

Symposium: Application of MRgFUS in Neurological Diseases

內容簡述： 聚焦超音波在神經領域的應用日漸寬廣。本次研討會將目前的聚焦超音波在神經學領域的應用做深入的探討。

時間 Time	題目 Topic	演講者 Speaker
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Opening

14:00-14:05	Opening Remarks 開幕致詞	胡漢華 Han-Hwa Hu 臺北醫學大學雙和醫院
Moderator: 蔣漢琳 Han-Lin Chiang 臺北榮民總醫院		
14:05-14:25 NEU-S01	Application of MRgFUS in the Treatment of Alzheimer Disease: A Review	郭明哲 Ming-Che Kuo 臺大醫院癌醫中心分院
Moderator: 鍾芷萍 Chih-Ping Chun 臺北榮民總醫院		
14:25-14:45 NEU-S02	Pilot Study of Focused Ultrasound for Drug-resistant Epilepsy	尤香玉 Hsiang-Yu Yu 臺北榮民總醫院
Moderator: 巫錫霖 Shey-Lin Wu 秀傳醫院		
14:45-15:05 NEU-S03	Current Indication and Future Directions of MRgFus for Movement Disorders	吳佩翰 Pei-Han Wu 秀傳醫院

Panel Discussion I

Moderator: 洪千岱 Chien-Tai Hong 雙和醫院		
15:05-15:20	Panel Discussion I 林信光 Shinn-Kuang Lin 台北慈濟；李宗海 Tsong-Hai Lee 林口長庚醫院 周中興 Chung-Hsing Chou 三軍總醫院；胡朝榮 Chaur-Jong Hu 雙和醫院 蔣漢琳 Han-Lin Chiang 臺北榮民總醫院；林雅如 Ya-Ju Lin 臺北馬偕醫院 鍾芷萍 Chih-Ping Chun 臺北榮總；洪千岱 Chien-Tai Hong 雙和醫院 趙雅琴 A-Ching Chao 高雄醫學大學附設醫院；陳龍 Lung Chan 雙和醫院 巫錫霖 Shey-Lin Wu 秀傳醫院；劉濟弘 Chi-Hung Liu 林口長庚醫院 傅維仁 Helen L. Po 臺北馬偕醫院；連立明 Li-Ming Lien 新光醫院	
15:20-15:40	Coffee Break	
Moderator: 劉濟弘 Chi-Hung Liu 林口長庚醫院		
15:40-16:00 NEU-S04	Is Carotid Ultrasound Alone a Sufficient Screening Tool for Carotid Stenosis after Radiation Therapy?	陳敏碩 Min-Shuo Chen 林口長庚
Moderator: 傅維仁 Helen L. Po 臺北馬偕醫院		
16:00-16:20 NEU-S05	Are Vascular Abnormalities the Sole Cause of Pulsatile Tinnitus? An Updated Diagnostic Approach	林宜靜 I-Ching, Lin 臺北馬偕
Moderator: 陳龍 Lung Chan 雙和醫院		
16:20-16:40 NEU-S06	Linking Carotid Ultrasound Parameters to Outcomes after Carotid Artery Stenting	林聖傑 Sheng-Chieh Lin 雙和醫院

Panel Discussion II and Closing Remarks

Moderator: 趙雅琴 A-Ching Chao 高雄醫學大學附設醫院		
16:40-16:55	Panel Discussion II 林信光 Shinn-Kuang Lin 台北慈濟；李宗海 Tsong-Hai Lee 林口長庚醫院 周中興 Chung-Hsing Chou 三軍總醫院；胡朝榮 Chaur-Jong Hu 雙和醫院 蔣漢琳 Han-Lin Chiang 臺北榮民總醫院；林雅如 Ya-Ju Lin 臺北馬偕醫院 鍾芷萍 Chih-Ping Chun 臺北榮總；洪千岱 Chien-Tai Hong 雙和醫院 趙雅琴 A-Ching Chao 高雄醫學大學附設醫院；陳龍 Lung Chan 雙和醫院 巫錫霖 Shey-Lin Wu 秀傳醫院；劉濟弘 Chi-Hung Liu 林口長庚醫院 傅維仁 Helen L. Po 臺北馬偕醫院；連立明 Li-Ming Lien 新光醫院	

Closing

16:58-17:00	Closing Remarks 閉幕致詞	陳龍 Lung Chan 雙和醫院
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NEU-S01

### **Application of MRgFUS in the treatment of Alzheimer Disease: A Review**

*Ming-Che Kuo*

*Department of Medicine, National Taiwan University Cancer Center*

Focused ultrasound (FUS) has emerged as a novel therapeutic modality in the management of Alzheimer's disease (AD), offering a non-invasive approach to transiently open the blood-brain barrier (BBB) and facilitate targeted delivery of therapeutics. Recent advances demonstrate that FUS can safely and reversibly open the BBB, promoting enhanced drug and antibody delivery to the brain and activating microglial clearance of amyloid- $\beta$  (A $\beta$ ) plaques. Preclinical studies have established the efficacy of FUS in reducing both amyloid and tau pathology, with corresponding improvements in cognition in animal models. Clinical trials have confirmed the safety profile of FUS-mediated BBB opening, with significant reductions in cerebral amyloid plaques, occasional neuropsychiatric improvements, and an absence of serious adverse events. Mechanistically, FUS may also enhance glymphatic clearance and mechanosensory pathways. Despite promising results, limitations include small cohort sizes, varied treatment protocols, and a need for long-term efficacy data. Current and future directions entail multicenter trials, combination therapies with anti-amyloid agents, and mechanistic optimization to enhance both safety and therapeutic benefit.

NEU-S02

### **Pilot Study of Focused Ultrasound for Drug-resistant Epilepsy**

*Hsiang-Yu Yu*

*Taipei Veterans General Hospital and National Yang Ming Chiao Tung University*

Epilepsy is a chronic neurological disorder, and approximately 70% of people with epilepsy

(PWE) can achieve good seizure control with antiseizure medications. However, the remaining 30%, classified as having drug-resistant epilepsy (DRE), require alternative treatments such as surgery or other therapeutic approaches.

For patients with surgically remediable DRE, seizure freedom can be achieved in 60–80% of cases through surgery. For those who are not suitable candidates for resective surgery, neuromodulation is a potential option. Currently approved neuromodulation therapies for epilepsy—such as vagus nerve stimulation (VNS), deep brain stimulation (DBS), and responsive neurostimulation (RNS)—require device implantation, which carries risks of complications such as bleeding, infection, and device malfunction.

Transcranial focused ultrasound (tFUS) is an emerging treatment modality for various neurological disorders. It has already been validated for the treatment of essential tremor and Parkinson's disease through its lesioning capabilities. tFUS holds promise as a less invasive treatment option for DRE, as it does not require surgical incisions.

Preclinical studies have demonstrated that tFUS can reduce seizure activity in both acute and chronic epilepsy animal models. Additionally, several recent human studies have reported a reduction in seizure frequency following tFUS lesioning of targeted brain regions. tFUS has also shown encouraging results in modulating brain activity to help control seizures in people with epilepsy.

At our institution, we are currently conducting clinical trials investigating the use of tFUS in epilepsy treatment, exploring both its lesioning and neuromodulation effects. In this presentation, I will share preliminary data from these trials and discuss the potential future applications of tFUS in the clinical management of epilepsy

NEU-S03

### **Current Indication and Future Directions of MRgFus for Movement Disorders**

Peihan Wu

Changbing Show-Chawn Memorial Hospital

The Chanbing Show-chawn focus ultrasound team had performed around 150 cases of MRgFUS treatment, including 20-30 Parkinson disease patients. We also joined the clinical trial of bilateral pallidothalamic traction ablation for Parkinson's disease. We would like to share our experiences in treating PD patients through MRgFUS by different targets, pros and cons. Finally, I would like to talk about the future possible applications in other movement disorder disease except tremor and PD.

### NEU-S04

#### **Is Carotid Ultrasound Alone a Sufficient Screening Tool for Carotid Stenosis after Radiation Therapy?**

Min-Shuo Chen<sup>1</sup>, and Chi-Hung Liu<sup>1,2</sup>

<sup>1</sup>Department of Neurology, Chang Gung Memorial Hospital, Linkou Medical Center, <sup>2</sup>School of Medicine, College of Medicine, Chang Gung University, Taoyuan, Taiwan

Carotid artery stenosis is a major risk factor for stroke. While duplex ultrasonography (DUS) and computed tomographic angiography (CTA) show adequate agreement in grading internal carotid artery (ICA) stenosis, standardized Doppler criteria for common carotid artery (CCA) stenosis remain limited. CCA stenosis is a recognized complication in head and neck cancer patients after radiation therapy (RT), with pathophysiology distinct from atherosclerosis. We hypothesize that RT-induced endothelial proliferation and fibrosis cause bidirectional vessel wall thickening, which, under the European Carotid Surgery Trial (ECST) method, may enlarge the reference diameter and narrow the residual lumen, leading to overestimation of stenosis severity. This study assesses the accuracy of carotid ultrasound for grading CCA stenosis in this patient population.

**Key words:**

Common carotid artery stenosis, Head and neck cancer, Radiation therapy, Duplex ultrasonography

### NEU-S05

#### **Are Vascular Abnormalities the Sole Cause of Pulsatile Tinnitus? An Updated Diagnostic Approach**

I Ching Lin<sup>1</sup>, Helen L. Po<sup>1,2</sup>

<sup>1</sup>Department of Neurology, MacKay Memorial Hospital, Taipei, Taiwan <sup>2</sup>Stroke Center, MacKay Memorial Hospital, Taipei, Taiwan

Tinnitus is the perception of sound in the ear without an external source. It cannot be heard by others nearby and can significantly impact a patient's quality of life. Pulsatile tinnitus is characterized by a rhythmic sound that is synchronous with the heartbeat, often described as a whooshing or pounding noise. Approximately 4% of all tinnitus patients experience pulsatile tinnitus. It is typically caused by vibrations resulting from turbulent blood flow in arteries or blood vessels. The first-line treatment for pulsatile tinnitus is to address the underlying etiology whenever possible. The causes of pulsatile tinnitus are classified as vascular, structural, or metabolic in origin, and most etiologies are treatable. Duplex ultrasonography is a sensitive, rapid, safe, noninvasive, and easily applicable diagnostic tool for evaluating vascular structures. It has become a widely used technique for the early detection of morphological and pathophysiological changes in blood vessels. In the present study, we investigated the etiological factors in patients with pulsatile tinnitus and evaluated the patients using duplex ultrasonography.

### NEU-S06

#### **Linking Carotid Ultrasound Parameters to Outcomes after Carotid Artery Stenting**

*Sheng-Chieh Lin*

*Taipei Medical University-Shuang Ho Hospital*

Extracranial carotid stenosis is a major risk factor for ischemic stroke. Carotid endarterectomy (CEA) and carotid artery stenting (CAS) remain the main treatment options, but peri-procedural risks and post-procedural complications are still under debate.

While CTA and MRA are often used for

pre-procedural assessment, extracranial carotid sonography (ECS) is widely available and routinely applied. Beyond its role as a screening tool for stenosis, an emerging question is whether ECS parameters could also serve as predictors of post-stenting hemodynamic changes, such as cerebral hyperperfusion syndrome (CHS).