

# Neuroradiology

**NR-I** *MRI in acute ischemic stroke management : Paradigm shift*  
(4 speakers, 90 min)

**NR-II** *Application of AI in magnetic resonance imaging*  
(4 speakers, 90 min)



Cheng-Yu Chen, MD  
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# Time Table

Saturday, May 21, 2022  
Room 202

Time	Topics	Speakers	Moderators
15:30-15:51 (21mins)	Perfusion-Diffusion Mismatch in Acute Ischemic Stroke	Kohsuke Kudo	Kei Yamada Sandy Cheng-Yu Chen
15:51-16:12 (21mins)	Intra-arterial thrombectomy and role of acute MRI management	Kevin, Li-Chun Hsieh	Kei Yamada Sandy Cheng-Yu Chen
16:12-16:33 (21mins)	MR imaging of acute stroke and mimics	Lim Choie Cheio, Tchoyoson	Kei Yamada Sandy Cheng-Yu Chen
16:33-16:54 (21mins)	Translational research in MR stroke imaging	Seung Hong Choi	Kei Yamada Sandy Cheng-Yu Chen
16:54-17:00 (6mins)	Q&A		Kei Yamada Sandy Cheng-Yu Chen

# *MRI in acute ischemic stroke management : Paradigm shift*

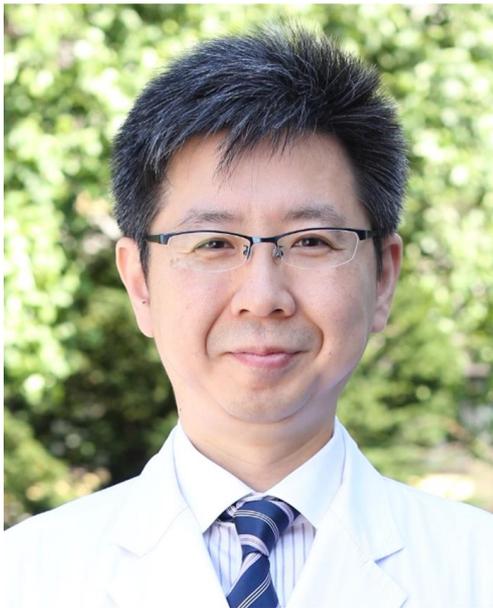
## Overview:

Organizer: Cheng-Yu Chen, MD

The application of MRI in acute stroke triage has changed the practice of emergent management of stroke patients. The new DAWN and DEFFUSE trials lead to the facts that patients with ischemic stroke can be treated by intra-arterial thrombectomy up to 16 to 24 hours following stroke onset if significant ischemic penumbra can be determined. This session acclaims the recent advance of MRI in stroke management. The emerging MR technology and new concepts that bring together to improve patients' outcome will be presented by international and local experts.

This 90-minute symposium will appraise inspirational lectures by stellar casts from international experts, including professor Kohsuke Kudo from University of Hokkaido, professor Kevin Hsieh from Taipei Medical University Hospital, professor Tchoyoson Lim from National Neuroscience Institute, Singapore, and professor Seung Hong Choi from National Seoul University Hospital.

# *Perfusion-Diffusion Mismatch in Acute Ischemic Stroke*



- Professor, Department of Diagnostic Imaging, Hokkaido University Graduate School of Medicine
- Director, Isotope Center, Hokkaido University
- Director, Medical AI Research and Development Center, Hokkaido University Hospital

**Kohsuke Kudo , M.D., Ph.D. Japan**

# *Perfusion-Diffusion Mismatch in Acute Ischemic Stroke*

- **Synopsis:**

- Recent advancement of mechanical thrombectomy in acute ischemic stroke requires tissue-based patient selection. The target tissue of acute recanalization is ischemic penumbra, which is reversible ischemic tissue, defined as perfusion-diffusion mismatch. For the safety and efficacy of endovascular therapy, objective and quantitative determinations of mismatch volume and ratio are important. Several automated programs are now available for clinical use, and we have developed our original program named “PMAneo” , which has been approved by Pharmaceuticals and Medical Devices Agency (PMDA) in Japan.
- The basic principle and pathophysiology of ischemic penumbra, and clinical use of automated program PMAneo will be presented in this lecture, including future perspectives using artificial intelligence (AI) for lesion segmentation.

- **Key Reference:**

- Ryota Sato, Kohsuke Kudo, Niki Udo, et al. A diagnostic index based on quantitative susceptibility mapping and voxel-based morphometry may improve early diagnosis of Alzheimer's disease. Eur Radiol. 2022 Feb

# *Intra-arterial thrombectomy and role of acute MRI management*



- Radiologist, Department of Medical Imaging, Taipei Medical University Hospital
- Assistant Prof., Department of Radiology, College of Medicine, Taipei Medical University

**Kevin, Li-Chun Hsieh, MD, Taiwan**

# *Intra-arterial thrombectomy and role of acute MRI management*

- **Synopsis:**

- Recent trials have demonstrated the superior efficacy of mechanical thrombectomy over other medical treatments for acute ischemic stroke even after the first 6–24 h of stroke onset. Quick and precise identification of the salvageable tissue is essential for successful stroke management. In this report, we shared the preliminary data of differentiating the ischemic penumbra from the infarct core by using diffusion tensor imaging (DTI)-derived metrics. Vessel wall images (VWI) and fast scan techniques were also implemented into our screening protocol to enhance the management for different vascular pathologies. We also try to identify the key imaging features to predict the prognosis after thrombectomy management.

- **Key Reference:**

- Ni CF, Cheng SJ, Chen CY, Yeh TH, Hsieh KL. Added Value of Rescue Devices in Intra-Arterial Thrombectomy: When Should We Apply Them? *Front. Neurol.* 2021 Jun.
- Cereda CW, Bianco G, Mlynash M, Yuen N,...Hsieh KL, et al.. Perfusion Imaging Predicts Favorable Outcomes after Basilar Artery Thrombectomy. *Ann Neurol.* 2021 Nov.

# *MR imaging of acute stroke and mimics*



- Senior Consultant, Neuroradiology, National Neuroscience Institute
- Adjunct Professor, Duke-NUS Medical School
- Academic Vice Chair, Education, Singhealth Duke-NUS Academic Clinical Program

**Lim Choie Cheio, Tchoyoson, MD, Singapore**

# MR imaging of acute stroke and mimics

- **Synopsis:**

- In up to 30% of cases of 'sudden neurological deficit', the final diagnosis is not acute ischemic stroke (AIS). It is clinically important to recognize these "false positive" cases among patients who qualify for reperfusion therapy for AIS, in order to prevent potential harm from hemorrhagic or procedural complications.
- The initial investigation of AIS continues to be computed tomography (CT, augmented by CT angiography), due to its availability, low cost, and shorter acquisition time. However, the multi-parametric nature of MRI enables allows more sensitive and specific identification of stroke mimics.
- The key role of diffusion-weighted imaging (DWI) will be emphasized, with description of stroke patterns and assessment of wake-up stroke, abbreviated stroke protocols. A variety of examples of stroke mimics will be illustrated including tumor, encephalitis, demyelination, hypoglycaemia, posterior reversible encephalopathy syndrome, mitochondrial encephalopathy, lactic acidosis, stroke-like episodes, and seizure-related disorders.
- Aggregating data from DWI, T2-weighted or fluid-attenuated inversion recovery, gradient recalled echo or susceptibility weighted imaging, angiographic data, and interpreting both signal intensity change together with anatomical distribution will be emphasized. Perfusion MRI, LVO reperfusion protocols, and translational research will be covered by other excellent speakers in this session

- **Key Reference:**

- Yu W-Y, Xu Z, Lee H-Y, et al. Identifying patients with neuronal intranuclear inclusion disease in Singapore using characteristic diffusion-weighted MR images. *Neuroradiology*, 2019.
- Goh, G. X., Tan, K., Ang, B. S. P., Wang, L.-F., & Tchoyoson Lim, C. C. Neuroimaging in Zoonotic Outbreaks Affecting the Central Nervous System: Are We Fighting the Last War? *American Journal of Neuroradiology*, 2020.

# *Translational research in MR stroke imaging*



**Seung Hong Choi, MD, PhD, Korea**

- Professor, Department of Radiology, Seoul National University Hospital and Seoul National University College of Medicine, Korea

# *Translational research in MR stroke imaging*

- **Synopsis:**

- Stroke risk and post-stroke disability have steadily decreased in the U.S. over the past two decades due to improved prevention, and access to reperfusion therapies for acute ischemic stroke, such as tissue plasminogen activator (t-PA, alteplase) and/or endovascular thrombectomy. Despite the efficacy and safety of thrombolysis and thrombectomy, not all patients who receive the treatment improve to full, independent recovery, and most patients are ineligible for treatment. Additionally, there are no efficacious treatments to improve long-term outcomes for patients after the acute phase of ischemic stroke, or to reduce brain injury induced by acute intracerebral hemorrhage. Therefore, development of new therapies for both acute and chronic stroke is sorely needed. For the needs, translational research is necessary to improve the current modalities and to give better opportunities to the stroke patients. In this talk, I will show several translational research for the development of stroke treatments.

- **Key Reference:**

- Sanghyup Lee, Roh-Eul Yoo, Seung Hong Choi, et al. Contrast-enhanced MRI T1 mapping for quantitative evaluation of putative dynamic glymphatic activity in the human brain in sleep-wake states. *Radiology*. 2021 Sep
- Koungh Mi Kang, Seung Hong Choi, Chul Kee Park et al. Differentiation between Glioblastoma and Primary CNS Lymphoma: Application of DCE-MRI Parameters Based on Arterial Input Function Obtained from DSC-MRI. *EUROPEAN RADIOLOGY*, 2021 May