



Physicians in Promoting Stroke Awareness: A Multidisciplinary Effort

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Stroke is caused by a vascular blockage or rupture in the central nervous system that leads to neurological deficit. Stroke can result in cerebral infarction, intracerebral hemorrhage, subarachnoid hemorrhage, silent cerebral hemorrhage, or ischemic injury to the spine or retina. A transient ischemic attack (TIA) is a brief episode of neurological dysfunction that resolves within 24 hours. Perioperative stroke is a stroke that occurs within the perioperative period. Stroke can happen to anyone and occur at any time, including pre-, intra- and post-operation. The term “perioperative” describes the entire period in which patients receive medical care, from the first states of surgery planning, through the operation, and to full recovery [1,2,3].

Patients in perioperative care often have comorbidities that increase stroke risks, such as hypertension, diabetes, cardiovascular disease, and atrial fibrillation. The possibility of perioperative stroke has been underappreciated but presents significant morbidity and mortality risks. The incidence of perioperative stroke is about 1.4-9.7% after cardiac surgery, 2.9-7.4% after carotid surgery, and 0.05-4.4% in general surgical procedures [4]. Stroke can result in severe disabilities, which can lead to a lifelong recovery process and significant burdens for patients, their families, the healthcare system and society [3,5,6,7,8].

There are numerous physicians and caregivers involved in perioperative care, but they are only one facet of patient care. Having physicians and healthcare teams educate patients and families on recognizing the early signs of stroke would be an effective and simple way to increase survivability and patient prognosis.

However, there are significant challenges to this approach. Sound medical knowledge, familiarity with current science and research, and access to updated clinical evidence of best practices are the key foundations to achieving the above goals. Unfortunately, it remains extremely difficult to motivate the general population to work alongside highly educated physi-

cians and health care teams to increase stroke awareness.

We hypothesized that the use of social media could make the material more accessible to a lay audience. Catching an audience's attention requires a quick and interesting presentation. Educational initiatives disseminated this way may be useful in promoting general medical knowledge, such as earlier recognition of stroke signs and immediate action once a stroke is suspected. Toward this goal, Dr. Jing Zhao at Fudan University and Dr. Renyu Liu at University of Pennsylvania collaborated in 2016 to create **Stroke 120**, a fantastic tool suitable for use in China for stroke awareness education [9,10]. They created various educational materials, including an animated video to help people understand and remember the signs and symptoms of stroke. The video was subsequently translated into more than 12 local dialects and promoted in corresponding regions [9,10].

That video was released to the public on major Chinese social media platforms, introducing the basic knowledge of stroke signs and symptoms to general population, and providing them with action steps in a simple and concise manner. As a result, people can recognize stroke signs and symptoms, such as sudden onset of limb weakness, speech disturbance, or changes to vision or balance, which can lessen the time taken to get patients to hospitals with Rapid Response Stroke Program [9,10]. Early treatment greatly improves stroke prognosis, giving physicians time to address potential complications, preserve brain function, and save lives. The release of the video was a huge success and was lauded by the general population and several major medical professional societies, which was very exciting for our team [9,10].

Inspired by the success of “**Stroke 120**”, we wondered if the media could be extended to further educate people and achieve a similar effect for perioperative stroke prevention and management.

The challenge was accounting for the many factors involved, including patients, families, primary care phy-

sicians, subspecialists, the procedure itself, continuity of care, etc. [2-4,8]. At least six elements have to be considered to translate the Stroke 120 video to perioperative stroke

- 1) **The nature and types of surgical procedures.** With advances in anesthesia, surgery and technologies, a large variety of previously impractical procedures have been made available to a broader range of the general population. Information on various procedures could be included in the media, such as procedures for the prevention and treatment of stroke itself, or potential procedures for patients with history of stroke who already had medical interventions. The complexity of surgical procedures for patients with complicated conditions creates additional challenges.
- 2) **The timing of procedures.** The procedure could be planned or an immediate emergency with less time for full preparation.
- 3) **The patient population.** Patients could be young or old, and older patients have increased risk of multiple comorbidities [2,9]. The patients can be first time stroke sufferers or people who have previously survived a stroke. The patients with a history of stroke or atrial fibrillation with or without intervention usually have a regimen of anticoagulants and/or anti-platelets medications [11-14].
- 4) **The variety of perioperative physicians.** Many different physicians are involved in perioperative care. There are primary care doctors and several different subspecialists [3]. Effective coordination and collaboration is often difficult during the perioperative period [3,4,12,15].
- 5) **The knowledge of patients and support groups.** In general, the majority of patients and their families do not have sufficient knowledge to recognize the risks and signs of stroke.
- 6) **Effects of surgery and anesthesia.** During the perioperative period, the symptoms and presentation of stroke are sometimes masked by the effects of surgical procedures themselves or the residual effects of general anesthesia [6,7,13].

The highest risk factors for onset of new strokes or recurrence of perioperative strokes are a prior history of transient ischemic attack or stroke and an existing atrial fibrillation [3,8,12]. Patients with stroke history or atrial fibrillation with or without intervention will usually take regular anticoagulants [11,12,13]. If coagulation and anticoagulation are not well adjusted, stroke or hemorrhage may happen intraoperatively [11,12,14,16]. The following are critical in preventing perioperative stroke and have to be carefully considered and individualized:

- 1) Medication strategy for the prevention of thrombosis/embolism and the management of bleeding risk.
- 2) Timing for stopping and resuming anticoagulants and anti-platelet therapy.
- 3) Proper bridge regimen for operation during perioperative period.
- 4) Effective communication among physicians and patients with coordination and care continuity.

Perioperative care physicians are composed of pri-

mary care doctors (such as family medicine physicians and internists) and specialists (emergency doctors, neurologists, cardiologists, intensive care physicians, respiratory specialists, multi-surgical subspecialists, obstetricians, pediatricians, rehabilitation physicians, and anesthesiologists, etc.) [3,8,15]. Among all physicians involved, only anesthesiologists play a unique and critical role throughout the entire procedure, because they serve as safety gatekeepers through each stage of the perioperative period. Preoperatively, they have to make sure patient's condition is suitable for surgery or is at least optimized so that patient can endure the surgical procedure without jeopardizing his or her life. Intraoperatively, they have to not only maintain the patient's vital signs to keep them stable, but also protect patients from intraoperative bleeding or thrombosis/embolism, stroke or other complications. Meanwhile, they must create the best possible conditions to enable surgeons to operate safely with minimal difficulty. Postoperatively, they have to enact a prompt emergence from anesthesia, maintain the patients' cognitive integrity, and prevent stroke or other complications. In addition, anesthesiologists are responsible for managing and minimizing patients' postoperative pain to facilitate a prompt recovery and rehabilitation [3,15].

Due to the unique perioperative perspective of anesthesiologists, they recognized the significance of disseminating information about the leading risks of perioperative stroke. A group of anesthesiologists felt the issue represented a meaningful and exciting project, and after a passionate discussion, they devised a social media approach.

As a result of that meeting, the "**Stroke and Atrial Fibrillation**" video was created and produced. The video release celebration was held on November 1, 2018 in Beijing during the 26th Annual Meeting of the Chinese Society of Anesthesiologists and the 15th Asian Australasian Congress of Anesthesiologists.

The screenwriters used simple language for the script. The physician team educated a group of artists to create a video that was vivid, precise, and under two minutes! The video can be viewed on various online resources for free (<https://xw.qq.com/gongyi/20181101012568/GON2018110101256800?from=timeline&isappinstalled=0>). This is an amazing piece of art and wonderful product of teamwork! Physicians, visual and audio artists, as well as cartoonists worked together to produce this video for public education of stroke, atrial fibrillation and perioperative care. As Dr. Liu said at the opening ceremony, this is an international and multidisciplinary collaborative academic effort with Dr. Lize Xiong, Dr. Weidong Mi, Dr. Yanqin Lou, and Dr. Renyu Liu from Anesthesia,



Figure 1: The video release at the opening ceremony of the annual meeting of the Chinese Society of Anesthesiology on Nov 1st, 2018. From left to right are Drs. Renyu Liu, Yuguang Huang, Jiahong Dong, Keqin Rao, Yupei Zhao, Xiaowei Ma, Lize Xiong, and Weidong Mi.

Dr. Yupei Zhao from Surgery, Dr. Jing Zhao from Neurology! Dr. Yuguang Huang from anesthesia and Dr. Jiahong Dong from surgery attended the video release as indicated in [Figure 1](#).

The project leader, Dr. Renyu Liu, an anesthesiologist at the University of Pennsylvania and the president of the International Chinese Academy of Anesthesiology, and Dr. Jing Zhao, the head of the **Rapid Responses Program of Stroke** in China have both devoted tremendous time and effort toward the prevention of perioperative stroke [9]. In order to promote action, they collaborated with people in China, including academic professionals, clinical professionals, the media, and relevant national organizations. They even translated the video into several local dialects for release in corresponding regions [10]. We are so proud of the Chinese American and Chinese anesthesiologists who have taken leadership in the initiation, coordination and promotion for perioperative stroke prevention and management, especially for patients with atrial fibrillation. This strategic educational video reflects a broad range of medical and clinical knowledge and skills. It is characterized by striking images and simple action steps, which can be easily remembered. It provides a useful approach to master key concepts for the general population and medical community. Through the publicity of this video, we expect progress will be made in several areas in the prevention and management of perioperative stroke. Physicians, health care alliances, patients, and the general population can work together to promote the earlier prevention and detection of stroke. We hope it will eventually decrease perioperative complications and stroke-related morbidity

and mortality. We believe that this video will significantly benefit many surgical patients with high risk of stroke, as well as their families. We believe this will result in the improvement of surgical patient safety/outcome and decrease of healthcare costs associated with perioperative stroke. The forefront of the perioperative stroke prevention movement is the improvement of beneficial and cost-effective strategies to supplement current perioperative stroke treatment and management.

Lastly, we wish to advocate for researchers to investigate the efficacy of the “**Stroke and Atrial Fibrillation**” video in preventing perioperative stroke and encourage additional studies to discover additional innovative measures to prevent perioperative stroke.

Conflict of Interests

The authors declare no conflict of interests.

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