



## Editorial

# Professor Juha Hernesniemi: A memorial tribute

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Professor Juha Hernesniemi emerged as one of the most distinguished microneurosurgeons over the past 40 years, achieving global recognition through his Live Microneurosurgery Courses and on-site teaching endeavors within the neurosurgical community. His mastery in micro neurosurgery, particularly in the realm of managing intracranial aneurysms, arteriovenous malformations, and dural arteriovenous fistulae, earned him the moniker “Ace of Aces.” In his pursuit of perfection, he viewed moments of rest as intervals within his strategic “Art of War.” Preferring to be known as “The Last of the Mohicans,” Hernesniemi exhibited a profound concern for upholding the essential microsurgical proficiencies alongside the advancements in cerebrovascular surgery within neurovascular care.<sup>[11]</sup>

The impact of Professor Juha Hernesniemi transcends the confines of the surgical suite. He stood as a respected educator, generously imparting his extensive reservoir of wisdom and expertise to budding neurosurgeons worldwide. His role as a mentor and counselor has profoundly molded the careers of numerous healthcare practitioners, ensuring that his influence will be enduring and continue to resonate across generations.<sup>[4,6,8,10,11,13]</sup>

Professor Juha Hernesniemi passed away unexpectedly on Monday, June 26, 2023, at his residence in Helsinki. He was 75 years old. Professor Hernesniemi was born in Kannus on October 18, 1947. His formative years and educational journey took place in Ruovesi. During this time, he encountered an influential local physician whose charisma led him to choose a career in medicine. An enduring passion from his youth was balance beam gymnastics, a pursuit that somehow remained intertwined with his life. He often humorously remarked, “As long as I can do handstands, I can also perform surgery” – a skill that persisted throughout his active professional tenure.<sup>[11]</sup>

In 1966, Hernesniemi embarked on his medical studies at the University of Zurich, a decision that left an indelible mark on his future trajectory. Zurich exposed him to the realm of neurosciences and research and crucially introduced him to two eminent figures in neurosurgery at the time: Professor Hugo Krayenbuhl and micro neurosurgery innovator M. Gazi Yasargil. The latter became Hernesniemi’s preeminent mentor, decisively shaping his path toward becoming a neurosurgeon.<sup>[10,11]</sup>

Relocating to Helsinki, Hernesniemi specialized in neurosurgery at Töölö Hospital, the sole neurosurgery training institution in Finland at the time. Although an official position in Helsinki’s neurosurgery clinic was not secured on his graduation, Hernesniemi’s determination led him to the neurosurgery unit at Kuopio University Hospital. Here, he eventually assumed the role of assistant chief physician of neurosurgery in 1981.<sup>[10,11]</sup>

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Professor Hernesniemi's unique microsurgical philosophy and his distinctive surgical approach were not forged overnight. They were meticulously crafted through the crucible of experience, first taking root at Kuopio Neurosurgery and then undergoing a process of refinement at Helsinki Neurosurgery (1997). This evolution was no small feat, as it entailed thousands of microsurgical repetitions.<sup>[11]</sup>

Each delicate maneuver, each precise incision, and every intricate step in the intricate world of neurosurgery contributed to shaping his perspective, not just in the realm of surgical precision but in the broader tapestry of life itself. It was a journey marked by tireless dedication, countless hours of practice, and a relentless pursuit of excellence. The result was a philosophy and approach that were not only honed to perfection but also deeply ingrained in the very fabric of his being. It was a testament to the transformative power of unwavering commitment and a testament to the profound impact that a single individual can have on the field of medicine and beyond.<sup>[4,6,10,13]</sup>

In the field of micro neurosurgery, the surgical approach of a neurosurgeon reflects their cognitive disposition. When observing various surgeons in action during your travels, it becomes evident that there exists a diverse array of styles in microneurosurgery. These surgical approaches reflect a neurosurgeon's journey, influenced by the guidance of mentors and trainers, the specific domain of neurosurgery they've chosen to master, and the distinctive contours of their temperament. In the theater of surgery, one can observe a spectrum of preferences: most neurosurgeons choose the comfort of a seated position, while a select few opt to stand. The pace and tempo of their movements vary widely; some surgeons operate at a brisk, almost rhythmic cadence, while others move with measured deliberation. The approach to breaks during surgery is another point of divergence; some surgeons incorporate short respites, while others remain steadfast in continuous concentration.<sup>[4,6,10,13]</sup>

In the symphony of the operating room, musical accompaniment plays its part. For some, it is a soothing backdrop, a tool to unwind both the mind and the surgical team. Yet, for others, the silence of the theater is paramount, fostering an environment of focused concentration. Even in the choice of instruments, disparities emerge. The decision between employing bipolar forceps for delicate dissections or favoring microdissectors bears the distinct mark of a surgeon's journey. Each choice is a tapestry woven from threads of training, past experiences, successes, and setbacks, all interwoven with the resources available, both within the surgical department and the broader societal context.<sup>[4,6,10,13]</sup>

Yet, at the heart of this diversity lies a unifying principle: The paramount importance of the outcome. In the complex world of microneurosurgery, there often is not a definitive right or wrong approach. Instead, what prevails are individual

preferences shaped by the unique mosaic of experiences, training, and personal inclinations. In the end, the true measure of a surgeon's artistry lies in the result – a testament to their skill, dedication, and the journey that brought them to this moment.<sup>[4,6,10,13]</sup>

Within the intricate domain of micro neurosurgery, success hinges on meticulous planning and the vivid mental choreography of forthcoming tasks. Every motion is a result of careful forethought, aiming to minimize those fleeting moments of uncertainty amid surgery. Much of the operation unfolds as a well-rehearsed script long before the surgeon's incision, obliterating any trace of lethargy in their approach. In essence, the physical surgery often represents the culmination of a silent, mental symphony – the neurosurgeon has, in their mind's eye, performed the procedure 1 or 2 times before stepping into the hallowed operating room.<sup>[4,6,10,13]</sup>

A fundamental tenet in this artistry is that every action and movement is imbued with purpose, directed unwaveringly toward the surgery's core objective. This entails a steadfast commitment to avoiding laborious, time-consuming techniques when streamlined, less hazardous approaches yield equivalent results. Complexity is distilled into simplicity, echoing the very essence of "go-go surgery," a term coined by Professor Yasargil, later refined by Professor Al Mefty to "good-good surgery" during his visit to Professor Hernesniemi.<sup>[4,6,10,13]</sup>

In this realm, there is scant room for drawn-out and cumbersome methodologies. Swifter, more efficient avenues lead to the same destination, and each procedure is meticulously partitioned into several sequential phases. The completion of each phase is non-negotiable before the journey proceeds, ensuring readiness for unforeseen twists and turns while upholding unwavering control over the task at hand.<sup>[4,6,10,13]</sup>

Ultimately, Professor Hernesniemi's overarching philosophy in micro neurosurgery can be distilled into four cardinal principles: simplicity, precision, expediency, and the preservation of normal anatomical structures; named himself as "simple, clean, fast, and preserving normal anatomy." In this narrative of surgical artistry, it is a symphony composed of these harmonious notes that yield the most exquisite results.<sup>[4,6,10,13]</sup>

In the intricate tapestry of micro neurosurgery, a remarkable evolution has unfolded since the advent of Professor Yasargil's pioneering micro neurosurgical techniques. Yet, to truly grasp the essence of microneurosurgery, one must look beyond the superficial notion of it being a mere extension of macro-neurosurgery under the microscope. Instead, it is a symphony – a harmonious blend of precision tools such as microsurgical instruments, the microscope itself, and the artful mastery of microsurgical techniques. Proficiency in technique selection and execution can only

be achieved through continuous practice, which should encompass both laboratory training and operating room experience. This practice enhances the utilization of senses such as depth perception, sensory feedback, and joint position sense, all of which are indispensable in micro neurosurgery.<sup>[4,6,10,13]</sup>

The utilization of high magnification, powerful illumination, and stereoscopic vision enables neurosurgeons to employ delicate instruments, working in an almost bloodless field with minimal trauma, often outside the brain tissue. The microscope provides detailed visualization and a three-dimensional understanding of neuroanatomical structures. However, achieving optimal visualization of each structure demands in-depth knowledge of microanatomy, meticulous preparation, and precise execution of the chosen approach. Numerous small details, some seemingly trivial, can significantly influence the outcome of a given surgery.<sup>[4,6,10,13]</sup>

Professor Hernesniemi's ingenious insight led him to streamline his micro neurosurgical techniques, employing Yasargil's Contraves Zeiss mouthpiece microscope and a standing armrest for support. This standing posture facilitated rapid adjustments in surgical directions. He meticulously positioned patients to optimize the surgical pathway before scrubbing in. Characterized by the fervent dedication and meticulous attention to the minutest details, Hernesniemi scrutinized, adapted, refined, and standardized every facet of his physical and cognitive microneurosurgical conduct. His artistry of achieving simplicity, cleanliness, and speed while preserving normal anatomy formed the cornerstone of his approach, resulting in impressively swift surgeries conducted under the operation microscope, all while appearing deceptively simple to replicate.<sup>[4,6,8,10,11,13]</sup>

From 1997 to 2015, Hernesniemi assumed the role of Professor and Chair at Helsinki Neurosurgery. Recognizing the value of live demonstrations and open-access videos, he established the annual Helsinki Live Demonstration Course in Operative Microneurosurgery in 2001, which would later become highly regarded in the neurosurgical community, drawing over 3000 attendees from around the world. Renowned for its transformative impact, the course featured Hernesniemi and other international experts in action, showcasing feats such as seamless micro anastomoses and sub-1-h clippings from start to finish. The course attracted numerous eminent micro neurosurgeons, both present and future Heads and Professors, who sought to observe his techniques firsthand, a testament more meaningful than accolades. Furthermore, Hernesniemi's operational footprint extended to other Live Courses, where he was often invited to perform surgeries.<sup>[4,6,8,10,11,13]</sup>

Hernesniemi's legacy also encompasses over 300 young neurosurgeons, referred to as "Hernesniemi Fellows," who traveled from diverse corners of the globe to Helsinki for the

opportunity to observe, document, assist, and discuss his microneurosurgical procedures. His interactions with them were characterized by kindness and support.<sup>[4,6,8,10,11,13]</sup>

Operating hours in his OR and adjoining library, they diligently curated his intraoperative videos. The Open Access Videobook, titled "1001 Hernesniemi Videos," available since 2017 through Surgical Neurology International, includes not only his procedures but also testimonials and memoirs from international masters who visited his institution. Hernesniemi encouraged his Fellows to soar high and urged them to surpass his achievements. Today, thousands across many nations stand on his shoulders, serving their respective populations.<sup>[4,6,8,10,11,13]</sup>

Hernesniemi coauthored 430 international articles, predominantly centered on intracranial microneurosurgery. He established the Kuopio Intracranial Aneurysm Patient and Family Database, currently comprising data on 4500 intracranial aneurysm patients, 50,000 relatives, and 13,500 population controls. A seemingly casual inclusion of "familial disease" emerged as a significant variable. His groundbreaking contributions to cellular and molecular intracranial aneurysms wall research date back to 2001 at the Helsinki Biomedicum Research Center, involving the resection of numerous unruptured and ruptured saccular aneurysms domes post-clipping.<sup>[5,7,9,12]</sup>

His adaptability and commitment to innovation were evident through his embrace of new approaches and technologies. To enhance researcher exchanges and elevate the quality of neurosurgical research, he invited international luminaries to serve as Opponents in Helsinki Neurosurgery's PhD Dissertations, often attired in white-tie formalwear. His enduring impact was underscored by his participation in over 10,000 surgeries involving the central nervous system and the treatment of over 70,000 patients. These substantial achievements garnered him recognition and accolades both within his home country and on the global stage.<sup>[4,6,8,10,11,13]</sup>

In 2011, Professor Hernesniemi embarked on his inaugural journey to Peru. The Peruvian Society of Neurosurgery orchestrated the Peruvian Congress of Neurosurgery, extending an esteemed invitation to Professor Hernesniemi to grace their event. His mission was to conduct a cadaveric demonstration of his intricate surgical methodologies in the city of Arequipa. I, a Neurosurgery resident at the time, found myself entrusted with the responsibility of ensuring his comfort and well-being during this momentous visit. What transpired during those days left an indelible mark on my professional journey. As a token of his generosity, Professor Hernesniemi presented me with his prized possession – his compendium of "Helsinki Microneurosurgery Basics and Tricks." Although his stay was brief, its impact was profound. The Peruvian neurosurgical community bore witness to his expertise, imbibing knowledge and inspiration that would

resonate for years to come. The seeds of a transformative partnership had been sown.<sup>[7,10]</sup>

Subsequently, Professor Hernesniemi's presence graced Peruvian soil on several occasions. In 2013, he returned for a live neurosurgical course held in the Almenara Hospital of Lima, and in 2016, he embarked on a 4-month-long neurosurgical odyssey in Trujillo. Throughout these visits, I had the privilege of being his companion and confidant, immersing myself in the rich tapestry of his routines, wisdom, and experiences. These encounters were more than just professional exchanges; they were a symphony of shared knowledge and mentorship. Professor Hernesniemi's legacy found fertile ground in Peru, and the cadence of his teachings would continue to echo through the corridors of Peruvian neurosurgery for generations to come.<sup>[2,7]</sup>

In 2016, Professor Hernesniemi and his team, which included another neurosurgeon and two neurosurgical nurses, made a third visit to Peru. Our primary objective was to establish the first highly specialized neurosurgical center at the EsSalud Hospital in Trujillo. This center was later named the "Juha Hernesniemi Highly Specialized Neurosurgical Center." The overarching goal was to enhance the treatment of neurosurgical conditions in the region, ultimately improving patient outcomes and reducing the need for costly and risky transfers of patients to neurosurgical facilities in the capital.<sup>[2,7]</sup>

Following an initial assessment of the center, two neurosurgeons and two nurses from the Helsinki University Central Hospital provided comprehensive micro neurosurgical training to the local team. In addition, their team collaborated closely with the local staff to create standardized protocols for surgical procedures and postoperative care. From February to May 2016, a total of 59 surgeries were performed at the newly established Neurosurgical Center, including cases involving cerebrovascular and skull-base conditions that had never been treated in Trujillo before. Furthermore, the first-ever "Cerebral Bypass and Vascular Microsurgery Live Course" was conducted in Trujillo in May 2016.<sup>[2,3,7]</sup>

On the departure of the international team, the local staff continued to operate in accordance with the protocols and guidelines introduced during their collaboration. Effective and sufficient knowledge transfer to the local team was achieved within a reasonable timeframe, ensuring a sustained enhancement in neurosurgical care while minimizing costs associated with personnel and infrastructure. This achievement was founded on the core microsurgical principles of Professor Hernesniemi, which can be summarized as "simple, clean, fast, and preservation of normal anatomy."<sup>[2,3,6,7,13]</sup>

I completed my vascular and tumors micro neurosurgery fellowship under the guidance of Professor Hernesniemi from 2015 to 2017. During this period, we successfully executed the "Hernesniemi's 1001 and more microsurgical videos of Neurosurgery" open-access video collection project. The inception of "Hernesniemi's 1001 and more micro neurosurgical videos – videobook of Neurosurgery" stemmed from Professor Hernesniemi's vision. He sought a means to pass down his extensive neurosurgical expertise, amassed over more than four decades, to the next generation. This initiative revolves around the micro neurosurgical techniques developed by the senior author and his teams in Kuopio and, subsequently, in Helsinki since 1997.<sup>[4]</sup>

The primary objective was to openly share Hernesniemi's neurosurgical principles and procedures with the broader neurosurgical community. Specifically, we aimed to reach out to those who, due to financial constraints or other reasons, could not have the opportunity to travel and visit highly specialized neurosurgical centers for educational purposes.<sup>[4]</sup>

A total of 1190 videos were meticulously edited by skilled video editors, primarily comprising neurosurgical fellows from the Helsinki Neurosurgery program. These edited videos included short and long microsurgical videos of intracranial and spinal diseases, Hernesniemi's surgical approaches, and bypass procedures.<sup>[4]</sup>

We are confident that "Hernesniemi's 1001 and more micro neurosurgical videos" represents an invaluable educational resource. It has the potential to disseminate and instill the micro neurosurgical principles championed by the senior author throughout the wider neurosurgical community.<sup>[4]</sup>

Following the completion of my Fellowship, I continued my doctoral studies at the University of Helsinki and the Department of Neurosurgery at Helsinki University Hospital. This journey culminated in January 2021, with Professor Hernesniemi serving as my mentor and steadfast supporter throughout every facet of my life. My doctoral thesis, titled "Microneurosurgery of Pineal Region Cysts and Tumors: Techniques, Indications, and Long-Term Outcomes," set out to examine the enduring results of surgical interventions on pineal region cysts and tumors. It was based on three critical components that evolved under the guidance of Juha Hernesniemi at Helsinki University Hospital during the study period: (a) complete microsurgical resection, (b) the praying sitting position, and (c) the paramedian supra cerebellar infratentorial approach.<sup>[1]</sup>

The thesis represents one of the most comprehensive long-term investigations involving 147 consecutive cases of surgically treated pineal region cysts and tumors. Most of these procedures were performed by Professor Hernesniemi at the Department of Neurosurgery of Helsinki University Hospital between 1997 and 2015. The long-term survival

rates, as well as the clinical and radiological outcomes presented in the thesis, surpassed those documented in existing literature.<sup>[1]</sup>

The findings highlighted the significance of considering the distribution of pineal tumors within the study population when developing decision-making protocols. For non-radiosensitive tumors, it was demonstrated that complete resection of cysts and neoplasms, coupled with the paramedian supra cerebellar approach and the use of the praying sitting position, collectively constitute a safe and efficacious approach to pineal region surgery.<sup>[1]</sup>

In October 2015, Professor Hernesniemi retired from his position at Helsinki Neurosurgery. However, even after his retirement, he continued to practice as a neurosurgeon in several countries, including Peru, Indonesia, Nepal, and China. During this time, he also coordinated educational courses in Mexico and Peru. He remained an active participant in international neurosurgery congresses and was highly collaborative within the neurosurgical community.<sup>[7]</sup>

In his later years, Professor Hernesniemi authored a highly detailed autobiography titled “Memoirs of a brain surgeon,” in which he chronicles his extensive journey through the highs and lows of the field of neurosurgery. With remarkable honesty, he shared the clinical experiences of numerous patients, addressing issues such as suffering, complications, and even mortality without reservation. This autobiography comes highly recommended for neurosurgeons of all generations around the world.<sup>[7]</sup>

Following Professor Hernesniemi’s passing, I underwent a significant period of reflection and emotional processing to comprehend and accept his departure. The influence he exerted on my life was profound and far-reaching. As a fortunate student in the realm of neurosurgery, I had the privilege of learning from an individual whose brilliance was truly exceptional.

It was through his guidance that I not only honed my professional skills but also embarked on a journey that brought monumental changes to my personal life. Furthermore, his mentorship afforded me the opportunity to explore the diverse tapestry of our world, immersing myself in new places and cultures.

Under his tutelage, numerous projects were not only initiated but also brought to fruition, with several still progressing. The void left by his absence is profound and will be keenly felt. I extend my heartfelt wishes for his eternal peace. Farewell to my cherished and immensely influential mentor.

*\*Additional note: As previously indicated, Professor Hernesniemi and I are currently involved in several ongoing projects. One*

*noteworthy endeavor is a book titled “PINEAL REGION: MICROSURGERY AND OTHER PERSPECTIVES,” spanning approximately 1000 pages. This book primarily draws on Professor Hernesniemi’s extensive expertise in the field, and we aim to make it available as an open-access publication through Surgical Neurology International. However, due to some financial challenges in publishing, we welcome any form of support for its release. Please reach out to me via email at Johchove@hotmail.com for further details.*

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