PANEL DISCUSSION

# Neurointerventional Society Leadership Perspectives on Stroke Care in 2021

Prominent societal leaders discuss hot topics in the neurointerventional field, including recent advancements and obstacles, the effects of COVID, burnout, awareness campaigns, and more.

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**The data for MR CLEAN and other mechanical thrombectomy (MT) trials dramatically changed the landscape of stroke intervention. In what ways has neurointerventional field and its associated specialties evolved in the 6 years since then?**

**Dr. Liebeskind:** The entire neurointerventional field has expanded tremendously in terms of primary interventions, secondary support systems, and other care pathways. There has been a massive expansion in terms of the focus on and initiatives relating to neuroendovascular therapies.

**Dr. Mack:** There has been substantial evolution of the neurointerventional field and its associated specialties over the past 6 years. Data from MR CLEAN and the other 2015 MT trials have increased the application of endovascular stroke treatments. The number of MT procedures performed over the past 6 years has increased substantially, and many patients have benefited. Collaboration between the various fields involved in MT procedures (neurology, neuroradiology, neurosurgery) has grown. The field is now working to study the indications not considered in those original trials (ie, large core, low National Institutes of Health Stroke Scale [NIHSS], distal vessel occlusions) and optimize stroke systems of care.

**Dr. Siddiqui:** We have evolved in terms of (1) expanded availability of MT in greater geographies, (2) improved prehospital workflow with early detection algorithms, (3) improved in-hospital workflow using streamlined clinical care and radiomics, (4) delivery and evaluation of MT starting to expand beyond the idealized patient cohorts from the original trials (ie, medium vessel, posterior circulation, low NIHSS score, large core), and (5) aggressive cross-specialty alignment on key initiatives, at least in the United States, with Society of NeuroInterventional Surgery (SNIS), Society of Vascular and Interventional Neurology (SVIN), and Joint Cerebrovascular Section (JCVS) of the American Association of Neurological Surgeons/Congress of Neurological Surgeons collaborating and coordinating research and data collection efforts at the NIH and for Agency for Healthcare Research and Quality–recognized quality outcomes initiatives.

**What progress has been made specifically in the development of comprehensive stroke centers during this time?**

**Dr. Siddiqui:** Our analysis (published in *Journal of NeuroInterventional Surgery*) suggests that there are just north of 300 MT-capable centers in the United States, and they are restricted to only 49% of the population.[1] This is despite a substantial increase in sites that provide MT, primarily because they are sprouting in areas where previous sites already existed. This is critical work that must be done. It requires government oversight, and we are attempting to develop an academic analysis to guide governmental action here in Buffalo, New York.

**Dr. Liebeskind:** A lot is focused on development of neurointerventional resources but also on other necessary support services. Since endovascular therapy was established as the mainstay for stroke treatment, we've seen an indication expansion, included an expanded time window for treating patients with distal occlusions or large strokes at baseline. Those different clinical paradigms have even further broadened the range of items a stroke center must be prepared to handle. Consider the condition of acute ischemic stroke. It revolves around a 24-hour time window for potential intervention, and thus you need to have everything ready to treat each patient that comes in within 24 hours from onset.

**Switching gears to COVID-19, how has the pandemic shaped the neurointerventional space in ways that will endure beyond this period?**

**Dr. Liebeskind:** The pathophysiology of COVID-19 has underplayed the quite prominent vascular and neurovascular involvement, and this only became apparent months into the pandemic. In the summer of 2020, we saw many patients in whom the COVID-19 may have preceded the presenting stroke by 2 to 3 weeks. The hypercoagulability became readily apparent. The stroke and neurointerventional field had its own realization of COVID-19 in a somewhat delayed fashion after the rest of the world was aware of the respiratory and pulmonary manifestations. There's also discussion about the rare complication of cerebral venous thrombosis associated with the vaccine. I've been part of many different initiatives looking at how our neurointervention practice has changed, starting with the basics and visibly adapting to the reality on the ground. Probably the most dramatic change has been the need to be flexible or nimble regarding more telemedicine approaches.

**Dr. Siddiqui:** The MT environment has remained stable, except for the initial dip in volumes likely due to people staying home despite symptoms and an increase in very poor outcomes in younger patients with COVID-19. We have gone back to performing cases

under conscious sedation (instead of general anesthesia) because of 100% vaccination in staff and early testing on presentation.

**How has your society and its membership looked to its executives for leadership during this time?**

**Dr. Mack:** Neurointerventional societal leadership has evolved rapidly during the pandemic. Communication became increasingly important as in-person meetings and on-site visits were unfeasible. Communication among society members and between societies with common interests are increasingly important. Connection with the membership has been a focus of societal executives over the course of the past year. SNIS, SVIN, and JCVS have worked together closely over the course of the past year on multiple projects focused on clinical trials, fellowship training, and stroke advocacy. With a common voice, we have been able to help write and submit an NIH/National Institute of Neurological Disorders and Stroke clinical stroke trials platform grant, establish the foundation for a neurointerventional fellowship match, and continue to advocate for stroke patients through outreach and advocacy. Collaborative efforts yielded multiple publications that focused on the management of patients with stroke and cerebrovascular disease during the time of the pandemic. Weekly/monthly webinars were initiated to provide educational material to our members and practitioners, and online proctoring and communication platforms were developed/adopted for use during neuroendovascular procedures. It is clear that as the field moves forward in a postpandemic era, many of these initiatives will continue benefiting the practitioners of neurointerventional surgery and their patients.

**Dr. Liebeskind:** Our members have mostly looked for guidance from the clinical and scientific perspective. For example, how to best answer questions and focus efforts related to understanding the pathophysiologic basis and impact of COVID-19 on our field. Beyond that, we're looked to for how we practice on a daily basis and how we organize our efforts for every code that we get called for.

**The societies have each adapted their educational efforts to reach users via online avenues such as webinars. What has this experience shown is viable beyond the pandemic, and how will the society continue to use online opportunities even when real-world settings have largely reopened?**

**Dr. Liebeskind:** Questions are emerging about how we practice most efficiently on a daily basis and the new normal—questions on how we might not do things how we did in the past. There's no question that, at least for the moment from a neurointerventional standpoint, there are specific scenarios where we still do things in person, but what that means in terms of how we're supported by others is an open question. Does everybody need to be at the institution? Who needs to come in and when? The focus has been on answering these questions from an efficiency standpoint. I think it's a healthy juncture because it forces us to rethink traditional ways of doing things and consider what makes the most sense.

**Dr. Mack:** The educational platforms provided to neurointerventional surgeons evolved greatly during the pandemic. In-person meetings have not been feasible, so virtual meetings and content have been refined. Attendance has been high as international participation has increased. Practitioners who would otherwise not be able to travel to attend meetings can gain access to well-developed online content. Monthly webinars provide educational content focused on disease management, procedural techniques, and societal collaborations/initiatives. This was critical during the early pandemic months when clinical activity was significantly reduced, and best practices needed to be shared. Journal submissions have increased greatly. The appetite for online content has not diminished as clinical volumes return to normal. Webinars are extremely well attended, and enthusiasm for the upcoming meetings is substantial. The communication channels and infrastructure developed over the course of the pandemic will benefit neurointerventional practitioners for years to come.

**Dr. Siddiqui:** Webinars are here to stay. They draw large audiences and are convenient for everyone concerned. However, they don't allow true personal interactions, no matter how good the virtual hangout. The future is hybrid because there is need for both; I expect most meetings will have a virtual option.

**One of the critical issues facing all practitioners, especially throughout the pandemic but also well before, is burnout. What elements of burnout are unique to the neurointerventional community, and how can the associated societies help their members in this regard?**

**Dr. Mack:** Neurointerventional surgeons consistently perform emergency MTs and other life-saving

procedures. These procedures require significant planning, use of personal protective equipment, and modifications to procedural areas. Each of these changes serves to lengthen the time and complexity of MT procedures.

The incidence of large vessel stroke did not decrease during the pandemic, and it even increased in certain demographics. Some neurointerventional surgeons had to be away from their families to perform their work. Physicians, nurses, and staff available for call and procedures were scarce as medical personnel were afflicted by COVID-19 or tested positive. These factors all increased burnout and strained an already short-staffed system without built-in redundancy. Fortunately, neurointerventional practitioners rose to the occasion and were able to provide high level care to patients throughout this crisis. The societies offered professional health services and community support for our members during this difficult time. Many neurointerventional surgeons felt that connection to other practitioners through online events, webinars, and group discussions, which were greatly beneficial during a time of isolation.

**Dr. Siddiqui:** The volume, unpredictability, and high variability of stroke call (and the lack of stroke call pay) makes for a very difficult lifestyle. We hope these are transitional problems as we develop methods to reduce the call burden by building better systems of care, increasing the workforce, and using robotics to manage issues.

**Dr. Liebeskind:** I don't think we yet know the lasting impact of that burnout or even how to define it. That's an open question societies are just starting to delve into and consider the impact of.

### How can the society ensure diversity, equity, and inclusion (DEI) in its membership and leadership positions in 2021 and beyond?

**Dr. Siddiqui:** This is a reflection of medicine in general, and it is slowly changing in the right direction. Societies need to ensure they are providing the right role models to encourage diverse populations of interested candidates to pursue neuroendovascular surgery. It is gratifying to see that happen in our societies.

**Dr. Liebeskind:** It is important that all available opportunities are equitable and that thought is given to the optimal voices regarding today's concerns and issues.

We're also fortunate that technologic changes have enabled societies to become truly global by involving people across the world. This provides an opportunity to be more inclusive, which is a starting point of DEI. We can communicate all hours of the day, every day of the week, with people on every continent.

### What advice would you give colleagues who are interested in leadership roles in the society? Where do you see the biggest opportunities and needs?

**Dr. Liebeskind:** Whether relating to academic, clinical, or any other form of professional goals, the one element that people typically cite as the critical ingredient is perseverance. I don't know if perseverance must be coupled with intense curiosity in all spheres, but the interest in being involved in spearheading a certain mission drives people to want to lead.

**Dr. Siddiqui:** There is much to be done in all spheres: academic analysis, hypothesis-driven research, outcomes-based comparative analyses, population-based analyses, patient advocacy, governmental lobbying to promote regulatory oversight and funding, population education, and more. There is a lot that anyone with passion can engage.

### How can the effectiveness of awareness campaigns such as Stroke Awareness Month, the Get Ahead of Stroke (GAOS) campaign, and World Stroke Thrombectomy Day be maximized, and how can their impact be measured? How have awareness campaigns such as GAOS fared during the pandemic?

**Dr. Liebeskind:** This is an area in which physicians and professional societies in medicine can improve and make a considerable impact. We're not politicians; we don't have this expertise in advocacy. Thus, campaigns like Stroke Awareness Month that have a simple focus are great. Every month is a stroke awareness month for us, but having a specific time of the year to publicly commemorate stroke is important. Of course, from an interventional standpoint, highlighting World Stroke Thrombectomy Day is significant because such a celebration has never occurred before. We would hope to not need thrombectomies with the most effective stroke prevention measure possible, but it is a part of what we do. It's useful as a campaign to highlight the role of intervention in neuroendovascular approaches for treating this horrible disorder, at the public level, at the health care staff level, and among experts who understand this is an established piece of what we do in our field.

**Dr. Mack:** The GAOS campaign continued to move forward strongly during the pandemic. The practitioners and staff involved demonstrated unwavering effort, despite the obstacles inherent to advocacy during the pandemic. Industry partners continued to enthusiastically support the effort, despite financial constraints. GOAS has made progress with legislation in multiple states and is actively engaging congressional leadership in others. The team recently hosted a successful virtual "Hill Day" where they engaged and spoke with legislators about the importance of stroke systems of care and ensuring that large vessel stroke patients have access to level 1 comprehensive stroke centers in a timely manner.

**Dr. Siddiqui:** Increasing public awareness requires a concerted effort from all societies for an approach to create media content that will resonate with the general and at-risk populations. This is very much missing and perhaps has the potential to be the most effective at saving patient lives and improving outcomes. We are making steady incremental progress one state at a time, but we could do more with better funding and media engagement.

## In 2021, what are the most significant obstacles and opportunities facing stroke specialists and specialties?

**Dr. Liebeskind:** The greatest limitations are access to care and proper recognition of a treatable stroke with thrombectomy. If the patient is not able to establish themselves, it typically takes an entire chain of command of recognition at every step of the process to understand that not only is that person having a stroke but that it's treatable (by reopening the vessel promptly). This requires a large group of individuals, and that's not available everywhere at all times. Figuring out the best system or practice to implement across diverse geographic regions where resources vary (including variation on time of day and other scenarios) is quite complex.

The biggest opportunity is awareness at the public level that these are treatable events and potentially completely reversible. Another opportunity is recognition with medical staff. From a health care standpoint, the field is extremely specialized when it comes to the people who perform thrombectomies. It's a very limited number of individuals in the country. Explaining exactly what it is that we do and how we do it is an opportunity. It's not necessarily the most familiar to other medical professionals.

Making sure we are providing the greatest access to our services is also important. Where a thrombectomy can be done, what else is there, and how you organize services will change in coming years. A key facet of that is which components you need and when for that one individual patient. Sometimes it's very basic and simply a question of recognizing you have a large artery that's blocked. In other cases, it requires a little bit more finesse and sophisticated examinations and tools to make sure you're treating the right patient. Making these tools available to the broadest base possible is the biggest stumbling block or limitation, as well as the greatest target or objective of how to expand things going forward.

**Dr. Siddiqui:** The biggest obstacle is poor access for patients. As for opportunities, I expect that progressive clinical trials will demonstrate that a large population of patients (perhaps > 300,000 per year in the United States) could be helped by MT. This would mean that essentially anyone with a decent premorbid status is a candidate. These efforts are already underway. When this is achieved, the remaining challenge will be early stroke detection by emergency medical services with streamlined patient delivery to higher level of care and robotics. ■

1. Aldstadt J, Waqas M, Yasumiishi M, et al. Mapping access to endovascular stroke care in the USA and implications for transport models. J Neurointerv Surg. Published online February 16, 2021. doi: 10.1136/neurintsurg-2020-016942

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*Catheter Technologies, Inc., Rebound Therapeutics Corp. (purchased in 2019 by Integra Lifesciences Corp), Rist Neurovascular, Inc. (purchased in 2020 by Medtronic), Sense Diagnostics, Inc., Serenity Medical, Inc., Silk Road Medical, SongBird Therapy, Spinnaker Medical, Inc., StimMed, LLC, Synchron, Inc., Three Rivers Medical, Inc., Truvic Medical, Inc., Tulavi Therapeutics, Inc., Vastrax, LLC, VICIS, Inc., Viseon, Inc; consultant/advisory board for Amnis Therapeutics, Apellis Pharmaceuticals, Inc., Boston Scientific, Canon Medical Systems USA, Inc., Cardinal Health 200, LLC, Cerebrotech Medical Systems, Inc., Cerenovus, Cerevatech Medical, Inc., Cordis, Corindus, Inc., Endostream Medical, Ltd, Imperative Care, Integra, IRRAS AB, Medtronic, MicroVention, Minnetronix Neuro, Inc., Penumbra, Q'Apel Medical, Inc., Rapid Medical, Rebound Therapeutics Corp., Serenity Medical, Inc., Silk Road Medical, StimMed, LLC, Stryker Neurovascular, Three Rivers Medical, Inc., VasSol, Viz.ai, Inc., W.L. Gore & Associates; National Principal Investigator/steering committees for Cerenovus EXCELLENT and ARISE II; Medtronic SWIFT PRIME, VANTAGE, EMBOLISE, and SWIFT DIRECT; MicroVention FRED and CONFIDENCE; MUSC POSITIVE; Penumbra 3D Separator trial, COMPASS, INVEST, MIVI neuroscience EVAQ trial; Rapid Medical SUCCESS; InspireMD C-GUARDIANS IDE pivotal trial.*