, body, head, pipe mouth and microscope and all instruments moving together in an elegant, clean, fast, original and anatomically correct sequential fluid male surgery, performed with body, head and

a love for what are you doing. But it is *still* not enough, because all these elements come together like in a successful orchestra, where you conduct the OR with a competent, synchronized, well trained, quietly efficient team which works and supports you - and this delivers the **Golden Standard for the patients**. I think all of these things will not be forgotten in the future. It is possible to achieve new horizons in microneurosurgery and I believe you will work proactively around the world looking for Final Solutions for many years to come, always doing better, saving lots of patients and training young neurosurgeons.

In Brain House it is an honor for us to have you as a good friend and we want to recognize you officially for all your work. The merit of having first created this new microneurosurgery.

BRAIN HOUSE

Padua & Palermo Italia, June 2016

1.13 JOUKE S. VAN POPTA

Can you learn neurovascular surgery by just watching videos of neurovascular operations? The answer is a definite and obvious “no”!

But watching these videos is nevertheless important and can be a very helpful tool in climbing the steep learning curve to become a proficient neurovascular surgeon.

What is even more important is that, for this to be beneficial for you, you should watch the videos of an absolute expert in the field, a master, a sensei!

If you see Professor Juha Hernesniemi operating, even if for only a short time, you immediately sense and feel that there is “something special” about him and his surgeries.

And that “something special” is not only the speed of the procedure, but it is in the elegance and beauty of the execution of it, in the handling of the micro-instruments and the neural and vascular structures, when he is dissecting under very high magnification of the microscope through the cisterns for the clipping of an aneurysm, or going around the AVM and patiently taking, one-by-one, all the small feeders of the lesion.

At that moment we’re not only watching surgery of the highest level, no!, we see art!, and we see an artist at work!

This foreword is not the place to define what art is (or what art is not) but all genuine artists of past, present and future times had and have that “something special” whether they were/are writers, poets, composers, musicians, or painters, etc.

Juha Hernesniemi has always been very generous in sharing his neurosurgical art with others, defending an “open-door” policy in his department where everyone who is interested is welcome, and where there are “no secrets” concerning the operations.

These videos you now see before you, collected in a “1001 Video Book” and published by Surgical Neurology International (SNI) on the internet, are his true and outstanding lifework and legacy, a legacy that lives on in all of those who were trained by him as residents, young

neurosurgeons and neurovascular fellows, and that is now shared freely and generously with neurosurgeons all over the world!

So watch these videos (Juha would say: “Take a look!”), study them, prepare your surgeries with them, and be inspired by them!

And remember: you are not only watching Surgery, you are seeing Art, performed by one of the greatest neurosurgical Artists!

University Hospital “Miguel Servet”
Zaragoza Spain, June 2016

2 VIDEO EDITORS

2.1 STANDING ON THE SHOULDERS OF GIANTS

The project “1001 videos” is a milestone in the development of microneurosurgery. This project focuses on the legacy of Prof. Hernesniemi outstanding surgical experience predominantly for the last 10 years and undoubtedly will be interesting to many neurosurgeons independently of their experience. Working on this project, assisting in the operation room, training with a microscope, listening and discussing extraordinary cases from Professor’s life, watching and editing videos of operations – everything was giving me a constant feeling of relating to something really important.

When I came to Helsinki University Central Hospital in summer 2015, this project had already been in progress for around half a year, but there were only few people working on it. Even though I heard some people saying the project would not be finished by the end of 2015 and maybe never at all, a handful of hardworking fellows have proved the opposite.

We spent many hours watching videos of operations. Sometimes we discussed certain moments for several hours finally coming to the explanation that satisfied all of us, and then moved on to another exciting case. Despite the fact that Professor Hernesniemi is one of the fastest surgeons in the world, some videos (like grade IV&V AVM or giant aneurysm cases) take 3-4 hours, but you noticed this only late in the evening looking at the clock and refusing to believe it.

Coming late in evening to the fellow's room, Prof. Hernesniemi was always devoting a lot of attention to our work. We could always feel his support. In our turn, we were trying not to let him down. As well as in any other work, we had ups and downs. A well-known Latin proverb says "Errare humanum est", which means "humans tend to make mistakes". We were not an exception from this rule. Like it often happens in life, even a small mistake can cause a lot of future correction work. I remember one of such moments. After a few weeks of working on the project, a small repeating spelling mistake of mine was revealed. I had to change almost everything that had been done before. I was very angry with myself. This error taught me to be more careful in future and to use knowledge and experience of my colleagues. One person cannot know everything and will never be able to do all kinds of operations.

"1001 videos" is a unique opportunity to learn from one of the leaders of modern neurosurgery. As Prof. Hernesniemi learned by such giants as Prof. Yaşargil, Prof. Drake, and others, we all have a chance also to gain a knowledge that was developed in previous time. While many books, articles and other materials show "what to do" in different situations, only a few answer the question "how to do". This project refers to the latter fewer numbers. Potentially it can become the first harbinger in the row of similar of works. I was happy be a part of this breakthrough project.

Danil A. Kozyrev
Saint-Petersburg, Russia

2.2 HOW IMPORTANT ARE MORE THAN 1001 VIDEOS OF NEUROSURGERY?

Once neurosurgeons finish their residency program and start to practice and improve their microneurosurgical skill, they have to work hard and learn from their mistakes. If they want to learn from famous neurosurgeons in USA or Europe, they need to spend great deal of resources. Fortunately, with the strict laws of USA and EU, they are not permitted to practice their microsurgical skill there. All they can do in this situation are just attend the operations.

For 1-year-period, how many cases can they attend? This 1001 video project is the best opportunity for the neurosurgeons in developing country to learn surgical technique from one of the most experienced neurosurgeon for free of charge. You can learn from your home, from your operating room, from everywhere. You can learn his hand technique, surgical anatomy and decision-making. I strongly believe that this project can improve the world of neurosurgery. It is my honour to participate in this project and share our prideful philosophy.

Peeraphong Thiarawat
Phitsanulok, Thailand

2.3 "THIS IS A LIFE CHANGING EXPERIENCE FOR YOU"

I first met Professor Juha Hernesniemi in 2012 during a microsurgical life course in Helsinki. Prior to the course, I

knew nothing about him, and little did I know that my life would change completely.

After graduating from medical school, I had attended several surgical and cadaveric courses in Hong Kong, but the microsurgical life course was new to me. I spent a considerable amount of time in Juha's operation room (OR 1) during the course, and was amazed at his very simple, fast, and beautifully done surgeries – his techniques were simply perfect.

I didn't know how I impressed him, but Juha invited me to become his fellow after the course ended. At that time, I was thinking of perhaps a 3-month visit/fellowship, because that was the average time a young Hong Kong neurosurgeon was allowed to spend 'overseas'. To my disappointment, I was asked to wait at least two years because of the high demand for such training slots.

The seed for my life change had sprouted. Because I wanted to see more of Professor Juha's surgeries, during my birthday month in 2013 and 2014, I flew to Helsinki for a week just to see his surgeries. Each time I was so impressed by his surgeries that I couldn't wait to return to my own working hospital and hopefully use what I had learnt to help my own patients. However, I faced a lot of resistance, mostly because Juha's surgical methods were considered 'too good to be true'. Despite the pressure, I insisted on using Professor Juha's methods. The patients I had treated mostly recovered earlier than those treated by traditional methods because of smaller wounds, less surgical trauma and less blood loss.

During the 1-week visit in 2014, Professor Juha told us that he was going to retire in late 2015. At that time, I knew I had to become his fellow before his retirement, as this would be a

once-in-a-lifetime chance. Professor Juha even granted me the Hernesniemi-Aesculap fellowship, which was given to only two recipients each year. Upon my return to Hong Kong, I applied for one year of no-pay leave from my working hospital, but was rejected. It took me less than a month to make a very important decision – I resigned from my 10-year neurosurgical job to follow Professor Juha, to learn what it takes to be such a great neurosurgeon. Later, I learnt that I was the first neurosurgeon in my local field to resign from a very stable associate consultant job in a government hospital for a 1-year cerebrovascular fellowship in Finland.

To some, it sounded utterly unwise. To me, it just felt so right.

I was glad that my mentor Dr. CF Fung, a renowned private Neurosurgeon in Hong Kong, encouraged me to go out to the world and see for myself the best neurosurgical practices. "Seeing is believing", he said. To this date, I am still so grateful to him.

I arrived on 3rd January 2015 at Helsinki airport. There was no snow then, but darkness dominated the day, with only 5 hours of 'greyness' in the sky. I checked in to a university apartment, which was a nice nordic-style modern apartment, facing the Lapinlahti.

The fellowship soon began. During my time as a fellow, there were as many as 20 international visitors and fellows in the OR, but most of the time there were five to six neurosurgeons. As fellows, we took turns to prepare the OR, manage the operative videos, assist Professor Juha in his surgeries and do clinical research. There was a small library inside the OR where fellows and visitors gathered to work in between operations.

Being able to be involved in Professor Juha's operations was just wonderful. Every day I saw very beautifully done surgeries, and with discussions before and after the surgeries, I learnt a lot about not only surgical anatomy, pathology and techniques, but also how he treated his patients. He knew exactly what his patients wanted and would try his very best to help them. He would modify his techniques constantly just to find the most perfect way to handle the cases. He would find the best cosmetic solutions for his patients when he designed the surgical wounds; he would ask whoever might know the language of his foreign patients to make sure they knew what treatment they would undergo. Despite his heavy workload as Professor and Chairman of the department, Professor Juha cared a lot about his patients. He would rather work odd hours in the hospital to deal with administrative chores, thereby giving more time to his surgeries, patients, fellows and academic meetings. He was always in the OR, and would check on everyone he saw, asking "How are we doing?"

With Professor Juha's close network with many other renowned neurosurgeons in the world, I had the opportunities to visit famous neurosurgical and neurointerventional centers. I got to meet Dr. Robert Spetzler at Barrow Neurological Institute, Professor Madjid Samii at International Neuroscience Institute, Dr. Rokuya Tanikawa at Teishinkai Hospital, Professor Peter Vajkoczy at Charité Universitätsmedizin Berlin, Professor Andreas Raabe at Inselspital Bern, Professor Carl Snyderman at University of Pittsburgh and Professor Anton Valavanis at Universitätsspital Zürich. I was deeply inspired by all these neurosurgical giants.

If you ask me how my life has changed, I would answer like this: before I met Professor Juha, I treated neurosurgeon as just a job. After spending so much time with him and other brilliant neurosurgeons from around the world, I have seen for myself how they perform their surgeries, how they interact with patients, how their teams function and how their systems work. Now, neurosurgery has become my mission in life – I aspire to do exactly what the great neurosurgeons are doing. My passion for this lifelong career has been rediscovered, thanks to this precious experience in Finland.

Thank you for transforming me, Professor Juha Hernesniemi.

Jane Lau

Hong Kong, China

2.4 EDITING THE HELSINKI MICRONEUROSURGERY

The editing of the videos for the “1001 videos” project represented an exceptional opportunity to improve my knowledge of microneurosurgical anatomy. Even if I spent only few months in Helsinki, I have been able to follow a high number of neurosurgical operations, to edit almost 50 videos for this project, as well as to preview the ones edited by other visitors/fellows.

Examining minutely these operative videos, discussing them with Professor Hernesniemi, was a unique chance to understand his microsurgical principles, and some of his tricks.

While editing the videos, after the selection of the radiologic images, I tried first to perform the operation in my mind, and then, while the microsurgical anatomy was rapidly disclosing

on the screen, I attempted to realize what would have been the next surgical step. It is greatly inspiring to observe how even difficult operations may be carried out smoothly with very few surgical instruments, and how every stage of the procedure exemplifies the general philosophy of Helsinki microneurosurgery: “simple, clean, fast, and preserving normal anatomy.”

I believe this project will help many neurosurgeon to improve their microneurosurgical knowledge, while transmitting them frames of operative technique, surgical expertise, and experience that we all should be committed to reach.

Roberto Colasanti
Ancona, Italy

2.5 MY LIFE EXPERIENCE IN HELSINKI

From day one I noticed that the hospital was unlike any other. All the people were very friendly, they made me feel at home and explained everything I needed to know about a typical day in the hospital and also about the video editing project. My fellows and other visitors taught me to edit our teacher's videos, it was a completely new experience for me, but after editing a few videos the process became a lot less difficult. I realized that the videos I edited were very different from the videos edited by other visitors and fellows. I thought this was because I am a young neurosurgeon and everything happening in the videos seemed very interesting; like patient positioning, infiltration and opening of the wound, retraction and of course the subarachnoid dissection. For this reason I tried to add as much information as possible to the videos, so other young neurosurgeons around the world get to learn the most of them.

Definitely working with Professor Juha Hernesniemi has changed my perspective, not only in the operating room but also because of their kindness and good treatment, in life.

Isaac Aguirre Carreno MD
Guadalajara, Mexico

2.6 A GREAT EXPERIENCE WITH 1001 VIDEOS

One of the unforgettable experiences of my life is undoubtedly the visit to the Neurosurgery department in Helsinki University Central Hospital under the tutelage of a great neurosurgeon, Professor Juha Hernesniemi.

My first impression upon entering the Department of Neurosurgery was the team work that was performed in a systematic way by the staff of anesthesiology, nursing, neurosurgery residents, vascular brain surgery fellows, and neurosurgeon, making it possible to complete many academic activities such as: read articles and several Neurosurgery books found in the library, analyze patient studies before entering the operating room, watching videos that are available for learning and editing for the project 1001 videos, all while preparing a patient for surgery until the Professor received the call to go to the operating room.

I was surprised by the first surgery that I observed, due to the speed with which it was carried out, emphasizing team work. Every surgery had been recorder previously the edition of the videos for the project.

After surgery, we returned to the library or workroom where we continued with the video edition, helping and guiding ourselves with earlier editions and the book of Helsinki Microneurosurgery Basics and Tricks.

We finished 3 surgeries daily and then we went to the video-editing department attached to the department of neurosurgery, with a cup of coffee, to continue the project.

I personally find this experience unique; it has a great learning method with the new video edition. This combination gives us a solid base; first as patient positioning and approach to be used according to the different pathologies; second, the knowledge of the anatomy and finally, the tricks performed by Professor Juha Hernesniemi during certain times of the microneurosurgery.

Throughout these three months I had the experience of observing the professor carrying out daily surgeries. As a result I am convinced that with its 9 approaches, including the approach most commonly used in the Department of Neurosurgery which is Lateral Supraorbital, any neurosurgical lesion can be reached, as long as they apply its principle that says: Simple, clean, preserving normal anatomy. Clean is fast and effective. Surgery is an art - you should be one of those artists like Juha Hernesniemi.

I am grateful with the Professor for giving me the opportunity to share all their surgeries during my visit and become involved in the project of 1001 videos.

Sincerely.

Kléber Eduardo González Echeverría

Guayaquil, Equator

2.7 HELSINKI NEUROSURGERY 2013 (“THE FAMOUS ARUMA’S VIDEO”)

<https://www.youtube.com/watch?v=M3jVOa5JRy0>



Aruma Jiménez O’Shanahan
Canary Islands, Spain

2.8 THANKS PROFESSOR JUHA

Thanks to Juha, all the fellows who spent time with me, and OR nurses, I had a precious time in Helsinki. What I earned there were experience of a number of surgical cases and a lot of friends. I learned tips and nuances in microsurgery through

closely observing operations by Juha and discussion we had before and after operations. Our discussion sometimes covered neurosurgery but history, culture, family, and so on over some academic drink, namely, beer. I also enjoyed sport with the fellows. All experience in Helsinki makes itself unforgettable.

Kiitos kaikesta, Juha. Pidä huolta itsestä ja kaikkea hyvää.

(Thank you for everything, Juha. Take care of oneself and all the best.)

Hidetsugu Maekawa
Chiva, Japan

3 FOUNDING AND SUPPORTERS FOR FELLOWSHIPS

3.1 FONDATION DE LUXEMBOURG

ORIGINS

The Fondation de Luxembourg was created in December 2008 by the Luxembourg State and the Oeuvre Nationale de Secours Grande-Duchesse Charlotte. Its mission is to promote private philanthropic commitment.

The structure was set up to meet the growing need for a centre of expertise in philanthropy in the Grand Duchy of Luxembourg and to encourage and facilitate philanthropic commitments made by private individuals and/or businesses.

MISSION

By providing information and advice and by developing specific tools and structures, the Fondation de Luxembourg seeks to encourage, support and guide donors (both individuals and companies) who wish to make a long-term commitment to the development of significant philanthropic projects.

It therefore acts as an expert and adviser in every field in which donors express an interest and is an effective gateway

to associations, NGOs and specialized organisations working on specific issues of general interest.

The Fondation de Luxembourg provides personalised accompaniment for structured philanthropic investment projects in a simplified framework and with the assurance of continuous follow-up.

The Ehrnrooth Fellowship
The C. Ehrnrooth Foundation

For post-graduate studies, training and research in neurological surgery and diagnostics.

The C. Ehrnrooth Foundation established the Ehrnrooth Fellowship with the purpose of granting scholarships to international fellows engaged in post-graduate studies, training or research at the Clinic of Neurological Surgery of the Helsinki University Central Hospital or the Helsinki University Department of Neurology.

Scholarships are granted for purposes of funding cost-of-living and travel expenses of one or two visiting fellows for a period of six to twelve months. The amount of the grants is equal to the Finnish state scholarship presently in the amount of 1.600 € per month for a duration of six to twelve months and is paid out in one installment to the approved fellow upon commencement of his or her stay in Finland.

The fellows are selected on the basis of excellence and need of training by the head of the Clinic of Neurological Surgery of the Helsinki University Central Hospital, Professor Juha

Hernesniemi and approved by the Managing Board of The C. Ehrnrooth Foundation.

The following fellows have been supported so far:

- Dr. Rossana Romani (2010 & 2011) from Italy did her PhD research on a lateral supra-orbital approach. After her post-doc studies she continued to live in Helsinki and started to work at Terveystalo, a company for health and welfare services.
- Dr. Ali Harati (2011), of German and Iranian nationality, started working at the neurosurgical department of the Knappschaftskrankenhaus in Germany after his studies in Helsinki. In his research he had focused on vascular spinal lesions.
- Dr. Ahmed Elsharkawy (2011 & 2012) from Egypt focused in his PhD research mainly on middle cerebral artery aneurysms classification, anatomy and surgery. After his post-doc studies in Helsinki he started to work at the Neurosurgery department at the Tanta University in Egypt.
- Dr. Luis Muñoz Gallegos (2012). He trained microneurosurgery and also returned to his home country and was employed by the Hospital Clínico Magallanes.
- Dr. Milton Martinez (2013), of Spanish Nationality investigated on aneurysm wall histology and morphology.
- Dr. Ferzat Hijazy (2013, 2014 & 2015) from Syria focused his research on posterior circulation AVMs. Dr. Hijazy went back

to Syria and started to work at the Harasta National Hospital, the Ministry of Health, and the Damascus Suburb Medical Directory.

- Dr. Makhkamjon K. Makhkamov (2013) from Uzbekistan returned working as neurosurgeon in the republican scientific center of neurosurgery in Tashkent (Uzbekistan). His primary objective was to learn new methods of microsurgical techniques in micro-neurosurgery, especially in cerebrovascular and skull base lesions.
- Dr. Rosalia Duarte Avila (2014) from Venezuela improved her knowledge mainly in the field of neurovascular and micro-neurosurgery, by assisting in more than 100 operations. Her aim was to return to Venezuela and to start working in the Department of Neurosurgery at the Hospital Miguel Perez Carreño.
- Dr. Mardjono Tjahjadi (2014) from Indonesia was involved in more than 400 microneurosurgical cases from the operative preparation, the intra-operative activities and the post-operative evaluations. He continues his PhD thesis in Helsinki on Posterior circulation aneurysms.
- Dr. Hugo Andrade (2014, 2015 & 2016) is of Venezuelan nationality and contributed during his stage in Helsinki to the construction of the first manuscript on Contralateral approaches for intracranial aneurysms. After finishing his PhD thesis he would like to continue his career in Germany and start teaching at the University.

- Dr. Ahmad Hafez (2014, 2015 & 2016) from Syria is focusing on cerebral AVM (arteriovenous malformation). After finishing his post-doc studies he would like to return to Syria.
- Dr. Fransua Sharafeddin (2015, 2016) from Russia is working on vascular surgeries, and more specifically on vascular pathology of the brain. He wishes to further his studies and including applying them to practical medicine.
- Dr. Danil Kozyrev (2015, 2016) from Russia is studying micro neurosurgery, collecting and analyzing surgical cases. He participated in the edition of the Hernesniemi's 1001 and more microneurosurgical videos, the Videobook of Neurosurgery. After the program, he wishes to go back to Russia and apply in practice the knowledge and skills gained.
- Dr. Joham Choque-Velasquez (2016, 2017) from Peru is studying the microsurgical management of cerebrovascular diseases and, brain and spinal tumors as well. During his fellowship, he led the edition of the Hernesniemi's 1001 and more microneurosurgical videos, the Videobook of Neurosurgery. In cooperation with The Helsinki Team, he participated designing a program for developing a highly specialized neurosurgical center in Peru. He is also focusing his PhD research on pineal region diseases that have to be operated in a highly technical context due to the anatomical location of the lesion.
- Dr. Benham Rezai Jahromi (2016, 2017) from Finland is working as first researcher on three projects: Giant

vertebrobasilar aneurysms, Aneurysm database of Helsinki and Arteriovenous malformation database of Kuopio.

3.2 AESCULAP ACADEMY FELLOWSHIPS by Prof. JUHA HERNESNIEMI

I am pleased to present you this fellowship program for training and education in micro neurosurgery, which was partly funded by an annual grant from Aesculap Academy.

This 6-month fellowship enabled two young, talented and ambitious neurosurgeons each year to be trained with me and my team in Helsinki, Finland.

Past Felows:

- Dr. Jouke S. van Popta (2010)
- Dr. Rossy Carolina Peña Salero (2011)
- Dr. Rafael Iván Neira Sayago (2011)
- Dr. Essam Ahmed Abdelhameed Ibrahim (2012)
- Dr. Ferzat Hijazy, MD, Syria (2012)
- Dr. Hugo Alberto Andrade Barazarte (2013)
- Dr. Aruma Jimenez (2014)
- Dr. Hidetsugu Maekawa (2014)

4 HOW TO BECOME TO BE A GOOD NEUROSURGEON

by Juha Hernesniemi

It is difficult to select trainees to become future neurosurgeons. We should pick young people with so much dedication, determination and full of energy that one day they will become far better than what we are. In my department, this selection is mainly based on my foresight that, one day, this particular young person will amaze me with both creativity and skillful performances. I hope, that with time some of these youngsters will become the best neurosurgeons in the world.

They must be young because the learning period is long, a whole lifetime! They must be intelligent, flexible; they must get well along with very different people. At the same time they must have a somewhat stubborn and tenacious character to fulfill their goals, often against the wishes of other people, sometimes even the chairman. They must be able to travel, and they must be fluent in the main languages of the international neurosurgical community, so as to be able to visit departments all over the world to learn new ideas and techniques. They have to be hard working and have good hands, irrespective of their glove size. It is extremely helpful to be in good physical and mental condition, by doing some sports or other hobbies that help to quickly recover from the many failures and complications encountered in everyday work.

How to become to be a good neurosurgeon

A good healthy sense of humor helps, and it is important to have the support of the family or good friends in all the daily joys and sorrows. Cynicism and black humor alone, will probably not be able to carry someone through the years of hard work, rather he or she will experience burn out sooner or later. The new trainees must realize from the early beginning that reaching a high professional level comes at the expense of long working hours and one is never truly free from the work. If possible, they should transform their work also into their hobby as that helps in maintaining the interest in the field for long periods of time.

I would like to share some of my thoughts and reflect on some of my experience about the issues a young neurosurgeon should be aware of and maybe give little advice on how to overcome some of the difficulties.

4.1 READ AND LEARN ANATOMY

To become a better microneurosurgeon, one should constantly study microanatomy of the brain as better knowledge of microsurgical anatomy leads to better surgery. With beautiful CT, MRI and angiography images of today, learning central nervous system anatomy is far easier than in the times of PEG, ventriculography and surgery without microscope. Reading the many textbooks available gives us the opportunity to share the accumulated experience of several generations of neurosurgeons.

Preparing yourself for some new or infrequent operation by reading means that during the actual surgery your hands will be guided by those who had previously accumulated much more experience on this particular procedure. By reading

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frequently you may save, first and foremost, your patient, but secondly also your time and your nerves. It is not enough to learn the anatomy once; rather, one is forced to revisit the same topics over and over again before acquiring appropriate expertise in the matter. Reading is hard work – and learning anatomy is even harder. It is a lifetime job, or more!

4.2 TRAIN YOUR SKILLS

Neurosurgery is no different from any sports or arts; only hard practice gives good results. Go to the microsurgical laboratory to dissect animals and cadavers if possible. Knowing anatomy and the different tissue properties results in better surgery. Train your hands in the laboratory setting in increasingly demanding tasks. Operating under the microscope should be started in a safe laboratory environment with enough time to familiarize oneself with all the instruments, devices and techniques, not to mention to develop the necessary hand-eye co-ordination.

Many of the movements we perform with our hands under the large magnification of the microscope should become automatic, without the need to concentrate on them, like e.g. placing microsutures. Practice special tricks in handling difficult situations, atraumatic manipulation of different kinds of tissues including the tiniest arteries and veins, dissection of important vascular and neuronal structures, and understanding the 3D relationship of different structures. It is possible to train most of the steps for any operation whether for vascular, tumor or spinal surgery in the laboratory setting. Not necessarily as a single procedure but as a collection of different techniques.

4.3 SELECT YOUR OWN HEROES

When beginning your career, select your own heroes. They may be in your own institute, or far away, in other parts of the world. While I was visiting the maestros and sitting as an observer in the corners of various cold operating rooms around the Europe and North America for altogether more than two years during my early career, I always dreamt of the day that I would be doing the same kind of high-level microsurgery. During one of my numerous visits to Professor M.G. Yaşargil nearly 30 years ago, a young Mexican neurosurgeon Jesus Martinez told me “One day we might do even better!” At that time I found it hard to believe him, but now, with retrospect I know that he was right. The same happens in sports, arts, and technical developments, the younger generations do better as they can stand on the shoulders of older ones.

Or not stand – they should begin their quest from a new starting point, the point where these earlier giants finished.

When planning your career, find a senior neurosurgeon to mentor you, in my case, Dr. Seppo Pakarinen. While you will need the help of many different people, try to find one to whom you can tell about your failures, fears, plans and hopes. He or she does not have to be the chairman of the institute, but he or she should be the one who has a great soul and understanding of life - and neurosurgery. Without the help of a good tutor it is extremely difficult to become a skilled microneurosurgeon, and almost impossible to make a real academic career.

4.4 KEEP FIT

Keep your body fit with regular exercise. Doing several hundred operations a year is both physically and mentally demanding, so try to find hobbies outside of the operating room to balance it out. This is easily said, but at least I have had big difficulties to follow these rules. You should do everything you can to avoid fatigue, burnout and cynicism towards your work. Remain a fighter, never give up; if you were thrown against a smooth wall, you should hold to it with fingers and nails like a cat. Keep up with mental training all the way throughout your career. Even close to or after your retirement you can still be useful, as you can continue to share your experience with younger neurosurgeons. With age you may slow down; you should respect this and behave accordingly. But neurosurgical skill and experience remain, something that is difficult if not impossible to achieve in a short time. Experienced neurosurgeons, unlike experts in e.g. the information technology field, are not pushed aside as easily by the next generation. *Ars longa, vita brevis, occasio praeceps, experientia fallax, iudicium difficile.*

4.5 BE A MEDICAL DOCTOR, TAKE RESPONSIBILITY!

Be a medical doctor when treating your patients! Don't hide behind the back of other neurosurgeons to save your own face. You have the responsibility for the patient, not for your untarnished surgical series. Within a busy institute one can easily build up a reputation of excellent surgical results by avoiding the high-risk patients and passing them on to others. With extreme selection of suitable cases, many patients will be excluded and die without ever being given a chance to

How to become to be a good neurosurgeon

survive - and this only to save the good outcome figures for one's surgical series. Superficial analysis of results from some institution may give you the wrong picture regarding the skills of a particular neurosurgeon; the one with the worst results may actually be the best, as he or she may be tackling the most difficult cases, thus facing the most difficult complications.

4.6 LEARN YOUR BEST WAY OF DOING YOUR SURGERY

Find your own best way to work, select your (few) favorite instruments (like e.g. the “little thing“, i.e. a small dissector used by Dr. Drake to push aside the aneurysm dome) and trust them. Be open to new techniques and instruments. Try them out and if you find them good, adopt them. As Dr. Drake said, “much of the merit of an approach is a matter of surgical experience“. He advised to make operations simpler and faster and to preserve normal anatomy by avoiding resection of the cranial base, the brain or by sacrificing the arteries and veins. All this results in better outcome for the patients, the only thing that really matters. You should try new treatment methods if you suspect that they might beat the old ones. But while reading various reports on new techniques with excellent results, be critical and believe your own figures; after all it is you providing the treatment, not the author of the publication. Furthermore, don't change your methods if you are performing well! A clear evaluation of your own skills could be stated in the following way: “Would you feel safe to be operated on by yourself?“ If not, develop your skills further, study and learn from those who are better! In my opinion, with a more active approach towards microsurgery, intensive care, imaging, rehabilitation and changes in mental

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attitude, we have made significant progress as compared to the 1970's, the time when I started my career. The annual number of operations per neurosurgeon has clearly increased. We have become more efficient, and the work, which is done well at a brisk pace, with greater experience, usually results in better outcome. In a way, I must agree with Jehovah's witnesses, clean surgery without blood loss is the fastest and safest way for the patient, and also for the staff.

4.7 OPEN DOOR MICROSURGERY

Go to congresses, give lectures and participate in discussions. But in addition you should also visit different departments, both home and abroad. Lectures in congresses give only a simplified picture of the actual level of neurosurgery at a particular institution. Unfortunately, the true results are often worse than those presented. Accept visitors. When doing so you get a great chance to learn and to be criticized by intelligent people who may have quite a different experience and different ways of thinking. With the constant presence of these observers you will be forced to perform on a much higher level than if you were operating just by yourself. Since 1997, I have been privileged to have a large number of excellent international fellows and visitors, who have taught me often more than what I felt I could teach them. Question, argue and discuss your daily routines. Tolerate different people and innovative thinking, but also stick to your old habits if proven good. When you go to visit neurosurgeons with excellent or new skills, you may learn much more in a few days than from traveling to tens of congresses and listening to hundreds of presentations. When traveling, try to adopt all the good things, even the small details. Of course

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this is not always possible due to economical, religious, or other factors that, perhaps, may be even related to your own surgical skills. You should travel throughout your career, as a resident, as a young neurosurgeon, and even later on as an already experienced specialist - you are never too old. Try to remain enthusiastic about learning new things, but remember that hard work and suffering is also a part of the learning process.

4.8 RESEARCH AND KEEP RECORDS

Remain critical towards your own results; that is the only way how to improve. Analyze your own cases immediately after the surgery; “why did it go so badly, why was it so smooth?” Write it down in your operative notes, track sheets or database, but make sure to record your findings. Our memory is short, only few months or even less if the number of cases is high. You should not be desperate if you don't have the top facilities, because it is the actual work that counts the most. The paper track sheets of Drs. Drake and Peerless, primitive from the present perspective, could still serve as a testimony of surgical experience and techniques for the upcoming generations. Make videos and photographs, analyze them, draw if you can, and discuss the cases with other neurosurgeons, residents and students. When recording your operations, you will find that you end up doing better and cleaner microsurgery. Analyze your cases also in your mind in the evenings or even during the sleep-less nights. Perform mental exercises in how to improve your surgery, which moves to omit or to add. Share your experience with others, especially with younger people, and speak openly about your complications. Being open means honest surgery, and the

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truth helps always also the patient. Do not brag in advance about how simple a particular case will be (“...even my mother could do it...”) as in this very same case you may end up having the most surprising and horrifying complications!

Dr. Drake stated in his book on vertebrobasilar artery aneurysms: “If only we could have back again many of those who were lost or badly hurt, for a second chance in the operative room with what we have learned.” With an individual patient we cannot have a second chance, but this chance is given to the next patient if we keep all of our experience in our memory and databases, analyze it and use it well.

4.9 FOLLOW UP YOUR PATIENTS

You should keep track of your own results. Follow up your patients with postoperative checkups on a regular basis, with outpatient visits, letters, telephone calls, and hospital records and add this follow-up data to your database. You should have your own personal small databases to keep track of your own surgical skills; it is only fair to your future patients if you know what the risks are of you performing a particular operation. If there is somebody close by who can do it better, let him or her operate on the patient, and meanwhile enhance your skills by observing, reading and practicing in a laboratory. You should not settle for mediocre results, always aim for the best standards of treatment! Mistakes happen, but don't make the same mistake twice. Discuss and analyze your cases with others, ask for advice to avoid future complications

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or disasters. Complications are caused by poor planning, lack of skills and/or knowledge. Accuse for complications by yourself, look at the mirror!

4.10 WRITE AND PUBLISH

Publish your results but don't publish everything! We should remember Francis Bacon's (1561-1626) words, cited on the first page of Dr. Drake's book "Every man owes it as a debt to his profession to put on record whatever he has done that might be of use to others". "One or two good papers a year in good journals are enough" was Dr. Drake's advice. In the present explosion of knowledge we should be very critical about what is published; only high quality data with good analysis and proper message. When publishing, we should look for relevant literature and not neglect the original works of the pioneers or the most important works on the subjects. Writing and publishing is hard work, it has to be practiced in the same way as surgical skills. The true skill comes only with time and numerous publications. Excuses like "I'm too busy with my clinical work to write..." are out of place. In neurosurgery, everybody is generally busy with his or her clinical work, which is the reason why writing is so hard. But despite the difficulties, writing is time well spent. Before putting any ideas on the paper, one is forced to analyze the problem to the smallest detail so that it can be communicated to others in a simplified and condensed way, often resulting in new ideas. The other advantage that comes from writing is that one becomes also a much better and more critical reader, who is able to distinguish a good publication from a poor one at a glance. Finding the proper balance between writing and

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actual clinical work is one of the most difficult tasks in academic neurosurgery.

4.11 KNOW YOUR PEOPLE

We are not alone when doing surgery. Treat all your staff members, such as anesthesiologists, neuroradiologists and nurses, well. Know their names, be familiar with their strengths and weaknesses, and adjust your surgery to the team you have available at that very moment. If the team is less experienced, as might be the case during the night, you must weigh the risks and benefits of doing a particular procedure at that time as opposed to doing it some other day with a better-qualified team. Many things affect your work: patients, their relatives, nurses in the OR, intensive care and bed wards, other neurosurgeons, anesthesiologists, other surgical specialists, referring doctors, administrative people, politicians, the society, and even your international colleagues. You will establish your reputation based on many factors, not only the success in surgery. Good reputation is hard to build, it takes years and years of work, but it can be swept away in a short instant if you drop your standards. On the other hand, with good reputation one can withstand many difficult situations and complications as long as the level of work is kept at the highest possible level. You must continuously monitor your own work: postoperative angiograms, CTs, and MRIs should be ordered and analyzed by yourself and your staff; otherwise someone else will order them. It is technically much easier to e.g. replace an aneurysm clip soon after a failed clipping or to remove a small tumor remnant observed on a postoperative image, compared to the

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abhorring thoughts of all the dangers and psychological stress to the patient if it has to be done after a longer period by someone else. In order to avoid malpractice charges one of the key points is to be open and honest, and to carry out postoperative controls.

4.12 ATMOSPHERE

The atmosphere in the department should be open and supportive of good work, and the employees should be proud of their clinic. Internal education of young doctors and nurses is a must; they will better understand the whole workflow of the department and they will become more open to helping their colleagues in need. Be honest! The staff has the right to know what happened to patients who experienced complications; otherwise rumors will destroy the atmosphere.

We should know our people, be kind but demanding. Do it in your own personal way, not in the ways some consultants or books on administration tell you to. Express your appreciation of your hardworking colleagues; pay them well if you can. It is a pity that in the socialized system of Scandinavian medicine this is seldom possible. Many neurosurgeons are passionate workers by nature, but being paid enough is also important. But above all, try to be a role model of a hard working professional who takes justified pride in his or her own work and who is continuously trying to improve his or her work.

<http://surgicalneurologyint.com/e-books/>

5 1001 AND MORE MICROSURGICAL VIDEOS OF NEUROSURGERY: PROCESS OF VIDEO EDITION

by Joham Choque-Velasquez

"More than 1001 videos of neurosurgery" is a great project that was born from an idea of Professor Juha Hernesniemi, while looking for a way to transmit us his legacy, which comes from more than 40 years of neurosurgical experience.

This project is the result of more than two years of hard work. In detail, 73% of all videos were edited during the last six months of 2015, 12 % during the first six months, while the remaining 15% of the videos were edited during the previous years. Hence, thanks to all the fellows/visitors that contributed to its realization while staying in Helsinki.

As it is written in the Helsinki Neurosurgery book: "The fellows that have the opportunity to edit the operative videos know that to edit the operations is difficult. Because there is very little to edit out as there is little time of non-action!"

While editing the videos, our aim was to eliminate some repetition, and to create, for the various operations, fluent step-by-step guides that may be reproduced by any other neurosurgeon in their own clinical practice. The programs that were used for the video editing were Final cut pro and Imovie.

New technologies cannot hide the value of the knowledge. Some videos have not a so high definition; however, they show an extremely high level of surgery, and how to manage

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uncommon circumstances/pathologies: hence, we decided to do not take out them from this project.

The format of our videos includes a first slide with the picture of the Helsinki University Hospital; a second one with the key man of this project, Professor Juha Hernesniemi; and a third one with the name of the video editor. The last slide of each video includes the names of all the fellows/visitors that were participating to the project when the video was edited.

Videos from the previous years were re-edited according to this format. Even though the videos have some important written explanation inside them, the target of our project was to let "observers" follow the surgeries, so they could catch the purpose of the consecutive steps.

The project is entitled "More than 1001 videos of neurosurgery". We included more than 1100 videos that are divided into six groups: 1) Short and 2) Long version videos; 3) Surgical approaches; 4) Tricks and pearls; and 5) Bypass Procedures. The first two groups are classified according to the frequency of the treated pathologies, thereby the subgroups inside each folder are: 1) brain aneurysms; 2) arteriovenous malformations; 3) cavernous malformations; 4) tumors and intracranial expansive processes; 5) and spinal diseases.

Short version videos are up to 5 minutes. They were designed for experienced neurosurgeons that will benefit from analyzing how their own surgical style differs from that of Professor Hernesniemi. Most of these videos include only microneurosurgery.

Long version videos are up to 20 minutes. They were designed especially for young neurosurgeons, and include a

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more detailed step-by-step guide to the different phases of the operations, from the used approach to the various microsurgical stages.

The “tricks and pearls” folder includes short edited videos showing some special and useful tricks and pearls, which represent important techniques of Professor Hernesniemi’s neurosurgical armamentarium. Indeed, we believe that they may be of great help for solving tedious problems while operating on, making the surgical procedures simpler and faster. They will surely conform an important training tool for many neurosurgeons.

A big project about microvascular Neurosurgery cannot miss bypass techniques. Even though the minimalistic style of Professor Juha Hernesniemi makes the clipping technique of complex aneurysms the main procedure for them, we believe also that the bypass technique is indispensable in the armamentarium of a neurosurgeon who wants to get a high level of skill. A special folder titled “Bypass” includes some bypass procedure from Professor Juha Hernesniemi. However, the big amount of them was edited from the master surgeries that Professor Rokuya Tanikawa performed in Helsinki Hospital during his many visits. These videos include the main steps of the bypass procedures.

We also uploaded some videos that show full microsurgeries, and many of them include the corresponding approach: Microsurgeries have an average time of about 25 minutes, while complete surgeries have an average time of 45 minutes. The main idea of these videos is to show to our colleagues all small and big details that a neurosurgeon as Juha Hernesniemi take into consideration when performing a surgery.

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Juha Hernesniemi's philosophy is condensed in the main principle "simple, clean, fast and preserving the normal anatomy". Clearly we can already see the application of this sentence in every approach. Under a minimalistic point of view the approaches are performed with the sufficient and necessary steps. Along his career, Professor Hernesniemi could progressively reduce and simplify every procedure at its maximum expression: almost all the different surgical approaches are performed in less than 15 minutes, with the exception of some lateral approach to the foramen magnum for low located vertebrobasilar aneurysms or tumors. Special attention was paid for the presigmoid approach, which has been so far the longest lasting approach used by Juha Hernesniemi in cases of aneurysms located extremely low below the posterior clinoid process, as well as for lesions extending to both middle and posterior fossae, petroclival tumors or Bypass procedures from P2. A folder named "presigmoid approach" includes the craniotomy, the partial petromastoidectomy, the opening of the dura, and the cutting of the petrosal superior sinus. With experience, the fastest approach was made in 45 minutes; however, mainly the presigmoid approach takes between 1-2 hs. This time is usually related with the age of the patient (dural adherence).

The preservation of the normal anatomy is clearly visible in the microsurgical technique of Prof Hernesniemi.

To make high quality procedures in the shortest surgery times, "Simple" implies achieving the goal by the minimal effort, doing only what is really necessary. "Clean" involves preventing the bleedings, as well as a good hemostasis and the use of saline irrigation. "Fast" is the result of the aforementioned factors, together with precise and fluent

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movements, respecting natural tissue boundaries and cleavage planes, under high magnification.

The main tools that permit an adequate microsurgery are:

-Operating Microscope and movements under the microscope with Stereoscopic vision, high magnification and powerful illumination combined with high mobility and displacement speed, it means microscopes that allow mouth switch and intraoperative angiography.

-Few Microsurgical instruments, 11 basic instruments that are used in almost all the situations; four bipolar forceps (long and short, sharp and blunt tipped), microdissector, straight microscissors, aneurysm clip applicator, straight blunt steel needle for irrigation, and three suction tubes (long, medium size, and short) which allow regulation of the suction power through three holes.

-Diathermia and Bipolar, at least four forceps, short and long, sharp and blunt.

-Sharp and blunt dissection. Blunt dissection with bipolar forceps, microdissector, small cottonoids without strings, and most importantly the use of water dissection; sharp dissection with microscissors, sharp bipolar, or one cheap alternative as a sharp, straight needle attached to a 1 ml syringe acting as a handle useful to open the Sylvian fissure.

-Minimal retraction in experienced hands. The role of microretractors by the suction or bipolar forceps is constantly and subconsciously interchanged.

-Fibrin glue sealant and fibrillar surgical are needed to maintain a clean surgical field. Never continue surgery before stopping all the bleedings!

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Approach	Anatomical Access	Burr hole characteristics and Craniotomy	Indications	Special Considerations
Lateral supraorbital Approach (LSO)	-Anterior Skull base -Sellar and suprasellar Region -Middle cranial fossa -Anterior portion of the sylvian fissure -Posterior and temporal extension of the craniotomy can access the distal part of the Sylvian fissure	-Curved frontotemporal skin incision made behind the hairline which stops 2 to 3 cm above the zygoma -A single burr hole is placed just under the temporal line in the frontal bone	-Anterior cranial fossa tumors -Sellar, suprasellar and sphenoid ridge lesions -Anterior Circulation Aneurysms (ACA <1,5 cm high) except distal ACA aneurysms -High basilar Tip and SCA Aneurysms (>1 cm high from posterior clinoid process)	-Supine position
Pterional Approach	-Similar to LSO -Retrosellar Approach better than LSO -Wider exposure of frontal and temporal lobes -Exposure of Insula through wide Sylvian fissure	-Curved skin Incision behind the hairline starting in the midline and finishing close to the level of zygoma: -Only one burr hole is used at the superior insertion of the temporal muscle	-Giant anterior circulation aneurysms, especially MCA aneurysms -High basilar tip aneurysms -AVMs close to the Sylvian fissure -Insular tumors	-Supine position
Interhemispheric Approach	-Medial surface of both cerebral hemispheres -Falx cerebri -Distal segment of ACA -Corpus Callosum -Third ventricle and Lateral ventricles	-Curved skin Incision for approaches in front of coronal suture with frontal base and extended more to the side of the planned bone flap -A straight incision along the midline for approaches behind the coronal suture -Mostly only one burr hole in the midline over the superior sagittal sinus at the posterior border of the bone flap is needed	-Distal anterior cerebral artery aneurysms -Third ventricle colloid cysts -Very high located craniopharyngiomas -Other pathologies of the third ventricle and those of the lateral ventricles can be accessed -Parasagittal meningiomas -Falx meningiomas	-Supine position for approaches in front of coronal suture -Semi-sitting position for approaches behind the coronal suture -Sometimes neuronavigation can be helpful for planning the trajectory
Subtemporal Approach	-Basilar artery bifurcation -Superior cerebellar artery (SCA) -Posterior cerebral artery (PCA), P1 and part of P2 segment -Interpeduncular Space -Floor of the middle fossa	-Skin incision starts 1 cm in front of the tragus going above the earlobe crossing the zygomatic line -One burr hole is placed at the cranial border of the planned bone flap and a second burr hole is made basally, close to the origin of the zygomatic arch	-Basilar tip aneurysms located below the posterior clinoid process and those at the posterior clinoid or less than 10 mm above the posterior clinoid process.	-Park Bench position -Protection of the pressure points. -Spinal drainage of 50-100 ml of CSF or ventriculostomy
Retrosigmoid Approach	-Cerebellopontine angle -Lateral-posterior Fossa	-Skin linear incision one inch behind mastoid process below the transversal-sigmoid sinuses junction (caudal to the zygomatic line and posterior to the mastoid line) -One burr hole is placed at the posterior border of the incision.	-Vestibular schwannoma surgery -Vertebral artery – PICA aneurysms -Microvascular cranial nerve decompression of the V or VII nerve -Meningiomas and another tumors of the lateral posterior fossa	-Park Bench position -Protection of the pressure points -Spinal drainage, if no possible, release of CSF from Magna cistern
Presigmoid Approach (Subtemporal approach +presigmoid- transpetrosal approach with partially pretosectomy)	-Space extended to both middle and posterior fossa -The midbasilar region as well as the posterior parts of the middle fossa	-Skin incision starts in front of the ear curve going to one inch behind mastoid line -Three to four burr holes (nowadays only one) are	-Basilar tip aneurysms located extremely low below the posterior clinoid process, and trunk basilar aneurysms -Lesions that extend to both middle and posterior fossa	-Park Bench position -Spinal drainage -Special blunt dissection of the vertebral artery -Not approach

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	and the petrous bone	usually used; close to the origin of the zygoma; at the most cranial part of the temporal bone; Inferior to the transverse sinus; and optionally superior to transverse sinus -Partial Petrosectomy and mastoidectomy are as much as is necessary to expose the dura anterior to the sigmoid sinus, superior petrous sinus and the dura of the floor of the middle fossa	-Petroclival tumors -Bypass procedures from P2	semicircular canals -Time consuming (at least 1 hrs.) -Risk of post-operative leak of CSF -Section of petrous superior sinus -Cutting the tentorium anterior to the drainage of vein of Labbé and posterior to the tentorial insertion of the fourth nerve
Supracerebellar Infratentorial Approach (Paramedian Approach)	-Pineal region -Inferior surface of Tentorium -Superior surface of cerebellum	-Straight skin incision 2–3 cm lateral from the midline starts about an inch cranial from theinion and extends caudally towards the level of the cranio-cervical junction -One burr hole about 3 cm lateral from the midline superior to the transverse sinus -3-4 cm diameter bone flap	-Pineal region lesions -Tentorial meningiomas, AVMs, aneurysms and intrinsic tumors of the superior surface of the cerebellum	-Sitting position-praying position -The endotracheal intubation tube secured to the clamp system -Anesthesiologist must have access to the intubation tube and both jugular veins -Precordial Doppler device above the right atrium
Fourth ventricle and Foramen magnum region Approach (median approach)	-Midline structures of the posterior fossa.	-Straight Skin incision in the midline below the level of the external occipital protuberance and extends caudally all the way down to the C1–C2 level -One burr hole is placed about 1 cm paramedian, below the level of the transverse sinus	-Tumoral and vascular lesions of the fourth ventricle, vermis, cisterna magna region and posterior brainstem -Distal PICA aneurysms	-Sitting position-praying position -Same as Supracerebellar infratentorial approach
Lateral Approach to Foramen magnum (Enough Lateral Approach)	-Inferior segment of the Lateral-posterior Fossa -Foramen magnum	-Straight Skin incision placed about one inch behind the mastoid starts below the zygomatic line extending usually 4–5 cm caudal from the tip of the mastoid -One burr hole is placed at the posterior border of the exposed bone	-Pathologies that are close to the level of the foramen magnum (Less than 10 mm) -Low-lying vertebral aneurysms -Foramen magnum meningiomas -Low brain stem cavernomas and Intrinsic tumors	-Park Bench position -The occipital condyle is left intact or minimally removed -The vertebral artery is not transposed -The sigmoid sinus is not skeletonized -The Extracranial/intraosseal course of the lower cranial nerves is not exposed

The table describes the approaches used by Professor Juha Hernesniemi to mainly operate lesions in close relation with the skull base and deep brain structures.

-Microsurgical doppler and flowmeter are necessary in any procedure that requires a vascular flow evaluation.

Along the edition process of this project with a huge amount of information, international fellows of professor Hernesniemi

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were mainly involved and special thanks should be done to some friend that cooperated during the review phase of the videos, showing us small mistakes, thanks Masahiro Indo and Kenneth Lopez.

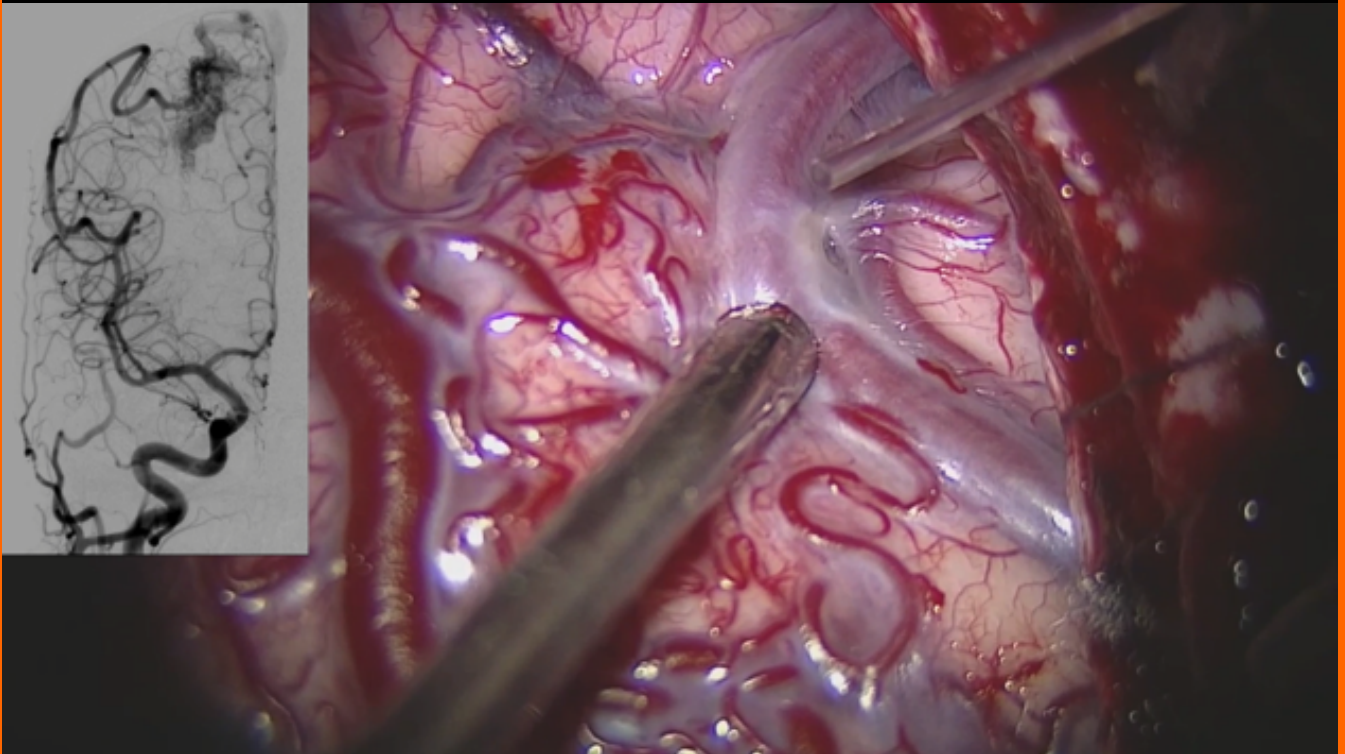
- Charles G Drake, Sydney J Peerless, Juha A Hernesniemi. Surgery of Vertebrobasilar Aneurysms. London, Ontario Experience on 1767 Patients. Springer 1996.
- Lehecka M, Laakso A, Hernesniemi J. Helsinki Microneurosurgery Basics and Tricks. Germany: Aesculap AG2011.

Joham Choque Velasquez
Helsinki Finland, June 2016¹



APPROACHES

Simple and fast



MICROSURGERY

Preserving normal anatomy

6 MICROSURGICAL VIDEO-BOOK CONTENT

<http://surgicalneurologyint.com/1001-hernesniemi-videos/>

Music at operating room of Professor Hernesniemi:

<http://www.iskelma.fi/info#taajuudet>

6.1 VIDEO INTRODUCTION

6.1.1 1001 AND MORE MICROSURGICAL VIDEOS OF NEUROSURGERY – VIDEO ADVERTISEMENT

<https://www.youtube.com/watch?v=ZQvvkJIxK8A>

6.1.2 DEPARTMENT OF NEUROSURGERY - HELSINKI UNIVERSITY HOSPITAL, INSIDE-OUTSIDE

<https://www.youtube.com/watch?v=rvCo5hHlqbY&feature=youtu.be>

6.1.3 SOME PRESTIGIOUS VISITORS IN HELSINKI UNIVERSITY HOSPITAL

https://www.youtube.com/watch?v=JXHdNF_O4H4

6.1.4 LAST SURGICAL CASE OF PROFESSOR HERNESNIEMI

<https://www.youtube.com/watch?v=gWySKaiTIbc>

**6.1.5 JUHA HERNESNIEMI'S FAREWELL,
HELSINKI UNIVERSITY HOSPITAL**

<https://www.youtube.com/watch?v=gxUGrFJZyL4>

**6.1.6 DEVELOPING THE NEUROSURGICAL
UNIT "JUHA HERNESNIEMI", TRUJILLO PERU,
2016**

https://www.youtube.com/watch?v=aG-S-ozGn_U

6.2 SHORT VERSION VIDEOS

6.2.1 ANEURYSMS

6.2.1.1 ANTERIOR CEREBRAL ARTERY ANEURYSMS

A1 Segment – AcomA Aneurysms

- <http://surgicalneurologyint.com/videogallery/unruptured-a1-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a1-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-a1-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-8/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-6/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-36/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-35/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-34/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-33/>

- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-24/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-23/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-22/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-21/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-20/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-17/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-14/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-13/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-12/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-11/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-10/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-9/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acom-a-aneurysm/>

- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-6/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-and-arachnoid-cyst/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-thrombosed-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-thrombosed/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-21/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-hypotrophyc-a1/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-17/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-15/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-13/>

- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-11/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-10/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-9/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-8/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-hypotrophyc-a1/>
- <http://surgicalneurologyint.com/videogallery/uruptured-acoma-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/uruptured-acoma-aneurysm/>

Distal ACA

- <http://surgicalneurologyint.com/videogallery/giant-pericallosal-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/pericallosal-previously-coiled/>
- <http://surgicalneurologyint.com/videogallery/ruptured-a2-3-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/ruptured-a3-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a2-3-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a3-a4-aneurysm/>

- <http://surgicalneurologyint.com/videogallery/unruptured-a3-aneurysm-coiled/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a3-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a3-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a3-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a4-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pericallosal-aneurysm/>

6.2.1.2 INTERNAL CAROTID ARTERY ANEURYSMS

- <http://surgicalneurologyint.com/videogallery/giant-ica-paraclinoid-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/giant-paraclinoid-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/giant-rt-ica/>
- <http://surgicalneurologyint.com/videogallery/ruptured-paraclinoid-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-paraclinoid-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-paraclinoid/>
- <http://surgicalneurologyint.com/videogallery/unrupture-icabif-aneurysm/>

- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-18/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-12/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-11/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-10/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-9/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-8/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-7/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-6/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica/>
- <http://surgicalneurologyint.com/videogallery/unruptured-icabif-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-icabif-aneurysm-3/>

- <http://surgicalneurologyint.com/videogallery/unruptured-icabif-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-opthalmic-artery-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-opthalmic-artery-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-paraclinoid-aneurysm-6/>
- <http://surgicalneurologyint.com/videogallery/unruptured-paraclinoid-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/unruptured-paraclinoid-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-paraclinoid-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-paraclinoid-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-paraclinoid-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-paraclinoid-aneurysm-7/>
- <http://surgicalneurologyint.com/videogallery/unruptured-paraophthalmic-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-previously-clipped-ica-bif-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-small-ica-bif-aneurysm/>

6.2.1.3 POSTERIOR COMMUNICATING ARTERY ANEURYSMS

- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-20/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-16/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-15/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-14/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-13/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-12/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-11/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-10/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-9/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-7/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-6/>

- <http://surgicalneurologyint.com/videogallery/ruptured-pcoma-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-coiled-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-8/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-coiled-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-segment-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-segment-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcoma-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcoma-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcoma-aneurysm-3/>

6.2.1.4 MIDDLE CEREBRAL ARTERY ANEURYSMS

M1-MCA bif

- <http://surgicalneurologyint.com/videogallery/giant-m1-aneurysm-clipping/>
- <http://surgicalneurologyint.com/videogallery/ruptured-m1-fusiform-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-17/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-12/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-11/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-10/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-9/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-8/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1aneurysm/>

- <http://surgicalneurologyint.com/videogallery/giant-mca-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/giant-mcabif-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/176203094/>
- <http://surgicalneurologyint.com/videogallery/large-ruptured-mcabif-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/large-unruptured-mcabif-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/mcabif-previously-coiled-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-fusimor-m2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mca-bif-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mca-bif-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mca-bif/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mca-with-ich/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-aneurysm/>

- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-aneurysm-9/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-aneurysm-8/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-aneurysm-6/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/uncut-mcabif-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-incidental-mcabif-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-incidental-mcabif-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-aneurysm-11/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-aneurysm-10/>

- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-aneurysm-9/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-aneurysm-8/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-aneurysm-7/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-aneurysm-6/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-20/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-19/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-18/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-16/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-15/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-14/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-13/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-12/>

- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-11/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-10/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurym/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-9/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-8/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-7/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-6/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-40/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-60/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-57/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-56/>

- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-55/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-54/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-51/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-50/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-47/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-46/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-and-temporal-arachnoid-cyst/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-39/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-38/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-37/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-36/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-35/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-34/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-33/>

- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-32/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-31/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-30/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-29/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-28/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-with-sdh/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-27/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-26/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-25/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-23/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-22/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-21/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-with-adenosine-induce-cardiac-arrest/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif/>

- <http://surgicalneurologyint.com/videogallery/unruptured-mcatrif-aneurysm/>

Distal MCA

- <http://surgicalneurologyint.com/videogallery/ruptured-m2-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m2-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m2-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m3-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-distal-mca-aneurysm/>

6.2.1.5 MULTIPLE INTRACRANIAL ANEURYSMS

- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-m1-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcoma-p1-p2-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/m1mcabif-pca-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/mca-aneurysm-previously-coiled/>
- <http://surgicalneurologyint.com/videogallery/mca-bif-a1-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/mcabif-pcom-aneurysms/>

- <http://surgicalneurologyint.com/videogallery/multiple-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/multiple-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/paraclinoid-mcabif-m2-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acha-and-unruptured-ica-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-and-unruptured-m1-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-and-unruptured-mcabig-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/ruptured-ica-and-unruptured-ica-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/ruptured-m1-and-ruptured-acoma-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-bilateral-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/unruptured-bilateral-paraclinoid-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-bilateral-mcabif-aneurysm-contralateral-approach/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-and-a1-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-acoma-aneurysms-4/>

- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-acoma-aneurysms-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-acoma-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-acoma-aneurysms-6/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-unrupt-ica-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-and-unruptured-pcom-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/unruptured-multi-m1-and-a2-3-aneurysms-2/>

6.2.1.6 POSTERIOR CIRCULATION ANEURYSMS

- <http://surgicalneurologyint.com/videogallery/recurrent-va-pica-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-ba-sca-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-tip-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-tip-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-tip-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-tip-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-tip-aneurysm/>

- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-tip-aneurysm-11/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-tip-aneurysm-10/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-tip-aneurysm-6/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-trunk-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-trunk-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-left-pica-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-p1-p2-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-p1-p2-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pica-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pica-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pica-aneurysm-6/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pica-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pica-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pica-aneurysm-3/>

- <http://surgicalneurologyint.com/videogallery/ruptured-pica-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-va-pica-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-vertebral-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/ruptured-vertebral-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unrupture-pica-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-artery-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-artery-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-sca-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-sca-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-sca-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-trunk-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-tip-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-tip-aneurysm/>

- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-tip-aneurysm-6/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-tip-aneurysm-5/http://surgicalneurologyint.com/videogallery/unruptured-basilar-tip-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pica-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pica-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-va-pica-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-vertebral-artery-previously-clipped/>
- <http://surgicalneurologyint.com/videogallery/vertebro-basilar-aneurysm/>

6.2.2 ARTERIOVENOUS MALFORMATIONS

6.2.2.1 *SUPRATENTORIAL AVMs*

- <http://surgicalneurologyint.com/videogallery/thalamic-avm/>
- <http://surgicalneurologyint.com/videogallery/parietal-avm-3/>
- <http://surgicalneurologyint.com/videogallery/frontal-avm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-thalamic-avm-2/>

- <http://surgicalneurologyint.com/videogallery/left-unruptured-thalamic-avm-2/>
- <http://surgicalneurologyint.com/videogallery/resection-of-embolized-avm/>
- <http://surgicalneurologyint.com/videogallery/davf-sss/>
- <http://surgicalneurologyint.com/videogallery/ruptured-parieto-occipital-avm/>
- <http://surgicalneurologyint.com/videogallery/daff-subtemporal-approach/>
- <http://surgicalneurologyint.com/videogallery/marginal-resection-of-an-avm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-avm-at-embolization/>
- <http://surgicalneurologyint.com/videogallery/marginal-resection-of-a-ruptured-avm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-thalamic-avm/>
- <http://surgicalneurologyint.com/videogallery/parietal-avm-2/>
- <http://surgicalneurologyint.com/videogallery/occipital-avm-and-m4-fistula/>
- <http://surgicalneurologyint.com/videogallery/occipital-davf-with-hematoma/>
- <http://surgicalneurologyint.com/videogallery/temporal-tentorial-avm-2/>
- <http://surgicalneurologyint.com/videogallery/davf-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-avm-75jf/>

- <http://surgicalneurologyint.com/videogallery/left-unruptured-thalamic-avm/>
- <http://surgicalneurologyint.com/videogallery/cingular-avm/>
- <http://surgicalneurologyint.com/videogallery/parieto-occipital-avm/>

6.2.2.2 POSTERIOR FOSA AVMS

- <http://surgicalneurologyint.com/videogallery/posterior-fossa-avm-2/>
- <http://surgicalneurologyint.com/videogallery/resection-of-tentorial-avm/>
- <http://surgicalneurologyint.com/videogallery/dural-arteriovenous-fistula/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-avm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-cerebellar-avm/>
- <http://surgicalneurologyint.com/videogallery/posterior-fossa-avm/>

6.2.2.3 SPINAL AVMS

- <http://surgicalneurologyint.com/videogallery/spinal-dural-residual-avf-2/>
- <http://surgicalneurologyint.com/videogallery/spinal-dural-residual-avf/>
- <http://surgicalneurologyint.com/videogallery/spinal-davf/>

- <http://surgicalneurologyint.com/videogallery/spinal-th7-davf/>
- <http://surgicalneurologyint.com/videogallery/spinal-davf-th-6-2/>

6.2.3 CAVERNOUS MALFORMATIONS

6.2.3.1 *SUPRATENTORIAL CAVERNOUS MALFORMATIONS*

- <http://surgicalneurologyint.com/videogallery/corpus-callosum-cavernoma-3/>
- <http://surgicalneurologyint.com/videogallery/frontal-cavernoma-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-cavernoma-4/>
- <http://surgicalneurologyint.com/videogallery/frontal-cavernoma-6/>
- <http://surgicalneurologyint.com/videogallery/iii-ventricle-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/insular-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/left-frontal-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/occipital-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/t-o-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/temporal-cavernoma-2/>

- <http://surgicalneurologyint.com/videogallery/temporal-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/temporor-occipital-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/thalamic-cavernoma-3/>
- <http://surgicalneurologyint.com/videogallery/thalamus-basal-ganglia-cavernoma/>

6.2.3.2 POSTERIOR FOSSA CAVERNOUS MALFORMATIONS

- <http://surgicalneurologyint.com/videogallery/brainstem-cavernoma-3/>
- <http://surgicalneurologyint.com/videogallery/brainstem-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-cavernoma-2/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-peduncle-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/pontine-cavernoma-2/>
- <http://surgicalneurologyint.com/videogallery/pontine-cavernoma-5/>
- <http://surgicalneurologyint.com/videogallery/pontine-cavernous-malformation/>

- <http://surgicalneurologyint.com/videogallery/pontomedullar-cavernoma-2/>
- <http://surgicalneurologyint.com/videogallery/right-cerebellar-cavernoma/>

6.2.3.3 SPINAL CAVERNOUS MALFORMATION

- <http://surgicalneurologyint.com/videogallery/t7-cavernous-malformation/>

6.2.4 TUMOURS OF THE CENTRAL NERVOUS SYSTEM

6.2.4.1 COLLOID CYSTS AND THIRD VENTRICLE LESIONS

- <http://surgicalneurologyint.com/videogallery/3rd-ventricle-astrocytoma/>
- <http://surgicalneurologyint.com/videogallery/3rd-ventricle-colloid-cyst-2/>
- <http://surgicalneurologyint.com/videogallery/3rd-ventricle-colloid-cyst/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-10/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-11/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-13/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-14/>

- <http://surgicalneurologyint.com/videogallery/colloid-cyst-2/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-3/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-4/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-5/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-6/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-9/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-of-the-3rd-ventricle-2/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst/>
- <http://surgicalneurologyint.com/videogallery/intraventricular-tumor/>
- <http://surgicalneurologyint.com/videogallery/third-ventricle-colloid-cyst/>

6.2.4.2 GLIOMAS

Supratentorial gliomas

- <http://surgicalneurologyint.com/videogallery/temporoparietal-glioma/>
- <http://surgicalneurologyint.com/videogallery/corpuscallosum-glioma/>
- <http://surgicalneurologyint.com/videogallery/frontal-gbm-3/>

- <http://surgicalneurologyint.com/videogallery/frontal-gbm-4/>
- <http://surgicalneurologyint.com/videogallery/frontal-glioma-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-glioma-6/>
- <http://surgicalneurologyint.com/videogallery/frontal-parietal-glioma/>
- <http://surgicalneurologyint.com/videogallery/fronto-parietal-glioma-2/>
- <http://surgicalneurologyint.com/videogallery/fronto-parietal-glioma/>
- <http://surgicalneurologyint.com/videogallery/occipital-gbm/>
- <http://surgicalneurologyint.com/videogallery/occipital-glioma/>
- <http://surgicalneurologyint.com/videogallery/left-occipital-parietal-glioma/>
- <http://surgicalneurologyint.com/videogallery/parietal-occipital-gbm/>
- <http://surgicalneurologyint.com/videogallery/parietal-gbm/>
- <http://surgicalneurologyint.com/videogallery/recurrent-frontal-glioma/>
- <http://surgicalneurologyint.com/videogallery/recurrent-frontal-high-grade-glioma/>
- <http://surgicalneurologyint.com/videogallery/recurrent-malignant-parieto-occipital-glioma/>

- <http://surgicalneurologyint.com/videogallery/recurrent-temporal-glioma/>
- <http://surgicalneurologyint.com/videogallery/right-recurrent-temporal-glioblastoma/>
- <http://surgicalneurologyint.com/videogallery/right-recurrent-temporal-glioblastoma-2/>
- <http://surgicalneurologyint.com/videogallery/temporal-gbm-2/>
- <http://surgicalneurologyint.com/videogallery/temporal-gbm-recurrent/>
- <http://surgicalneurologyint.com/videogallery/temporal-glioma-2/>
- <http://surgicalneurologyint.com/videogallery/temporal-glioma-3/>
- <http://surgicalneurologyint.com/videogallery/temporal-parietal-astrocytoma-2/>
- <http://surgicalneurologyint.com/videogallery/temporal-parietal-astrocytoma/>

Posterior fossa gliomas

- <http://surgicalneurologyint.com/videogallery/brainstem-glioma-2/>
- <http://surgicalneurologyint.com/videogallery/brainstem-glioma-4/>
- <http://surgicalneurologyint.com/videogallery/brainstem-glioma/>
- <http://surgicalneurologyint.com/videogallery/cerebellum-glioma/>

- <http://surgicalneurologyint.com/videogallery/intramedullary-ependymoma/>
- <http://surgicalneurologyint.com/videogallery/pontine-glioma/>
- <http://surgicalneurologyint.com/videogallery/posterior-fossa-ependymoma-2/>

6.2.4.3 *FOURTH VENTRICLE TUMOURS*

- <http://surgicalneurologyint.com/videogallery/4th-ventricle-ependymoma-2/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-mts-2/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-recurrent-ependymoma-2/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-tumor-3/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-tumor/>
- <http://surgicalneurologyint.com/videogallery/ependymoma-of-the-iv-ventricle/>
- <http://surgicalneurologyint.com/videogallery/ivth-ventricle-tumor-4/>
- <http://surgicalneurologyint.com/videogallery/ivth-ventricle-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/ivth-ventricle-tumor/>

6.2.4.4 MENINGIOMAS

Skull base supratentorial meningiomas

- <http://surgicalneurologyint.com/videogallery/tuberculum-sellae-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-12/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-11/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-10/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-6/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-5/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-4/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-recurrent-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-recurrent-meningioma/>
- <http://surgicalneurologyint.com/videogallery/cavernous-sinus-meningioma/>
- <http://surgicalneurologyint.com/videogallery/clinoid-meningioma/>

- <http://surgicalneurologyint.com/videogallery/intraorbital-meningioma/>
- <http://surgicalneurologyint.com/videogallery/large-anterior-clinoid-meningioma/>
- <http://surgicalneurologyint.com/videogallery/left-anterior-clinoid-meningioma/>
- <http://surgicalneurologyint.com/videogallery/left-anterior-clinoid-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/olfactory-groove-meningioma-6/>
- <http://surgicalneurologyint.com/videogallery/medial-sphenoid-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/middle-fossa-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/olfactory-groove-meningioma-4/>
- <http://surgicalneurologyint.com/videogallery/olfactory-groove-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/olfactory-groove-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/olfactory-groove-meningioma/>
- <http://surgicalneurologyint.com/videogallery/olfactory-groove-recurrent-meningioma/>
- <http://surgicalneurologyint.com/videogallery/olfactory-meningioma/>
- <http://surgicalneurologyint.com/videogallery/optic-nerve-sheath-meningioma/>

- <http://surgicalneurologyint.com/videogallery/planum-sphenoidale-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/planum-sphenoidale-meningioma/>
- <http://surgicalneurologyint.com/videogallery/recurrent-olfactory-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-intraosseous-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-intraosseous-meningioma/>
- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-meningioma-6/>
- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-meningioma-4/>
- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/sphenoidal-meningioma-meningioma/>
- <http://surgicalneurologyint.com/videogallery/sphenoidal-wing-meningioma/>
- <http://surgicalneurologyint.com/videogallery/suprasellar-meningeoma-2/>
- <http://surgicalneurologyint.com/videogallery/suprasellar-meningeoma/>
- <http://surgicalneurologyint.com/videogallery/suprasellar-meningioma-laitila/>

- <http://surgicalneurologyint.com/videogallery/suprasellar-meningioma-2/>

Meningiomas in other supratentorial locations

- <http://surgicalneurologyint.com/videogallery/anterior-falcine-meningioma/>
- <http://surgicalneurologyint.com/videogallery/convexity-frontal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/convexity-meningioma-and-tuberculum-sellae-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/convexity-meningioma/>
- <http://surgicalneurologyint.com/videogallery/falx-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/falx-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/frontal-convexity-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-convexity-meninigioma/>
- <http://surgicalneurologyint.com/videogallery/frontal-convexity-meningioma/>
- <http://surgicalneurologyint.com/videogallery/frontal-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/frontal-meningioma-4/>
- <http://surgicalneurologyint.com/videogallery/frontal-meningioma-5/>

- <http://surgicalneurologyint.com/videogallery/fronto-temporal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/left-frontal-convexity-meningioma/>
- <http://surgicalneurologyint.com/videogallery/parasagittal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/parasagittal-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/parasagittal-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/parasagittal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/parietal-parasagittal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/peritorcular-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/posterior-parasagittal-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/reccurent-parietal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/right-convexity-meningioma/>

Posterior fossa meningiomas

- <http://surgicalneurologyint.com/videogallery/foramen-magnum-meningioma-5/>
- <http://surgicalneurologyint.com/videogallery/foramen-magnum-meningioma-3/>

- <http://surgicalneurologyint.com/videogallery/foramen-magnum-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/foramen-magnum-vertebrobasilar-complex/>
- <http://surgicalneurologyint.com/videogallery/intra-supratentorial-meningioma/>
- <http://surgicalneurologyint.com/videogallery/infratentorial-meningioma/>
- <http://surgicalneurologyint.com/videogallery/petroclival-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/petroclival-meningioma/>
- <http://surgicalneurologyint.com/videogallery/posterior-fossa-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/posterior-fossa-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/posterior-fossa-meningioma/>
- <http://surgicalneurologyint.com/videogallery/reccurent-foramen-magnum-meningioma/>
- <http://surgicalneurologyint.com/videogallery/recurrent-posterior-fossa-meningioma-4/>
- <http://surgicalneurologyint.com/videogallery/recurrent-posterior-fossa-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/recurrent-posterior-fossa-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/right-sinus-confluence-meningioma-excision/>

- <http://surgicalneurologyint.com/videogallery/sinus-confluence-meningioma/>

6.2.4.5 PINEAL REGION LESIONS

- <http://surgicalneurologyint.com/videogallery/pineal-cyst-2/>
- <http://surgicalneurologyint.com/videogallery/pineal-cyst-3/>
- <http://surgicalneurologyint.com/videogallery/pineal-cyst-4/>
- <http://surgicalneurologyint.com/videogallery/pineal-cyst-5/>
- <http://surgicalneurologyint.com/videogallery/pineal-cyst-6/>
- <http://surgicalneurologyint.com/videogallery/pineal-cyst/>
- <http://surgicalneurologyint.com/videogallery/pineal-region-meningioma/>
- <http://surgicalneurologyint.com/videogallery/pineal-region-tumor/>
- <http://surgicalneurologyint.com/videogallery/pineal-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/pineal-tumor-3/>
- <http://surgicalneurologyint.com/videogallery/pineal-tumor-4/>
- <http://surgicalneurologyint.com/videogallery/pineal-tumour/>
- <http://surgicalneurologyint.com/videogallery/pineal-astrocytoma-2/>

6.2.4.6 SPINAL TUMOURS

- <http://surgicalneurologyint.com/videogallery/intradural-extramedullary-spinal-tumor/>

- <http://surgicalneurologyint.com/videogallery/t7-12-spinal-astrocytoma-2/>
- <http://surgicalneurologyint.com/videogallery/c2-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/c2%E2%80%A2-ventral-spinal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/c23-meningioma/>
- <http://surgicalneurologyint.com/videogallery/c6-c7-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/c7-spinal-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/c7-spinal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/spinal-meningioma/>

6.2.4.7 OTHERS TUMOURS

- <http://surgicalneurologyint.com/videogallery/cerebellar-metastasis/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-mts/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-tumour/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-choroid-plexus-papilloma/>

- <http://surgicalneurologyint.com/video-gallery/cerebellar-hemangioblastoma-2/>
- <http://surgicalneurologyint.com/video-gallery/craniopharyngioma-2/>
- <http://surgicalneurologyint.com/video-gallery/craniopharyngioma-3/>
- <http://surgicalneurologyint.com/video-gallery/craniopharyngioma-4/>
- <http://surgicalneurologyint.com/video-gallery/craniopharyngioma/>
- <http://surgicalneurologyint.com/video-gallery/eosinophilic-granuloma/>
- <http://surgicalneurologyint.com/video-gallery/frontal-metastasis-2/>
- <http://surgicalneurologyint.com/video-gallery/frontal-metastasis/>
- <http://surgicalneurologyint.com/video-gallery/fronto-parietal-mts-2/>
- <http://surgicalneurologyint.com/video-gallery/giant-craniopharyngioma/>
- <http://surgicalneurologyint.com/video-gallery/intraorbital-tumor-2/>
- <http://surgicalneurologyint.com/video-gallery/metastatic-tumor/>
- <http://surgicalneurologyint.com/video-gallery/orbital-melanoma-2/>
- <http://surgicalneurologyint.com/video-gallery/orbital-tumor-2/>

- <http://surgicalneurologyint.com/videogallery/orbital-tumor-3/>
- <http://surgicalneurologyint.com/videogallery/orbital-tumor/>
- <http://surgicalneurologyint.com/videogallery/periaqueductal-tumor/>
- <http://surgicalneurologyint.com/videogallery/paraventricular-cerebellar-tumor/>
- <http://surgicalneurologyint.com/videogallery/parietal-mts-2/>
- <http://surgicalneurologyint.com/videogallery/pituitary-apoplexy/>
- <http://surgicalneurologyint.com/videogallery/quadrigenial-cistern-hemangioblastoma-2/>
- <http://surgicalneurologyint.com/videogallery/quadrigenial-cistern-hemangioblastoma/>
- <http://surgicalneurologyint.com/videogallery/reccurent-cerebellar-hemangioblastoma-2/>
- <http://surgicalneurologyint.com/videogallery/recurrent-craniopharyngioma/>
- <http://surgicalneurologyint.com/videogallery/recurrent-frontal-tumor/>
- <http://surgicalneurologyint.com/videogallery/spinal-hemangioblastoma-3/>
- <http://surgicalneurologyint.com/videogallery/spinal-hemangioblastoma-2/>
- <http://surgicalneurologyint.com/videogallery/subependymoma-of-the-sylvian-aqueduct/>

- <http://surgicalneurologyint.com/videogallery/recurrent-craniopharyngioma-2/>
- <http://surgicalneurologyint.com/videogallery/suprasellar-tumor/>
- <http://surgicalneurologyint.com/videogallery/temporal-epidermoid-tumor/>
- <http://surgicalneurologyint.com/videogallery/temporal-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/temporal-tumor-3/>
- <http://surgicalneurologyint.com/videogallery/thalamic-tumour/>

6.2.5 SPINAL DEGENERATIVE LESIONS

- <http://surgicalneurologyint.com/videogallery/l45-spinal-stenosis-2/>
- <http://surgicalneurologyint.com/videogallery/c56-prolapsed-disc/>
- <http://surgicalneurologyint.com/videogallery/lumber-disc-herniation-l4-5/>
- <http://surgicalneurologyint.com/videogallery/lumbar-disc-herniation-l5-s1/>
- <http://surgicalneurologyint.com/videogallery/cervical-disc-herniation-c5-6/>
- <http://surgicalneurologyint.com/videogallery/cervical-disc-herniation-c4-6/>
- <http://surgicalneurologyint.com/videogallery/cervical-disc-herniation-c4/>

- <http://surgicalneurologyint.com/videogallery/cervical-disc-herniation-c5-7/>
- <http://surgicalneurologyint.com/videogallery/lumbar-disc-prolapse-l3-l4-3/>
- <http://surgicalneurologyint.com/videogallery/cervical-disc-prolapse-c5-c6-3/>
- <http://surgicalneurologyint.com/videogallery/lumbar-hemilaminectomy-discectomy/>
- <http://surgicalneurologyint.com/videogallery/l45-spinal-stenosis/>

6.3 LONG VERSION VIDEOS

6.3.1 ANEURYSMS

6.3.1.1 *ANTERIOR CEREBRAL ARTERY ANEURYSMS*

A1 Segment – AcomA Aneurysms

- <http://surgicalneurologyint.com/videogallery/unruptured-a1-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a1-m1-aneurysms-unedited/>
- <http://surgicalneurologyint.com/videogallery/acoma-aneurysm-unedited/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-32/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-31/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-30/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-29/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-28/>

- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-27/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-26/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-25/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-19/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-18/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-16/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-aneurysm-15/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma/>
- <http://surgicalneurologyint.com/videogallery/unedited-unruptured-acoma-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-20/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-19/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-18/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-16/>

- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-14/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-12/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-aneurysm-7/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma/>

Distal ACA aneurysms

- <http://surgicalneurologyint.com/videogallery/a2-segment-aneurysm-unedited/>
- <http://surgicalneurologyint.com/videogallery/ruptured-a2-3-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-a2-3-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/ruptured-a2-3-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a2-3-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a2-3-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a2-3-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-a3-aneurysm-coiled-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured/>

6.3.1.2 INTERNAL CAROTID ARTERY ANEURYSMS

- <http://surgicalneurologyint.com/videogallery/bilateral-paraclinoid-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/giant-ophthalmic-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/giant-paraclinoid-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/giant-unruptured-ica-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/ophthalmic-a-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/paraclinoid-aneurysm-unedited/>
- <http://surgicalneurologyint.com/videogallery/paraclinoid-mcabif-m2-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-paraclinoid-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/ruptured-paraclinoid-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/ruptured-paraclinoid-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/small-familial-ica-aneurysm-non-edited/>
- <http://surgicalneurologyint.com/videogallery/unedited-unruptured-ica-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-giant-ica/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-23/>

- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-22/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-21/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-20/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-19/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-17/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-16/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-15/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-14/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-aneurysm-13/>
- <http://surgicalneurologyint.com/videogallery/unruptured-paraclinoid-aneurysm/>

6.3.1.3 MIDDLE CEREBRAL ARTERY ANEURYSMS

M1 Segment – MCA bif aneurysms

- <http://surgicalneurologyint.com/videogallery/m1-aneurysm-unedited/>
- <http://surgicalneurologyint.com/videogallery/ruptured-fusiform-m1/>
- <http://surgicalneurologyint.com/videogallery/uncut-m1-aneurysm/>

- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-18/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-16/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-15/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-14/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-aneurysm-13/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-aneurysm-12/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-5/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-17/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm/>

- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-67/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-66/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-and-temporal-arachnoid-cyst-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-68/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-65/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-64/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-63/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-with-acute-subdural-hematoma/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-62/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-61/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-with-adenosine-induced-cardiac-arrest/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-59/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-58/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-53/>

- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-52/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-49/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-48/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-45/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-44/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-43/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-42/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-41/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-69/>
- <http://surgicalneurologyint.com/videogallery/giant-mcabif-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/large-ruptured-mcabif-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/large-unruptured-mcabif-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/mca-bif-aneurysm-6min-unedited/>
- <http://surgicalneurologyint.com/videogallery/mca-bif-aneurysm-complete-surgery/>

- <http://surgicalneurologyint.com/videogallery/mca-bif-aneurysm-unedited/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mca-bif-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-aneurysm-11/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-aneurysm-10/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-aneurysm-7/>
- <http://surgicalneurologyint.com/videogallery/uncut-mca-bif-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/mca-aneurysm-ruptured-unedited/>
- <http://surgicalneurologyint.com/videogallery/giant-mca-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/giant-mca/>

Distal MCA aneurysms

- <http://surgicalneurologyint.com/videogallery/distal-mca-aneurysm-unedited/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m2-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m2-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m3-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m3-aneurysm-3/>

6.3.1.4 MULTIPLE INTRACRANIAL ANEURYSMS

- <http://surgicalneurologyint.com/videogallery/multiple-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/mcabif-pcom-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acha-and-unruptured-ica-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acha-and-unruptured-ica-aneurysms-3/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-and-unruptured-mcabig-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-acoma-and-unruptured-m1-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-ica-and-unruptured-ica-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-m1-and-unruptured-acoma-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mca-ruptured-acoma-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mca-ruptured-acoma-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-mcabif-bilateral-aneurysms-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-giant-unruptured-ica-unruptured-mca-aneurysms-part-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-giant-unruptured-ica-unruptured-mca-aneurysms-part-1/>

- <http://surgicalneurologyint.com/videogallery/unruptured-bilateral-mca-aneurysms-contralateral-approach/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-bilateral-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/unruptured-ica-bilateral-aneurysms-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-and-a1-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-and-a1-aneurysms-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-m1-and-mcabif-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mca-bif-and-acoma-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-m1-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-unruptured-m1-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-unruptured-ica-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-acoma-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-acoma-aneurysms-5/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-and-contralateral-m1-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-mcabif-aneurysm-with-contralat-m1/>

- <http://surgicalneurologyint.com/videogallery/unruptured-multi-m1-and-a2-3-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/unruptured-multi-m1-and-a2-3-aneurysms-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-and-unruptured-pcom/>
- <http://surgicalneurologyint.com/videogallery/unruptured-acoma-and-unruptured-pcom-2/>

6.3.1.5 POSTERIOR COMMUNICATING ARTERY ANEURYSMS

- <http://surgicalneurologyint.com/videogallery/pcom-segment-aneurysm-real-time/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-24/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-22/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-19/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-18/>

- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-17/>
- <http://surgicalneurologyint.com/videogallery/ruptured-pcom-aneurysm-8/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-coiled/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-10/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-coiled-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-9/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-7/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pcom-aneurysm-6/>

6.3.1.6 POSTERIOR CIRCULATION ANEURYSMS

- <http://surgicalneurologyint.com/videogallery/basilar-tip-aneurysm-unedited/>
- <http://surgicalneurologyint.com/videogallery/basilar-tip-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/clipping-of-the-basilar-tip-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/complex-pica-unedited/>
- <http://surgicalneurologyint.com/videogallery/giant-unruptured-basilar-aneurysm/>

- <http://surgicalneurologyint.com/videogallery/giant-unruptured-basilar-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/left-pica-aneurysm-unedited/>
- <http://surgicalneurologyint.com/videogallery/pica-complete-surgery/>
- <http://surgicalneurologyint.com/videogallery/pica-unedited/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-tip-a/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-tip-aneurysm-9/>
- <http://surgicalneurologyint.com/videogallery/ruptured-basilar-tip-aneurysm-7/>
- <http://surgicalneurologyint.com/videogallery/ruptured-proximal-pica-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-vertebral-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/ruptured-vertebral-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/ruptured-vertebral-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/unedited-basilar-subtemporal/>
- <http://surgicalneurologyint.com/videogallery/unedited-basilar-tip-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-aneurysm/>

- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-sca-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-sca-aneurysm-5/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-sca-aneurysm-6/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-trunk-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/unruptured-basilar-tip-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pica-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-pica-aneurysm-4/>
- <http://surgicalneurologyint.com/videogallery/unruptured-va-pica-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/unruptured-va-pica-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/unruptured-vertebral-artery/>
- <http://surgicalneurologyint.com/videogallery/complex-pica-unedited-2/>

6.3.2 ARTERIOVENOUS MALFORMATIONS

6.3.2.1 *SUPRATENTORIAL AVMs*

- <http://surgicalneurologyint.com/videogallery/large-hematoma-due-to-small-avm-unedited/>
- <http://surgicalneurologyint.com/videogallery/unruptured-parietal-avm/>
- <http://surgicalneurologyint.com/videogallery/cingular-avm-2/>
- <http://surgicalneurologyint.com/videogallery/thalamic-avm-2/>
- <http://surgicalneurologyint.com/videogallery/right-parietal-avm/>
- <http://surgicalneurologyint.com/videogallery/frontal-avm-postembolism-part-1-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-avm-postembolism-pt-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-avm-postembolism-pt-3/>
- <http://surgicalneurologyint.com/videogallery/occipital-avm-m4-fistula-pt-1/>
- <http://surgicalneurologyint.com/videogallery/occipital-avm-m4-fistula-pt-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-avm-unruptured-ica-aneurysm-3/>
- <http://surgicalneurologyint.com/videogallery/parietal-avm-5/>
- <http://surgicalneurologyint.com/videogallery/temporal-tentorial-avm-3/>

- <http://surgicalneurologyint.com/videogallery/occipital-davf-with-hematoma-3/>
- <http://surgicalneurologyint.com/videogallery/occipital-davf-with-hematoma-2/>
- <http://surgicalneurologyint.com/videogallery/parietal-avm-4/>
- <http://surgicalneurologyint.com/videogallery/parieto-occipital-avm-2/>
- <http://surgicalneurologyint.com/videogallery/occipital-davf-with-hematoma-part-1/>
- <http://surgicalneurologyint.com/videogallery/occipital-davf-with-hematoma-part-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-avm-unruptured-ica-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/temporal-tentorial-avm/>
- <http://surgicalneurologyint.com/videogallery/occipital-avm-m4-fistula-part-1/>
- <http://surgicalneurologyint.com/videogallery/occipital-avm-m4-fistula-part-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-avm-postembolism-part-1/>
- <http://surgicalneurologyint.com/videogallery/frontal-avm-postembolism-part-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-avm-postembolism-part-3/>
- <http://surgicalneurologyint.com/videogallery/parietal-avm/>

- <http://surgicalneurologyint.com/videogallery/unruptured-postembolized-avm/>
- <http://surgicalneurologyint.com/videogallery/davf-3/>
- <http://surgicalneurologyint.com/videogallery/large-hematoma-due-to-small-avm-unedited-2/>

6.3.2.2 POSTERIOR FOSSA AVMs

- <http://surgicalneurologyint.com/videogallery/cerebellum-avm/>
- <http://surgicalneurologyint.com/videogallery/brainstem-avm/>
- <http://surgicalneurologyint.com/videogallery/posterior-fossa-avm-4/>
- <http://surgicalneurologyint.com/videogallery/posterior-fossa-avm-3/>
- <http://surgicalneurologyint.com/videogallery/posterior-fossa-avm-part-1/>
- <http://surgicalneurologyint.com/videogallery/posterior-fossa-avm-part-2/>
- <http://surgicalneurologyint.com/videogallery/dural-arteriovenous-fistula-2/>

6.3.2.3 SPINAL AVMs

- <http://surgicalneurologyint.com/videogallery/spinal-th7-davf-2/>
- <http://surgicalneurologyint.com/videogallery/spinal-davf-th-6/>

6.3.3 CAVERNOUS MALFORMATIONS

6.3.3.1 *SUPRATENTORIAL CAVERNOUS MALFORMATIONS*

- <http://surgicalneurologyint.com/videogallery/corpus-callosum-cavernoma-2/>
- <http://surgicalneurologyint.com/videogallery/corpus-callosum-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/frontal-cavernoma-3/>
- <http://surgicalneurologyint.com/videogallery/frontal-cavernoma-5/>
- <http://surgicalneurologyint.com/videogallery/frontal-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/fronto-parietal-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/occipital-cavernoma-2/>
- <http://surgicalneurologyint.com/videogallery/thalamic-cavernoma-2/>
- <http://surgicalneurologyint.com/videogallery/thalamic-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/left-insular-cavernoma/>

6.3.3.2 POSTERIOR FOSSA CAVERNOUS MALFORMATIONS

- <http://surgicalneurologyint.com/videogallery/brainstem-cavernoma-2/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-cavernoma-3/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-peduncle-cavernoma-2/>
- <http://surgicalneurologyint.com/videogallery/pontine-cavernoma-3/>
- <http://surgicalneurologyint.com/videogallery/pontine-cavernoma-4/>
- <http://surgicalneurologyint.com/videogallery/pontine-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/pontine-cavernous-malformation-2/>
- <http://surgicalneurologyint.com/videogallery/pontomedullar-cavernoma/>

6.3.3.3 SPINAL CAVERNOUS MALFORMATION

- <http://surgicalneurologyint.com/videogallery/t7-cavernous-malformation-2/>

6.3.4 TUMOURS OF THE CENTRAL NERVOUS SYSTEM

6.3.4.1 *COLLOID CYSTS AND THIRD VENTRICLE LESIONS*

- <http://surgicalneurologyint.com/videogallery/3rd-ventricle-colloid-cyst-4/>
- <http://surgicalneurologyint.com/videogallery/3rd-ventricle-colloid-cyst-3/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-12/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-7/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-8/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-of-the-3rd-ventricle-3/>
- <http://surgicalneurologyint.com/videogallery/colloid-cyst-of-the-3rd-ventricle/>

6.3.4.2 *GLIOMAS*

Supratentorial gliomas

- <http://surgicalneurologyint.com/videogallery/frontal-gbm-5/>
- <http://surgicalneurologyint.com/videogallery/frontal-gbm-6/>
- <http://surgicalneurologyint.com/videogallery/frontal-gbm-7/>

- <http://surgicalneurologyint.com/videogallery/frontal-gbm/>
- <http://surgicalneurologyint.com/videogallery/frontal-glioma-3/>
- <http://surgicalneurologyint.com/videogallery/frontal-glioma-4/>
- <http://surgicalneurologyint.com/videogallery/frontal-glioma-5/>
- <http://surgicalneurologyint.com/videogallery/frontal-parietal-glioma-2/>
- <http://surgicalneurologyint.com/videogallery/fronto-parietal-glioma-3/>
- <http://surgicalneurologyint.com/videogallery/left-optic-glioma/>
- <http://surgicalneurologyint.com/videogallery/multicentric-glioblastoma/>
- <http://surgicalneurologyint.com/videogallery/occipital-gbm-2/>
- <http://surgicalneurologyint.com/videogallery/occipital-glioma-2/>
- <http://surgicalneurologyint.com/videogallery/optic-glioma/>
- <http://surgicalneurologyint.com/videogallery/parietal-gbm-2/>
- <http://surgicalneurologyint.com/videogallery/parietal-occipital-gbm-2/>
- <http://surgicalneurologyint.com/videogallery/recurrent-frontal-glioma-2/>

- <http://surgicalneurologyint.com/videogallery/recurrent-right-temporal-glioma/>
- <http://surgicalneurologyint.com/videogallery/right-temporal-gbm/>
- <http://surgicalneurologyint.com/videogallery/right-corpus-callosum-glioma/>
- <http://surgicalneurologyint.com/videogallery/recurrent-malignant-parieto-occipital-glioma-2/>
- <http://surgicalneurologyint.com/videogallery/temp-pariet-astrocytoma-2/>
- <http://surgicalneurologyint.com/videogallery/temp-pariet-astrocytoma/>
- <http://surgicalneurologyint.com/videogallery/temporal-gbm/>
- <http://surgicalneurologyint.com/videogallery/temporal-glioma-4/>
- <http://surgicalneurologyint.com/videogallery/temporal-glioma/>
- <http://surgicalneurologyint.com/videogallery/temporal-parietal-astrocytoma-3/>

Posterior fossa gliomas

- <http://surgicalneurologyint.com/videogallery/brainstem-glioma-3/>
- <http://surgicalneurologyint.com/videogallery/cerebellum-glioma-2/>
- <http://surgicalneurologyint.com/videogallery/high-grade-pontine-glioma-unedited/>

- <http://surgicalneurologyint.com/videogallery/intramedullary-ependymoma-2/>
- <http://surgicalneurologyint.com/videogallery/pontine-glioma-2/>
- <http://surgicalneurologyint.com/videogallery/posterior-fossa-ependymoma-3/>
- <http://surgicalneurologyint.com/videogallery/posterior-fossa-ependymoma/>

6.3.4.3 *FOURTH VENTRICLES TUMORS*

- <http://surgicalneurologyint.com/videogallery/4th-ventricle-ependymoma-3/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-ependymoma/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-mts-3/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-mts/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-recurrent-ependymoma-3/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-recurrent-ependymoma/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-tumor-6/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-tumor-5/>
- <http://surgicalneurologyint.com/videogallery/4th-ventricle-tumor-4/>

- <http://surgicalneurologyint.com/videogallery/ependimoma-4th-ventricle-unedited/>
- <http://surgicalneurologyint.com/videogallery/ependymoma-iv-ventricle-unedited/>
- <http://surgicalneurologyint.com/videogallery/ivth-ventricle-tumor-3/>

6.3.4.4 MENINGIOMAS

Skull base supratentorial Meningiomas

- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-15/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-14/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-13/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-9/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-8/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma-7/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoid-meningioma/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoidal-meningioma-unedited/>
- <http://surgicalneurologyint.com/videogallery/cavernous-sinus-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/clinoid-meningioma-2/>

- <http://surgicalneurologyint.com/videogallery/medial-sphenoid-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/medial-sphenoid-meningioma/>
- <http://surgicalneurologyint.com/videogallery/olfactory-groove-meningioma-9/>
- <http://surgicalneurologyint.com/videogallery/olfactory-groove-meningioma-8/>
- <http://surgicalneurologyint.com/videogallery/olfactory-groove-meningioma-7/>
- <http://surgicalneurologyint.com/videogallery/olfactory-groove-meningioma-5/>
- <http://surgicalneurologyint.com/videogallery/optic-nerve-sheath-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/planum-sphenoidale-meningioma-unedited/>
- <http://surgicalneurologyint.com/videogallery/recurrent-olfactory-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/recurrent-olfactory-meningioma/>
- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-intraosseous-meningioma-4/>
- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-intraosseous-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-meningioma-8/>
- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-meningioma-7/>

- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-meningioma-5/>
- <http://surgicalneurologyint.com/videogallery/sphenoid-wing-meningioma/>
- <http://surgicalneurologyint.com/videogallery/sphenoidal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/suprasellar-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/suprasellar-meningioma/>
- <http://surgicalneurologyint.com/videogallery/tuberculum-sellae-meningioma/>

Meningiomas in other supratentorial locations

- <http://surgicalneurologyint.com/videogallery/convexity-frontal-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/convexity-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/convexity-meningioma-and-tuberculum-sellae-meningioma/>
- <http://surgicalneurologyint.com/videogallery/falx-meningioma-4/>
- <http://surgicalneurologyint.com/videogallery/falx-meningioma-5/>
- <http://surgicalneurologyint.com/videogallery/falx-meningioma/>
- <http://surgicalneurologyint.com/videogallery/frontal-convexity-meningioma-4/>

- <http://surgicalneurologyint.com/videogallery/frontal-convexity-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/frontal-convexity-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-meningioma-6/>
- <http://surgicalneurologyint.com/videogallery/frontal-meningioma-7/>
- <http://surgicalneurologyint.com/videogallery/frontal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/fronto-temporal-convexity-meningioma/>
- <http://surgicalneurologyint.com/videogallery/intraventricular-meningioma-trigonum-unedited/>
- <http://surgicalneurologyint.com/videogallery/left-frontotemporal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/left-parasagittal-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/left-parasagittal-meningioma/>
- <http://surgicalneurologyint.com/videogallery/parasagittal-meningioma-4/>
- <http://surgicalneurologyint.com/videogallery/parietal-parasagittal-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/posterior-parasagittal-meningioma/>

- <http://surgicalneurologyint.com/videogallery/reccurent-parietal-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/right-parafalcine-frontal-meningioma/>

Posterior fossa meningiomas

- <http://surgicalneurologyint.com/videogallery/clivus-meningioma/>
- <http://surgicalneurologyint.com/videogallery/foramen-magnum-meningioma-6/>
- <http://surgicalneurologyint.com/videogallery/foramen-magnum-meningioma-4/>
- <http://surgicalneurologyint.com/videogallery/foramen-magnum-meningioma/>
- <http://surgicalneurologyint.com/videogallery/intra-supratentorial-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/left-petroclival-meningioma/>
- <http://surgicalneurologyint.com/videogallery/middle-fossa-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/middle-fossa-meningioma/>
- <http://surgicalneurologyint.com/videogallery/peritorcular-meningioma-3/>
- <http://surgicalneurologyint.com/videogallery/peritorcular-meningioma/>
- <http://surgicalneurologyint.com/videogallery/petroclival-meningioma-2/>

- <http://surgicalneurologyint.com/videogallery/posterior-fossa-meningioma-4/>
- <http://surgicalneurologyint.com/videogallery/reccurent-foramen-magnum-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/recurrent-posterior-fossa-meningioma-5/>
- <http://surgicalneurologyint.com/videogallery/recurrent-posterior-fossa-meningioma/>
- <http://surgicalneurologyint.com/videogallery/tentorial-meningioma/>

6.3.4.5 PINEAL REGION LESIONS

- <http://surgicalneurologyint.com/videogallery/pineal-astrocytoma-3/>
- <http://surgicalneurologyint.com/videogallery/pineal-astrocytoma/>
- <http://surgicalneurologyint.com/videogallery/pineal-cyst-7/>
- <http://surgicalneurologyint.com/videogallery/pineal-region-meningioma-2/>
- <http://surgicalneurologyint.com/videogallery/pineal-tumor-5/>
- <http://surgicalneurologyint.com/videogallery/pineal-tumor-6/>
- <http://surgicalneurologyint.com/videogallery/pineal-tumor/>
- <http://surgicalneurologyint.com/videogallery/c23-spinal-meningioma/>

6.3.4.6 SPINAL TUMOURS

- <http://surgicalneurologyint.com/videogallery/c6-c7-meningioma/>
- <http://surgicalneurologyint.com/videogallery/intradural-extramedullary-spinal-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/spinal-hemangioblastoma/>
- <http://surgicalneurologyint.com/videogallery/c2-meningioma/>

6.3.4.7 OTHERS TUMOURS

- <http://surgicalneurologyint.com/videogallery/cerebellar-choroid-plexus-papilloma-2/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-hemangioblastoma/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-metastasis-2/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-mts-2/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-mts-3/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-tumor-3/>
- <http://surgicalneurologyint.com/videogallery/cerebellar-tumor/>
- <http://surgicalneurologyint.com/videogallery/craniopharyngioma-5/>

- <http://surgicalneurologyint.com/videogallery/craniopharyngioma-6/>
- <http://surgicalneurologyint.com/videogallery/cranipharyngioma/>
- <http://surgicalneurologyint.com/videogallery/frontal-tumor-with-hematoma-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-tumor-with-hematoma/>
- <http://surgicalneurologyint.com/videogallery/fronto-parietal-mts-3/>
- <http://surgicalneurologyint.com/videogallery/fronto-parietal-mts/>
- <http://surgicalneurologyint.com/videogallery/giant-pituitary-macroadenoma/>
- <http://surgicalneurologyint.com/videogallery/intraorbital-tumor-3/>
- <http://surgicalneurologyint.com/videogallery/intraorbital-tumor/>
- <http://surgicalneurologyint.com/videogallery/left-petroclival-tumour-for-right-optic-nerve-decompression/>
- <http://surgicalneurologyint.com/videogallery/metastatic-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/orbital-melanoma-3/>
- <http://surgicalneurologyint.com/videogallery/orbital-melanoma/>
- <http://surgicalneurologyint.com/videogallery/orbital-tumor-4/>

- <http://surgicalneurologyint.com/videogallery/orbital-tumor-5/>
- <http://surgicalneurologyint.com/videogallery/paraventricular-cerebellar-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/parietal-mts-3/>
- <http://surgicalneurologyint.com/videogallery/parietal-mts/>
- <http://surgicalneurologyint.com/videogallery/parietal-tumour/>
- <http://surgicalneurologyint.com/videogallery/periaqueductal-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/pituitary-macroadenoma/>
- <http://surgicalneurologyint.com/videogallery/reccurent-cerebellar-hemangioblastoma-3/>
- <http://surgicalneurologyint.com/videogallery/reccurent-cerebellar-hemangioblastoma/>
- <http://surgicalneurologyint.com/videogallery/recurrent-frontal-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/right-cerebellar-metastasis/>
- <http://surgicalneurologyint.com/videogallery/suprasellar-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/temporal-epidermoid-tumor-2/>
- <http://surgicalneurologyint.com/videogallery/tumor-medulla-oblonga/>

- <http://surgicalneurologyint.com/videogallery/temporal-tumor-4/>
- <http://surgicalneurologyint.com/videogallery/temporal-tumor/>

6.3.5 SPINAL DEGENERATIVE LESIONS

- <http://surgicalneurologyint.com/videogallery/lumbar-disc-herniation-14-5/>
- <http://surgicalneurologyint.com/videogallery/cervical-disc-herniation-4/>
- <http://surgicalneurologyint.com/videogallery/cervical-disc-herniation-3/>
- <http://surgicalneurologyint.com/videogallery/cervical-disc-prolapse-c5-c6-2/>
- <http://surgicalneurologyint.com/videogallery/lumbar-disc-prolapse-13-14-2/>
- <http://surgicalneurologyint.com/videogallery/anterior-cervical-discectomy-2/>
- <http://surgicalneurologyint.com/videogallery/anterior-cervical-approach-with-va-injury/>
- <http://surgicalneurologyint.com/videogallery/anterior-cervical-discectomy/>
- <http://surgicalneurologyint.com/videogallery/anterior-cervical-approach/>
- <http://surgicalneurologyint.com/videogallery/anterior-discectomy/>
- <http://surgicalneurologyint.com/videogallery/lumbar-disc-herniation/>

- <http://surgicalneurologyint.com/videogallery/cervical-disc-herniation-2/>
- <http://surgicalneurologyint.com/videogallery/cervical-disc-herniation/>
- <http://surgicalneurologyint.com/videogallery/lumbar-disc-prolapse-13-14/>
- <http://surgicalneurologyint.com/videogallery/cervical-disc-prolapse-c5-c6/>

6.4 SURGICAL APPROACHES

- <http://surgicalneurologyint.com/videogallery/anterior-interhemispheric-approach/>
- <http://surgicalneurologyint.com/videogallery/approach-of-a-pericallosal-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/dorsal-th2-th3-hemilaminectomy-2/>
- <http://surgicalneurologyint.com/videogallery/dorsal-th2-th3-hemilaminectomy/>
- <http://surgicalneurologyint.com/videogallery/enough-lateral-approach-for-the-foramen-magnum/>
- <http://surgicalneurologyint.com/videogallery/enough-lateral-for-low-brainstem-cavernoma/>
- <http://surgicalneurologyint.com/videogallery/frontal-interhemispheric-approach-2/>
- <http://surgicalneurologyint.com/videogallery/frontal-interhemispheric-approach/>
- <http://surgicalneurologyint.com/videogallery/interhemispheric-approach-right-side/>
- <http://surgicalneurologyint.com/videogallery/interhemispheric-approach-left-side/>
- <http://surgicalneurologyint.com/videogallery/lso-approach-2/>
- <http://surgicalneurologyint.com/videogallery/lso-approach/>
- <http://surgicalneurologyint.com/videogallery/lso-left-side-unedited/>
- <http://surgicalneurologyint.com/videogallery/lso-right-side/>

- <http://surgicalneurologyint.com/videogallery/lso-uncut-9-min-right-side/>
- <http://surgicalneurologyint.com/videogallery/lso-unedited/>
- <http://surgicalneurologyint.com/videogallery/minicraniotomy-lso-approach/>
- <http://surgicalneurologyint.com/videogallery/non-edited-lso-approach/>
- <http://surgicalneurologyint.com/videogallery/opening-of-the-superior-petrosal-sinus/>
- <http://surgicalneurologyint.com/videogallery/paramedian-suboccipital-approach-uncut/>
- <http://surgicalneurologyint.com/videogallery/paramedian-suboccipital-approach/>
- <http://surgicalneurologyint.com/videogallery/parietal-interhemispheric-approach-2/>
- <http://surgicalneurologyint.com/videogallery/parietal-interhemispheric-approach/>
- <http://surgicalneurologyint.com/videogallery/posterior-interhemispheric-approach-uncut/>
- <http://surgicalneurologyint.com/videogallery/posterior-interhemispheric-approach-3/>
- <http://surgicalneurologyint.com/videogallery/posterior-interhemispheric-approach/>
- <http://surgicalneurologyint.com/videogallery/prepping-a-patient-in-sitting-position/>
- <http://surgicalneurologyint.com/videogallery/presigmoid-approach-craniotomy-lt/>

- <http://surgicalneurologyint.com/videogallery/presigmoid-approach-petrosectomy/>
- <http://surgicalneurologyint.com/videogallery/petrosectomy-during-presigmoid-approach-short/>
- <http://surgicalneurologyint.com/videogallery/presigmoid-approach-craniotomy-2/>
- <http://surgicalneurologyint.com/videogallery/presigmoid-approach-craniotomy/>
- <http://surgicalneurologyint.com/videogallery/presigmoid-approach-partial-petromastoidectomy/>
- <http://surgicalneurologyint.com/videogallery/presigmoid-approach/>
- <http://surgicalneurologyint.com/videogallery/pterional-approach-2/>
- <http://surgicalneurologyint.com/videogallery/pterional-approach-basilar-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/pterional-approach-for-basilar-tip-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/pterional-approach/>
- <http://surgicalneurologyint.com/videogallery/retrosigmoid-approach-unedited/>
- <http://surgicalneurologyint.com/videogallery/retrosigmoid-approach/>
- <http://surgicalneurologyint.com/videogallery/right-subtemporal-approach/>
- <http://surgicalneurologyint.com/videogallery/suboccipital-midline-approach/>

- <http://surgicalneurologyint.com/videogallery/subtemporal-approach-unedited/>
- <http://surgicalneurologyint.com/videogallery/subtemporal-approach-4/>
- <http://surgicalneurologyint.com/videogallery/subtemporal-approach-5/>
- <http://surgicalneurologyint.com/videogallery/subtemporal-approach-3/>
- <http://surgicalneurologyint.com/videogallery/subtemporal-approach-2/>
- <http://surgicalneurologyint.com/videogallery/subtemporal-approach-micro-part/>
- <http://surgicalneurologyint.com/videogallery/subtemporal-approach-micro/>
- <http://surgicalneurologyint.com/videogallery/subtemporal-approach/>
- <http://surgicalneurologyint.com/videogallery/supracerebellar-subtentorial-approach-2/>
- <http://surgicalneurologyint.com/videogallery/supracerebellar-subtentorial-approach/>
- <http://surgicalneurologyint.com/videogallery/surgical-nurse-draping-of-a-patient/>

6.5 TRICKS AND PEARLS

- <http://surgicalneurologyint.com/videogallery/arteriotomy-anastoclip-trombosed-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/aneurysmorhaphy-for-a-giant-aneurysm-2/>
- <http://surgicalneurologyint.com/videogallery/technique-of-clipping-an-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/temporary-trapping-double-clipping-technique/>
- <http://surgicalneurologyint.com/videogallery/cardiac-arrest-with-adenosine/>
- <http://surgicalneurologyint.com/videogallery/tight-sylvian-fissure-dissection/>
- <http://surgicalneurologyint.com/videogallery/dirty-coagulation-2/>
- <http://surgicalneurologyint.com/videogallery/coagulation-and-wrapping-blister-like-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/contralateral-approach-both-m1-aneurysms/>
- <http://surgicalneurologyint.com/videogallery/rescue-double-clipping-technique/>
- <http://surgicalneurologyint.com/videogallery/sylvian-fissure-dissection/>
- <http://surgicalneurologyint.com/videogallery/readjusting-clips-2/>
- <http://surgicalneurologyint.com/videogallery/cottonoid-trick-to-separate-clips/>
- <http://surgicalneurologyint.com/videogallery/aneurysm-wrapping/>

- <http://surgicalneurologyint.com/videogallery/focused-opening-of-the-s-f-remodeling-and-aneurysm-clipping/>
- <http://surgicalneurologyint.com/videogallery/wrapping-and-sunt-clip/>
- <http://surgicalneurologyint.com/videogallery/fenestration-of-the-lamina-terminalis/>
- <http://surgicalneurologyint.com/videogallery/water-dissection-for-meningioma/>
- <http://surgicalneurologyint.com/videogallery/dirty-coagulation/>
- <http://surgicalneurologyint.com/videogallery/tear-in-a-fragile-aneurysm-neck/>
- <http://surgicalneurologyint.com/videogallery/intraoperative-ruptured-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/intraoperative-avm-rupture/>
- <http://surgicalneurologyint.com/videogallery/rescue-vascular-clamp/>
- <http://surgicalneurologyint.com/videogallery/passing-through-artery-in-avm/>
- <http://surgicalneurologyint.com/videogallery/round-shape-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/readjusting-clips/>
- <http://surgicalneurologyint.com/videogallery/icg-a-spinal-avf/>
- <http://surgicalneurologyint.com/videogallery/icg-failure/>
- <http://surgicalneurologyint.com/videogallery/how-to-clip-a-ruptured-paraclinoid-aneurysm/>

- <http://surgicalneurologyint.com/videogallery/lamina-terminalis-in-severe-ivh/>
- <http://surgicalneurologyint.com/videogallery/clipping-a-calcified-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/aneurysmorhaphy-for-a-giant-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/clipping-of-giant-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/shaping-a-ruptured-aneurysm-with-coagulation/>
- <http://surgicalneurologyint.com/videogallery/aneurysmorhaphy/>
- <http://surgicalneurologyint.com/videogallery/adenosine-for-ruptured-basilar-tip-aneurysm/>
- <http://surgicalneurologyint.com/videogallery/anterior-clinoidectomy/>
- <http://surgicalneurologyint.com/videogallery/damaging-of-the-transverse-sinus/>
- <http://surgicalneurologyint.com/videogallery/water-dissection-technique-meningioma/>
- <http://surgicalneurologyint.com/videogallery/short-burst-of-bipolar-in-damaged-vein/>
- <http://surgicalneurologyint.com/videogallery/peri-operative-aneurysm-rupture/>
- <http://surgicalneurologyint.com/videogallery/double-clipping-technique/>
- <http://surgicalneurologyint.com/videogallery/carotid-suture-bypass-elana/>

- <http://surgicalneurologyint.com/videogallery/opening-and-lifting-of-the-tentorium-subtemporal-approach-2/>
- <http://surgicalneurologyint.com/videogallery/focused-opening-of-the-sylvian-fissure/>
- <http://surgicalneurologyint.com/videogallery/water-dissection-for-avm/>
- <http://surgicalneurologyint.com/videogallery/sylvian-fissure-dissection/>
- <http://surgicalneurologyint.com/videogallery/left-clinoidectomy-2/>
- <http://surgicalneurologyint.com/videogallery/opening-and-lifting-of-the-tentorium-subtemporal-approach/>
- <http://surgicalneurologyint.com/videogallery/left-clinoidectomy/>
- <http://surgicalneurologyint.com/videogallery/right-clinoidectomy/>
- <http://surgicalneurologyint.com/videogallery/p2-trassylvian-dissection/>
- <http://surgicalneurologyint.com/videogallery/shaping-of-aneurysm-with-coagulation/>
- <http://surgicalneurologyint.com/videogallery/icg-hemangioblastoma/>
- <http://surgicalneurologyint.com/videogallery/icg-before-clipping/>

6.6 BYPASS PROCEDURES (Special credit to Professor Rokuya Tanikawa)

- <http://surgicalneurologyint.com/videogallery/radial-artery-harvest-technique/>
- <http://surgicalneurologyint.com/videogallery/anastomosis-va-ra-m2-ra-va-bypass/>
- <http://surgicalneurologyint.com/videogallery/wide-opening-of-a-tight-sylvian-fissure-ec-ic-bypass/>
- <http://surgicalneurologyint.com/videogallery/anastomosis-m2-ra-ec-ic-bypass/>
- <http://surgicalneurologyint.com/videogallery/harvesting-of-the-oa-and-dissection-of-the-va/>
- <http://surgicalneurologyint.com/videogallery/bypass-sta-mca-m2-segment/>
- <http://surgicalneurologyint.com/videogallery/anastomosis-m2-ra-va-ra-m2/>
- <http://surgicalneurologyint.com/videogallery/sta-m2-bypass-2/>
- <http://surgicalneurologyint.com/videogallery/sta-m2-bypass/>
- <http://surgicalneurologyint.com/videogallery/cervical-dissection-of-the-eca-ec-ic-bypass/>
- <http://surgicalneurologyint.com/videogallery/anastomosis-eca-ra-ec-%EF%80%A2ic-bypass/>
- <http://surgicalneurologyint.com/videogallery/saphenous-vein-graft-harvesting/>
- <https://youtu.be/auT2RNHnRiY>
- <https://youtu.be/62RpiaXxCt4>
- https://youtu.be/-re_86UGdJY

- <https://youtu.be/xU9QnjRviKc>
- <https://youtu.be/U0PUWbA1fMU>
- <https://youtu.be/ML1xzWsgCnc>
- <https://youtu.be/kVTAx0FCzEM>

6.7 SUPPLEMENTARY CONTENT – SURGERY IS ARTS

6.7.1 ENRIQUE GALDOS RIVAS

(Lima, Peru, 1933)

www.facebook.com/galdosrivas/



"Neither things nor men can shed its past. That is why the motif of Galdos Rivas" work is inspired or linked, to put it better, to the past of people. Indeed, it has that old ancestral essence that carries a Peruvian in his blood. His painting has a great expressive force; which communicates through an aesthetic feast of colours, a well done message of beauty, which could give the name of "The Wizard of Colour" to its author ... "

Karl Buchholz
German Art Collector and Promoter
Bogotá, Colombia, 1979

"From childhood he lived in Lima, in downtown, near the Church of San Francisco, at a populous neighbourhood of Amazonas St. The idea of

drawing, perhaps, took shape in him since he was five years old, while painting the walls and patios with pieces of plaster, as who makes 'world'. However, it is just in adolescence

when he conceived the idea of wishing to be an artist, rather within the discipline of architecture. By then, he painted murals on the walls, especially one in his living room, which he also made the frame and shadow ... "

José Antonio Bravo, writer (Cielo Abierto Magazine, Lima, 1979)

Enrique Galdos Rivas studied at the National School of Fine Arts where he graduated in 1959 with Gold Medal.

In 1961 he travels to Brazil, with a grant given by the Government of his country.

In 1967 he becomes entitled to the scholarship that takes him to Argentina, from where he moved to Rio de Janeiro and New York, to follow his specialization in printmaking techniques.

As a teacher, he has worked in Lima at Art Center Institute (1960-1962) and National School of Fine Arts (1968-1990), where he was designated as Director of Research. In 1995 he was appointed Professor Emeritus at this school.

He has received numerous awards in Peru and other countries. Some of the international highlights are Honourable Mention at the 7th Biennial of São Paulo (1963); V Prize, 2nd American Biennial of Art, Cordoba, Argentina, (1964); I Gulf & South American Steamship Co. Award(1966); Cristobal Colon Award, Madrid (1984); amongst more than 30 prizes.

He has exhibited several times, individually and collectively, in Peru, Brazil, Chile, Argentina, Uruguay, Nicaragua, Ecuador, Bolivia, Mexico, Puerto Rico, Colombia, Venezuela, United States, Spain, France, Italy, Switzerland, Great Britain, The Netherlands, Germany and China.

APPRAISALS

The paintings have a direct link with objects of the sensitive world and play in a chromatic festive environment to go hand in hand with a land like Peru, rich in sounds, feelings and

colour.

Galdos Rivas can be defined as a colourist, in other words, he knows how to obtain from colour the maximum expressive possibility. The multicolour suggestions perfectly follow the principle that sees the value in the harmony of colours based on the light proportion and shadows skillfully adjusted.

Carlo A. Gianinazzi, La Voce di Castagnola, Switzerland
Lugano, Switzerland

Galdos Rivas belongs to this beautiful Golden Generation that ended the School of Fine Arts of Lima in the 1960s. He has given so much prestige to Peruvian painting in America, Europe and Asia.

Indeed, Enrique Galdos Rivas pursues particular attributes which makes him an outstanding figure in his Generation. He is a painter who has the virtue of evolving throughout his career, the figurative painting as the non-figurative, including the intermediate scales. Furthermore, he is the first Peruvian painter to include colors, tones and artwork from our Andean culture (ceramics, fabrics, etc.) in abstract compositions and abstract-figurative, in the iconographic panorama. His style was critical for the fine arts from Peru, to reach an authentic Peruvian creation and recreation with the approach of the abstractionism law and composition.

Galdos Rivas is the Peruvian painter who has created the need as well as satisfied need for "synthesis" inside the evolution of the painting in our country. He has also accentuated, in his work, this Peruvian and Andean load that has distinguished his art. Indeed, it has influenced the

paintings of young artists of the latest generations.

Nonetheless, it is also remarkable to say that this Peruvian artist, keeps on being the same simple, loquacious, kind man; and overall, friend, as always; more mature now, with an endless quantity of awards and honours achieved in Peru and abroad; in addition to hundreds of exhibitions in our country, America and Europe

José Antonio Bravo, Writer, art critic and painter
Lima, Peru

6.7.2 MARTHA GALDOS

(Lima, Peru, 1982)

www.facebook.com/MarthaGaldosOficial



Martha Galdos presents her debut release *Respiraré* (I'll Breathe), which includes a new version –as bonus track– of the famed traditional Peruvian song “El Cóndor Pasa” (also known in English as “If I Could”, in the Simon & Garfunkel version), recorded in the two official languages of Peru, Spanish and Quechua –the native tongue of Andean region. Music production and direction have been conducted by Pepe Céspedes, pianist and composer specialized in jazz and Peruvian rhythms; he’s toured with international artists such as Susana Baca (Perú) and Django (Spain). Galdos’ “El Condor Pasa” will be the soundtrack for the project “1001 and more Microneurosurgery Videos” by the notorious Finnish neurosurgeon Juha Hernesniemi as part of his “Helsinki Legacy” work.

Galdos is a world music vocalist and researcher of the roots of the vast music mixture of her native land, Peru. There, in her country of origin, Galdos has been immersed in the amalgam of rhythms produced of this culture encounter: landó, panalivio and festejo, among others, and also more popular genres of the South American Andes as huayno, without distancing from other musical traditions such as European waltz and American jazz.

With the vision of finding bridges amongst other cultures of the world by means of storytelling, Galdos intervenes old music jewels from Peru, Brazil, United States and France – some are part of the collective memory, others are previously unreleased– and leads them to a contemporary, refreshing and bilingual voyage. There, the electric keyboard, the acoustic

piano, and Peruvian percussion instruments (little box “cajita”, donkey jaw “quijada de burro”, and “cajón”) provide support for her voice, full of sweet and high notes nuances. The intimate result is a sensory invitation of joy, peace and sound vitality.

Galdos comes from a family of artists and musicians, among them, the painter Enrique Galdos Rivas, who shared with his daughter the sounds he collected from his various trips around the world. This experiences encouraged Galdos to study English, French and Portuguese. After some years of focus on her first career, Communications, and after some work experiences in Germany and the United States, she returned to Peru and decided to start in music at the age of 28. This radical change in her life, led her to accomplish tenth finalist in 2012 in the talent show I am (*Yo Soy*) broadcasted on national Peruvian television impersonating Liza Minnelli.

She has collaborated with Portuguese artist Luis Represas and British guitarist Robin Banerjee (Amy Winehouse). She began her international tours in 2015 and was the second Peruvian singer in 13 years to represent her country at the *Panama Jazz Festival* in 2016, directed by renowned pianist and philanthropist Danilo Perez. She has started singing lessons with *maestro* Luciano Garrido while continuing her music studies.

In the meantime, Galdos is already in the early stages of composing songs for her next album.

APPRAISALS

"Martha Galdos belongs to a new generation of vocalists who are able to turn interpretation into a form of art. It is not only about performing with great voice... it means that when doing it, the artist has to be able to convey feelings, to move us or enjoy us; to sum up, to convert music into a unique sensory experience. "

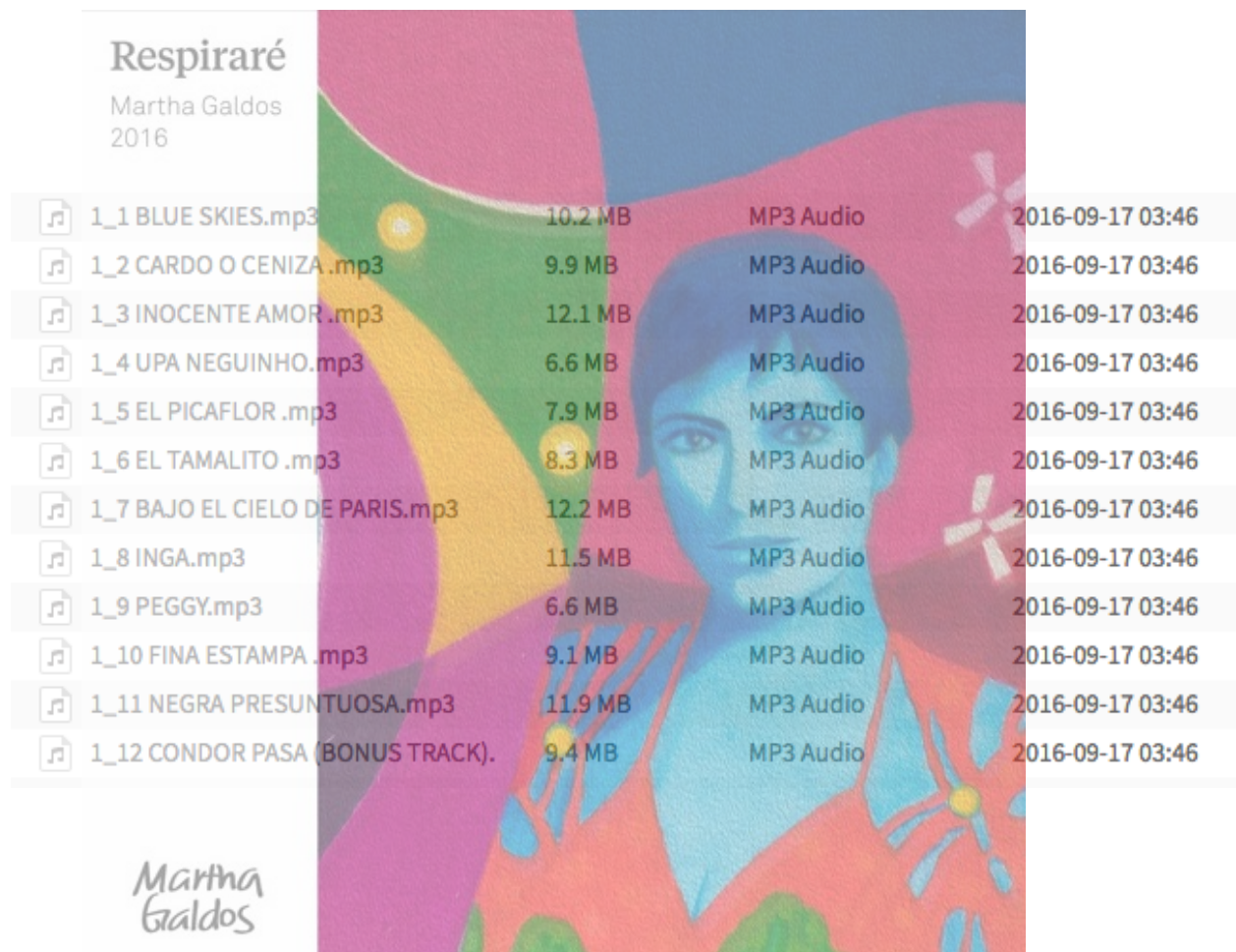
Carlos Fernandez, journalist, Filarmonía Radio, Perú

"The virtuous artist gave a concert that people loved. Before, when greeting the audience, she highlighted the friendly ties between Panama and Peru and other intercultural features in common. With her beautiful voice, her pleasant personality and warmth, it resonated with the public. And they enjoyed the show. The repertoire included a rich variety of "Peruvian coastal songs marked influence on Afrorhythms zamacueca, landó and celebration and emblematic songs of world music in jazz, bossa nova, samba and blues."

Panama America journal, Panamá.

6.7.3 MUSIC FOR 1001 VIDEOS PROJECT BY MARTHA GALDOS, ALBUM “RESPIRARÉ”

- http://marthagaldos.com/wp-content/uploads/2016/12/Respirare_Album_1001videos.zip
- <https://mega.nz/#F!bo1jmCQB!LKxiLhhoNfiaKMyaLOuxoQ>



Respiraré
Martha Galdos
2016

1_1 BLUE SKIES.mp3	10.2 MB	MP3 Audio	2016-09-17 03:46
1_2 CARDO O CENIZA .mp3	9.9 MB	MP3 Audio	2016-09-17 03:46
1_3 INOCENTE AMOR .mp3	12.1 MB	MP3 Audio	2016-09-17 03:46
1_4 UPA NEGUINHO.mp3	6.6 MB	MP3 Audio	2016-09-17 03:46
1_5 EL PICAFLOR .mp3	7.9 MB	MP3 Audio	2016-09-17 03:46
1_6 EL TAMALITO .mp3	8.3 MB	MP3 Audio	2016-09-17 03:46
1_7 BAJO EL CIELO DE PARIS.mp3	12.2 MB	MP3 Audio	2016-09-17 03:46
1_8 INGA.mp3	11.5 MB	MP3 Audio	2016-09-17 03:46
1_9 PEGGY.mp3	6.6 MB	MP3 Audio	2016-09-17 03:46
1_10 FINA ESTAMPA .mp3	9.1 MB	MP3 Audio	2016-09-17 03:46
1_11 NEGRA PRESUNTUOSA.mp3	11.9 MB	MP3 Audio	2016-09-17 03:46
1_12 CONDOR PASA (BONUS TRACK).	9.4 MB	MP3 Audio	2016-09-17 03:46

Martha Galdos

Music at operating room of Professor Hernesniemi:

<http://www.iskelma.fi/info#taajuudet>

Back cover portrait by a great Uruguayan Neurosurgeon,
Roberto Croza



-----johchove-----

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