

Machine Learning Based Classifications of Neurodegenerative Disorders Using Multiplex Blood Biomarkers

Time: Sep. 12, 12:30-13:45

Location: Institute of Biomedical Sciences (IBMS) B1B room

Author: Chin-Hsien Lin¹, Shu-I Chiu^{2,3}, Ta-Fu Chen¹, Jyh-Shing Roger Jang², and Ming-Jang Chiu^{1,4,5,6*}

¹Department of Neurology, National Taiwan University Hospital, College of Medicine, National Taiwan University, Taipei, Taiwan.

²Department of Computer Science and Information Engineering, National Taiwan University, Taipei, Taiwan.

³Department of Computer Science, National Chengchi University, Taipei, Taiwan.

⁴Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University, Taipei, Taiwan

⁵Graduate Institute of Brain and Mind Sciences, National Taiwan University, Taipei, Taiwan

⁶Graduate Institute of Psychology, National Taiwan University, Taipei, Taiwan

Abstract:

Easily accessible biomarkers for Alzheimer's disease (AD), Parkinson's disease (PD), frontotemporal dementia (FTD), and related neurodegenerative disorders are urgently needed in an aging society to assist early-stage diagnoses. In this study, we aimed to develop machine learning algorithms using the multiplex blood-based biomarkers to identify patients with different neurodegenerative diseases. Plasma samples (n=377) were obtained from healthy controls, patients with AD spectrum (including mild cognitive impairment (MCI)), PD spectrum with variable cognitive severity (including PD with dementia (PDD)), and FTD. We measured plasma levels of amyloid-beta 42 (A β 42), A β 40, total Tau, p-Tau181, and α -synuclein using an immunomagnetic reduction-based immunoassay. We applied machine learning-based frameworks, including a linear discriminant analysis (LDA), for feature extraction and several classifiers, using features from these blood-based biomarkers to classify these neurodegenerative disorders. We found that the random forest (RF) was the best classifier to separate different dementia syndromes. Using RF, the established LDA model had an average accuracy of 76% when classifying AD, PD spectrum, and FTD. Moreover, we found 83% and 63% accuracies when differentiating the individual disease severity of subgroups in the AD and PD spectrum, respectively.

Robot-assisted Stereoelectroencephalography Operations: Early Experience from Chang Gung Memorial Hospital

Speaker: Yu-Chi Wang

Department of Neurosurgery, Chang Gung Memorial Hospital in Linkou, Taoyuan, Taiwan

PhD. Program of Biomedical Engineering, Chang Gung University, Taiwan

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Abstract:

For patients with drug refractory epilepsy (DRE), stereoelectroencephalography (sEEG) has been shown to be a minimally invasive and valuable tool which enables direct electrical recording from superficial and deep-seated brain structures. ROSA (Robotized Stereotactic Assistance) is a navigation as well as robotic arm. It was imported to Taiwan in recent years, specifically deployed for sEEG implantation in 2020 though. Herein, we described the pilot cases who underwent ROSA-sEEG in our institute. The clinical data, pre-OP image, planning with ROSA's sophisticated software, the surgical protocols, and the post-OP image coregistration were demonstrated. To multiple depth electrodes implantation, ROSA-assisted methodology intended to be more precisely and quickly due to the advanced image-guided modality. Complications can be minimized with this safe and feasible procedure, and ROSA-sEEG is an alternative option to traditional stereotactic frame or frameless protocol. Since intracranial monitoring is useful to define the epileptogenic zone (EZ), utilizing ROSA for electrodes placement is able to make this procedure more efficient to provide essential information in the most complex pediatrics or adult cases of DRE.

Advances in FM Management

日期:2020/9/12 (六) 時間:12:30-13:45

地點:南港 中研院生醫所 B1A

Time	Topics	Speaker	Moderator
12:30-12:35	Opening remarks	溫永銳 醫師 中國附醫 疼痛科	
12:35-13:30	The Management of Fibromyalgia From a Psychosomatic Perspective	黃偉烈 醫師 台大雲林 精神醫學部	溫永銳 醫師 中國附醫 疼痛科
13:30-13:40	Q&A	溫永銳 醫師、黃偉烈 醫師	
13:40-13:45	Closing remarks	溫永銳 醫師 中國附醫 疼痛科	

演講摘要:

纖維肌痛症的疼痛模式屬全身性慢性疼痛，痛的部位廣泛，顳顎關節、頸、背、胸、臀部甚至四肢等都可能感受到痛。慢性疼痛與情緒障礙、睡眠障礙、認知損害、疲勞和慢性壓力共存的傾向，已經對臨床造成了巨大的挑戰，它不僅使這些病症的診斷複雜化，而且可能降低治療效果，影響了患者的日常功能和生活品質。

在精神科的診斷體系，對於類似纖維肌痛症表現者，有不同的稱呼，包括過去的身體型疾患(somatoform disorders)與當代的身體症狀障礙症(somatic symptom disorder)等。而在過去與現代的診斷概念中，都有特別強調疼痛類群的描述存在。因此，從精神科的視角，或許能提供對於纖維肌痛症因應的不同觀點。

纖維肌痛症患者發生憂鬱和焦慮障礙的風險分別是健康對照組的4.3倍和4.7倍。憂鬱症和焦慮症亦是纖維肌痛的最常見合併症。此外，憂鬱和疼痛之間的關係似乎是雙向的。因此情緒問題在臨床上，往往需要和纖維肌痛症同時處理。

纖維肌痛症的病因尚未完全明朗，有研究指出可能與中樞神經系統或神經傳導物質的失調有關。纖維肌痛症的病人對痛感的閾值較低，中樞神經敏感化較強，輕碰就覺得痛，甚至有人形容風吹就會痛。而在心理層次，對於身體狀況的過度注意力、對疾病過度預期的傾向、高生理歸因、對疾病嚴重度的災難化思考、全有全無的健康感知型態等，都與慢性化的身體症狀有關。而心理和生理層面的種種特徵，也可能透過內分泌系統和自律神經系統產生連結。

治療方式，除藥物治療外，非藥物治療，如認知行為治療、有氧運動、水中運動或打太極拳也都有文獻支持。認知行為治療、有氧運動、某些抗癲癇藥物與抗憂鬱藥物，在多個治療準則中被列為優先建議的選項。而認知行為治療如何施行，需要對個案認知面與行為面特徵的掌握。

纖維肌痛症雖然像高血壓、糖尿病等慢性病一樣不易根治，但若與臨床醫師充分溝通、配合治療、規律運動，一樣可以得到平穩的疼痛控制。本演講最後將舉出一些在精神科情境較常見的個案樣貌，說明精神科觀點的處理方向，期望能和聽眾有所交流。