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25th Annual Scientific Meeting of The Hong Kong Neurological Society

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List of Speakers

Name	Affiliation
Prof Daniela Berg	University of Tübingen, Germany
Prof Thomas Berger	Innsbruck Medical University, Austria
Dr Koon-ho Chan	The University of Hong Kong, Hong Kong SAR
Prof Eric Yuk-tat Chan	Queen Mary Hospital, Hong Kong SAR
Dr Eric Lok-yiu Chan	Tuen Mun Hospital, Hong Kong SAR
Ms Abby Chau	Queen Elizabeth Hospital, Hong Kong SAR
Prof Werner Hacke	University of Heidelberg, Germany
Prof Jian-ping Jia	Xuanwu Hospital, China
Dr Leonard Li	Tung Wah Hospital, Hong Kong SAR
Dr Colin Lui	Tseung Kwan O Hospital, Hong Kong SAR
Prof Christopher J Mathias	Imperial College London, United Kingdom
Prof Vincent Mok	Prince of Wales Hospital, Hong Kong SAR
Prof Norman KY So	Cleveland Clinic, United States
Dr Yannie Soo	Prince of Wales Hospital, Hong Kong SAR
Dr Mona Tse	Queen Mary Hospital, Hong Kong SAR
Prof Adrian Wong	Hong Kong Institute of Education, Hong Kong SAR
Prof Su-ming Zhang	Tongji Hospital, China

SCIENTIFIC PROGRAMME

Venue: Grand Ballroom, Lower Level 1, Kowloon Shangri-La Hotel

3 November 2012, Saturday

		Function Room
08:30 – 09:00	Registration	
09:00 – 10:00	**FREE PAPER PRESENTATION** *Chairpersons: Thomas Leung, Winnie Wong*	**POSTER PRESENTATION**
10:00 – 10:30	Coffee Break	
10:30 – 12:00	**DISSERTATION HIGHLIGHTS** *Chairpersons: Thomas Leung, Winnie Wong*	
12:00 – 13:20	**BAYER LUNCH SYMPOSIUM** *Chairpersons: Lawrence Wong, Tak-Hong Tsoi* **Novel Oral Anticoagulants (OAC) in Secondary Stroke Prevention in Atrial Fibrillation—from Trials to Clinical Practice** *Werner Hacke*	
13:20 – 13:35	**OPENING CEREMONY** Welcome Remarks: *Leonard SW Li,* President of the Hong Kong Neurological Society	
13:35 – 15:10	**SYMPOSIUM ON MOVEMENT DISORDERS** *Chairpersons: Nelson Cheung, Kin-Lun Tsang* **Early Diagnosis of Parkinson's Disease** *Daniela Berg* **Occupational Life Style Redesign (OLSR) Program for Patients with Parkinson's Disease** *Abby YC Chau* **Progression of Parkinson's disease** *Daniela Berg*	
15:10 – 15:25	Coffee Break	
15:25 – 17:00	**SYMPOSIUM ON STROKE** *Chairpersons: Thomas Leung, Bell Tse* **State of the Art of Thrombolytic Treatment for Acute Stroke** *Werner Hacke* **Current Situations and Strategies on the Management of Intracerebral Haemorrhage (ICH) in Mainland China** *Su-Ming Zhang* **A Hundred Serving the Million: Delivery of TPA through Telemedicine** *Yannie Soo*	

4 November 2012, Sunday

		Function Room
08:30 – 09:00	Registration	
09:00 – 10:35	**SYMPOSIUM ON DEMENTIA** *Chairpersons: Gardian Fong, Vincent Mok*	**POSTER PRESENTATION**
	Alzheimer's and Vascular Dementia: the Preclinical Stage *Vincent Mok*	
	Cognitive Assessment for Vascular Cognitive Impairment *Adrian Wong*	
	Dementia in Asia *Jian-Ping Jia*	
10:35 – 10:55	Coffee Break	
10:55 – 12:20	**ORIENT EUROPHARMA SYMPOSIUM ON EPILEPSY** *Chairpersons: Eric Chan, Jason Fong*	
	Epilepsy: How Big is the Burden? *Eric LY Chan*	
	How to Run a State-of-the-art Epilepsy Care Program: US Experience *Norman KY So*	
	Regional Epilepsy Surgery Service: Local Experience *Colin HT Lui*	
12:20 – 13:20	Lunch	
13:20 – 14:55	**BIOGEN IDEC SYMPOSIUM ON NEURO-IMMUNOLOGY** *Chairpersons: Richard Chang, Patrick Li*	
	Current Advances in Biomarkers in Multiple Sclerosis *Thomas Berger*	
	Treatment of Central Nervous System Inflammatory Demyelinating Disorders: Bedside to the Bench *KH Chan*	
	Laboratory Investigations in Patients with Multiple Sclerosis and Neuromyelitis Optica *Eric YT Chan*	
14:55 – 15:10	Coffee Break	
15:10 – 16:35	**SYMPOSIUM ON AUTONOMIC DISORDERS** *Chairpersons: David Chin, Leonard Li*	
	The Rapidly Changing Spectrum of Autonomic Disorders in the New Millennium *Christopher J Mathias*	
	Frequency and Significance of Elevated Troponin Level and Arrhythmia in Acute Stroke Patients *Mona Tse*	
	Skin Sympathetic Response: Clinical Application and Limitations *Leonard Li*	
16:35 – 17:00	Closing Remarks & Award Presentation	

Health-Related Quality of Life in Stroke Patients in a Local Tertiary Hospital

FP 1

YF Cheung[1], HK Lai[2], VWY Kwok[1], J Chan[1], P Li[1], AJ Hedley[2]
[1] Division of Neurology, Queen Elizabeth Hospital, Hong Kong SAR
[2] School of Public Health, Department of Community Medicine, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong SAR

Background: Stroke is a potentially chronic disabling illness. Health-related quality of life (HRQoL) is just as important as other traditional outcome measures like mortality or dependency. In mild stroke, the impact of illness can affect multiple health dimensions which may not be captured by traditional assessment tools like the Barthel Index. Quality-adjusted life year (QALY) is being used for cost-utility analysis and helps decisions on resource allocation. SF-36 is a popular generic HRQoL measure. Local data on changes in HRQoL after stroke are scarce.
Methods: Stroke patients admitted to the Queen Elizabeth Hospital were recruited from March to May 2012. They must be Chinese and speak Cantonese, 18 years of age or older, provide written informed consent, and verbally and cognitively competent in answering the SF-36 questionnaire. The Chinese (Hong Kong) SF-36 Version 1 was administered at baseline and 2 months after stroke. It measured eight domains of perceived health: Physical Functioning (PF), Role-Physical (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role-Emotional (RE), and Mental Health (MH).
Results: 162 patients were recruited with a mean age of 66.5 ± 14.5 years, 65% male, mean NIHSS 3.9 ± 3.5, mean mRS 2.5 ± 1.5, and mean BI 80.6 ± 19.4. Two patients withdrew from the study soon during the administration of SF-36 questionnaire. At 2 months, seven patients had died, five withdrew from the study and 25 were lost to follow-up, leaving 124 (76.5%) subjects responding to the SF-36 interview; of these, 24 were made through proxies. Comparisons between baseline and 2-month mean SF-36 scale scores are shown in the Table below. At 2 months, PF, RP, BP, GH, and MH domains showed significant improvement.

	PF	RP	BP	GH	VT	SF	RE	MH
Baseline	57.77	39.23	70.12	48.5	56.87	74.59	56.1	65.95
2 Months	70.84	54.27	84.65	53.9	59.8	77.95	55.28	69.87
Mean change	13.08	15.04	14.53	5.41	2.93	3.35	-0.81	3.92
P value	<0.001*	0.005*	<0.001*	0.003*	0.132	0.205	0.884	0.038*

* Statistically significant, P<0.05 (2-sided)

Conclusion: Significant improvement in five out of eight domains of the SF-36 has been observed 2 months after stroke. Further studies will be performed to identify sustainable or ongoing improvements in HRQoL among these stroke patients and the factors associated with these outcomes.

Analysing High-frequency Oscillations of Intracranial EEG: Wavelet or Fast-Fourier Transform?

FP 2

H Leung, P Kwan, A Chan, T Leung, KL Leung, Y Soo, TM Chan, XL Zhu, W Poon, V Mok, LKS Wong
Department of Medicine and Therapeutics, Prince of Wales Hospital, The Chinese University of Hong Kong, Hong Kong SAR

Background: Intracranial electroencephalography (IEEG) may be considered the gold standard for identifying epileptogenic zones. By visual analysis, this is exemplified by low-amplitude fast-activities (LAFA) that are characterised by rhythmic beta-activities at onset with increasing amplitudes and decreasing frequencies. IEEGs nonetheless suffer from limitations where ictal patterns other than LAFA are encountered, or with multifocal onsets. Recently high-frequency oscillations (HFOs) have been proposed to be specific for epileptogenic tissues. They may be divided into ripples (80-250 Hz) and fast ripples (250-500 Hz). We explored the utility of HFOs in patients implanted with depth-electrodes.
Methods: We explored the utility of Fast-Fourier-Transform (FFT) versus wavelet-analysis (WT) in identifying ictal-HFOs among 540 electrode analyses. Of these, 126 were focused on calibration: seven 9-channel, 3-minute intracranial seizure-epochs from a patient with bilateral mesial-temporal sclerosis (MTS) implanted with unilateral depth-electrode achieving Engel Class-Ia outcome were tested with FFT/WT-algorithms. The remaining 414 electrode-analyses were focused on determination of laterality: eight 9-channel intracranial seizure-epochs from a patient with bilateral-MTS using FFT+WT and seven 9-channel seizure-epochs from a patient with bilateral-MTS using WT alone.
Results: Calibration analysis confirmed the presence of HFOs in the amygdalo-hippocampal complex (AHC). FFT analysis (short-time, Hanning-window) showed spectral power only in the anterior depth-electrodes whereas WT (continuous-wavelet transform, biorthogonal-wavelet 6.8) offered a more dynamic range and a rapid fall-off but detectable HFOs further away from AHC (Figs 1-4). Laterality analysis confirmed the superiority of WT by giving a 4-to-6-fold higher peak power (2-sample *t*-test, P=0.01, CI= –2.06 ~ –0.34) [Figs 5, 6]. One episode of subclinical event with apparent right AHC-onset had HFOs in keeping with left AHC-onset. In the patient with bilateral independent onset by visual analysis, HFOs were found in the left AHC and right posterior temporal area (Fig 7) suggesting the location of epileptogenic focus outside bilateral AHCs.
Conclusions: Ictal HFOs were better depicted with WT than FFT in patients implanted with bilateral depth-electrodes. It may offer an alternative analytic approach in difficult cases in which non-LAFA onsets, subclinical events or propagated patterns were encountered.

(Continued)

FP 2

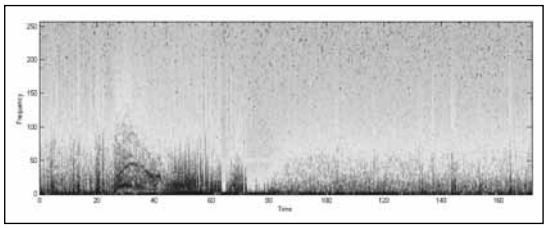

Fig 1. Spectrogram using short-time FFT at the first electrode point of a 9-channel depth electrode

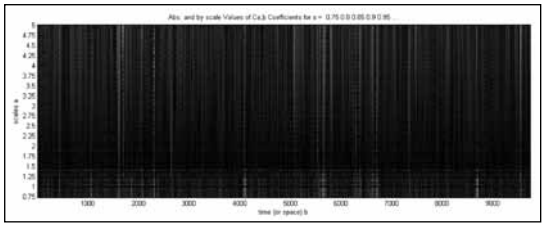

Fig 2. Continuous wavelet analysis using biorthogonal wavelet 6.8 at the first electrode point of a 9-channel depth electrode

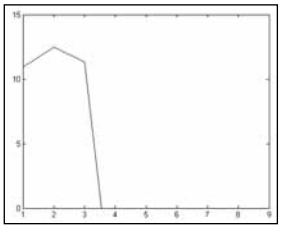

Fig 3. FFT analysis of HFOs in the ripple-range over a span of 9 channels (depth electrode)

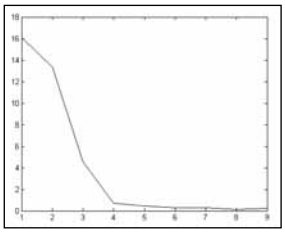

Fig 4. Continuous wavelet analysis of HFOs in the ripple-range over a span of 9 channels (depth electrode)

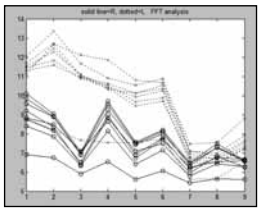

Fig 5. FFT analysis of ictal HFO in a patient with bilateral MTS and bilateral depth-electrode implantation

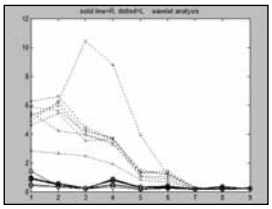

Fig 6. Wavelet analysis of ictal HFO in a patient with bilateral MTS and bilateral depth electrode implantation

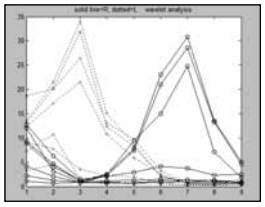

Fig 7. Wavelet analysis of HFO in patient with bilateral MTS and bilateral onset

FP 3

Prevalence of Atrial Fibrillation-related Cardioembolic Stroke Increased Significantly in Chinese Population in the Past Decade

Yannie Soo, Xiaoyun Huang, Xian-Yien Chen, Nathan Chan, Vincent HL Ip, Lisa Au, Florence Fan, Thomas Leung, Lawrence KS Wong
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Background: Atrial fibrillation–related cardioembolic stroke (AF-CE) is a major cause of cardioembolism, which may be potentially preventable with anti-coagulation. The objective of this study was to evaluate the changes in the prevalence of AF-CE over the past 10 years in the Chinese population.
Methods: We reviewed data collected prospectively from Prince of Wales Hospital Stroke Registry in 1999, 2004, and 2009. We compared the prevalence of vascular risk factors and stroke subtypes in these 3 years.
Results: A total of 2744 patients were admitted for ischaemic stroke or transient ischaemic attack in these 3 years, 946 patients in 1999, 887 in 2004, and 911 in 2009. There was no significant difference in the mean age of patients in these 3 years (71.2 ± 11.3 years, 70.7 ± 12.8 years, and 70.8 ± 12.5 years respectively, P=0.644). The proportion of AF-CE increased significantly: 9.7% in 1999, 11.7% in 2004, and 23.7% in 2009 (P<0.001). The proportion of AF-CE among patients below 65 years old increased significantly from 22.9% in 1999 to 29.3% in 2009 (P=0.002). Among patients with atrial fibrillation, the mean CHADS score prior to the index stroke was 2.7 ± 1.3 in 1999, 3.0 ± 1.3 in 2004, and 2.2 ± 1.3 in 2009. The percentage of patients who were on warfarin before admission was 23.0% in 1999, 23.8% in 2004, and 13.0% in 2009.
Conclusions: Over the past 10 years, the prevalence of AF-CE has increased significantly in the Chinese population, and the proportion of relatively young patients involved also increased significantly. Although most of the patients with atrial fibrillation had CHADS score of ≥2, only a minority of them were on warfarin before admission. Raising the awareness of this potentially preventable stroke subtype is warranted in Chinese population.

FP 4

Acceptance and Commitment Therapy for Drug-resistant Epilepsy: a Randomised Control Trial in Hong Kong

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[3] Department of Clinical Psychology, New Territories East Cluster, Hospital Authority, Hong Kong SAR

Background: Patients with drug-resistant epilepsy are at higher risk of psychological co-morbidity and impaired quality of life compared with their drug-responsive counterparts and matched healthy population. Inter-relationship between seizure manifestations and psychological conditions was prominent. Evidences on the effects of psychological intervention for epilepsy patients became more substantial with research efforts and its impacts were being increasingly recognised in primary health care.
Methods: The present study used a single-blinded prospective randomised controlled trial to evaluate the efficacy of an acceptance and commitment therapy (ACT) versus a social support group (SS) on quality of life, psychological states, and seizure outcomes. Patients with drug-resistant epilepsy were randomised into either the ACT (n=27) or SS (n=25) intervention group. Both groups consisted of a psycho-educational package of epilepsy, while ACT was specifically designed to address psychological reactions in face of seizure experiences. Therapeutic outcomes were measured by examining changes in quality of life (QOLIE-31-P), psychological condition (Beck Depression Inventory II, Beck Anxiety Inventory), seizure severity and self-record seizure frequency. Patients were assessed at two time-points, prospectively from baseline and 2 months after intervention.
Results: Repeated measure ANOVA indicated that both ACT and SS groups significantly reduced seizure frequency ($F=22.9$, $P<0.001$), seizure severity ($F=8.23$, $P=0.006$), depressive symptoms ($F=5.47$, $P=0.024$), anxiety symptoms ($F=22.46$, $P<0.001$), and improved total quality of life ($F=41.24$, $P<0.001$). There were significant interactions between these interventions on reduction of seizure frequency ($P=0.012$), seizure severity ($P=0.037$), and improvement of total quality of life ($P=0.002$). ACT group showed more improvement than the SS group.
Conclusion: Results of the present study suggested that adjunctive psychological intervention was beneficial to patients with drug-resistant epilepsy. ACT showed significantly more improvement on seizure outcomes and quality of life.

FP 5

Prognosis of Patients with Central Nervous System Demyelinating Diseases in Hong Kong

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Background: Central nervous system (CNS) demyelinating diseases, which include multiple sclerosis (MS), neuromyelitis optica (NMO), and the prodromal clinical isolated syndrome (CIS), may lead to severe disability. However, there is little local data on their prognosis.
Methods: Up to July 2012, all patients who have been seen at least once in Pamela Youde Nethersole Eastern Hospital (PYNEH) for CNS demyelinating diseases, a Hong Kong tertiary hospital, were identified and the de-novo cases were retrospectively analysed in an observational study.
Results: A total of 118 patients with CNS demyelinating diseases have been seen at least once in PYNEH, of which 95 had the diagnosis made at PYNEH. Among the 95 patients, 41 were MS (43.2%), 12 were NMO (12.6%), 41 remained as CIS (43.2%), and 1 was recurrent optic neuritis (1%) at the time of analysis. A total of 86 CIS cases have been diagnosed at PYNEH, of which 38 (44.2%) progressed into MS, 7 (8.1%) progressed into NMO, and 41 (47.7%) remained as CIS after a mean duration of 6.38 years from symptom onset. Of the MS group, 10 (24.2%) died or progressed into EDSS ≥6.0, while 31 (75.6%) remained independent with EDSS <6.0 after a mean disease duration of 6.63 years. For NMO patients, 6 (50%) progressed into EDSS ≥6.0 or died. Three patients with NMO were initially treated as MS (25%). In the 41 patients who remained as CIS, 6 (14.6%) died and 5 of the 35 who survived (14.3%) were still dependent with EDSS >6.0 after a mean duration of 6.37 years.
Conclusion: The outcome of CNS demyelinating diseases in Hong Kong seemed worse than that of Caucasian groups.

DH 1

Outcomes of Mild or Improving Acute Ischaemic Stroke With or Without Intravenous Thrombolysis

Andrew LT Chan
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Background: Mild or improving acute ischaemic stroke (MIAIS) patients who present to an emergency department within 3 hours are commonly excluded from the use of intravenous (IV) tissue plasminogen activator (TPA). They present a therapeutic dilemma as variable outcomes are noted in previous studies. Yet, a significant proportion of these patients either remains dependent at hospital discharge or dies during hospital admission. Despite TPA service has been established for a few years in Hong Kong, little is known about the outcomes of MIAIS patients in Hong Kong. As the underlying stroke pathogenesis of local patients may be different from the Caucasian cohort, local data may serve as a reference for decision-making process. This study aimed to analyse the outcomes of MIAIS patients who presented within 3 hours of symptom onset.
Methods: A retrospective descriptive study using the TPA activation registry of the Emergency Department of a regional hospital during the period from December 2008 to November 2010 was performed.
Results: There were altogether 209 patients in the registry. Of 135 acute ischaemic stroke patients, 55 (40.7%) received IV TPA. Eighty patients were ineligible and half of them were patients with MIAIS. Data of 44 patients with NIHSS score ≤5 were analysed. About one-quarter of the 37 non-TPA patients had unfavourable outcome (modified Rankin Scale ≥2) at 3 months and 16% of them could not be discharged home directly. One out of the seven TPA-treated patients was complicated by symptomatic intracranial haemorrhage according to the ECASS-3 definition.
Conclusions: The use of IV TPA in patients with MIAIS is unsupported based on the current study and literature review. However, as a significant proportion of these patients ended up with unfavourable outcomes, more studies are needed to stratify their risks and to substantiate the use of IV TPA in order to further reduce the stroke-related disability in Hong Kong.

DH 2

Prediction of Clinical Outcomes in Spontaneous Intracranial Haemorrhage of Basal Ganglia by Diffusion Tensor Imaging

Phillip YC Chan
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Background: Basal ganglia is one of the commonest sites of spontaneous intracranial haemorrhage. However, the degree of motor recovery of these patients varies considerably, from ongoing paralysis to rapid improvement to normal motor power within days. The possible explanation for this observation is the degree of motor fibres tract damage on the capsular motor fibres secondary to the haematoma. For those who have complete disruption of motor fibre tract, they will carry a worse prognosis. On the other hand, if the motor tract is just displaced by the haematoma, patients will usually enjoy a satisfactory recovery.
Methods: Diffusion tensor imaging (DTI), an emerging technique in magnetic resonance imaging, has shown its capacity to demonstrate the integrity of various fibre tracts including corticospinal tract. Recent studies have reported its ability to predict the motor outcome in stroke patients in the very early stage by using the fractional anisotropy (FA) ratio (rFA = FA affected side/unaffected side). We performed DTI in nine patients with basal ganglia haemorrhage admitted to Queen Elizabeth Hospital within 72 hours after the onset. We measured the rFA values at basal ganglia, cerebral peduncle and pontine levels and assessed their correlation with subsequent motor and functional outcomes.
Results: We demonstrated a significant correlation between baseline rFA at the basal ganglia level and paresis grading at 3 months. However, we were unable to show any statistically significant correlation between rFA and motor outcomes at the other two levels. It was likely related to small sample size of patients. We also demonstrated that patients who had rFA >0.8 would enjoy good motor and functional outcomes, which was in line with the findings of other literatures.
Conclusion: DTI is valuable in predicting good motor outcome. However, from a pragmatic point of view, a prognostic tool with high negative predictive value will be even more valuable as it can help stratify patients into different target groups with different goals of rehabilitation. Further studies are required to assess the superiority of negative prediction on motor and functional outcomes over other measures like clinical assessment and electrophysiological studies.

DH 3

Is It Justified to Perform Intra-operative Neurophysiological Monitoring of Carotid Endarterectomies? Review of QEH Experience and Current Literature

Joyce WT Lo
Department of Medicine, Queen Elizabeth Hospital, Hong Kong SAR

Background: Carotid endarterectomy reduces the risk of recurrent stroke in symptomatic and asymptomatic patients with haemodynamically significant carotid stenosis when compared to medical treatment, but the benefit is dependent on a low perioperative stroke and mortality rate. The use of intra-operative monitoring aims to decrease the incidence of perioperative stroke by detecting hypoperfusion during operation, and guide decision on the need for shunt placement to reduce the risk of cerebral ischaemia. But it is also resource demanding.
Methods: Methods of intra-operative monitoring include the use of transcranial Doppler (TCD) to monitor middle cerebral artery blood flow velocities, electroencephalography (EEG), stump pressure measurement, somatosensory-evoked potentials, and clinically monitoring for changes in mental status if the operation is performed under local anaesthesia.
Results: This is a review of our experience with intra-operative monitoring in the 52 carotid endarterectomies performed in our hospital since the start of the service from the year 1997 to June 2011—37 with both EEG and TCD monitoring, and 15 with EEG monitoring only. The decision for shunt insertion is guided by both the EEG and TCD monitoring results. The peri-operative outcome of these patients will be presented. Three (5.8%) patients had significant intra-operative EEG/TCD changes which resulted in change of the practice of the surgeons, with no peri-operative stroke developed. Two patients suffered from immediate postoperative stroke which were not massive perfusion-related stroke ipsilateral to the clamped internal carotid artery. This review will also include a discussion on the current opinion on the utility and drawbacks of different monitoring methods, and other options to decrease the risk of peri-operative stroke.
Conclusion: It is justified for intra-operative monitoring to be done in our hospital to decrease the risk of stroke for carotid endarterectomies performed under general anaesthesia, since it is shown to be useful to prevent peri-operative stroke due to haemodynamic insufficiency from clamping of the carotid artery during surgery.

DH 4

Amyloid Burden in Poststroke Dementia — a Pittsburgh Compound B (PiB) PET Imaging Study

Lisa Au, Jie Yang, Adrian Wong, Pauline Kwan, Joan Khoo, Christine Lau, Joy Ip, Eric Leung, Lawrence KS Wong, Vincent Mok
Division of Neurology, Department of Medicine and Therapeutics, Prince of Wales Hospital, Hong Kong SAR

Background: The aetiology of post-stroke dementia (PSD) might be the result of vascular lesions, Alzheimer pathology, or combinations of these. The distinction between vascular dementia and Alzheimer's disease (AD) in PSD are difficult due to overlaps in symptomatology. The frequency of amyloid burden in PSD is unknown. We aimed to determine the frequency of amyloid pathology using Pittsburgh Compound B positron emission tomography (PiB PET) imaging; and to examine any differences in the clinical, radiological, and cognitive profiles between subjects with and without amyloid pathology.
Methods: We performed neuropsychological assessments for consecutive patients who were admitted to acute stroke unit with stroke or transient ischaemic attack (TIA) over a 24-month period at 3 to 6 months after discharge. Patients were invited to participate in this study if a diagnosis of dementia was made according to Diagnostic and Statistical Manual 4th edition. We performed clinical, radiological, and neuropsychological assessments. PiB PET imaging was arranged after informed consent. PiB-positivity was defined as having AD-like PiB binding.
Results: Of the 47 recruited subjects, 12 (25%) demonstrated AD-like PiB retention. When comparing the PiB-positive and PiB-negative group, there were no significant differences in terms of clinical characteristics, radiological findings, and cognitive profiles. PiB-positivity was identified in patients with different mechanisms of stroke, including large artery (25%), small vessel (50%), cardioembolic (8.3%) or haemorrhagic stroke (16.7%), as well as TIA (41.7%).
Conclusion: Around one in four patients with PSD harbours amyloid pathology. It is feasible to use PiB PET imaging to differentiate the underlying aetiology of PSD with greater accuracy.

DH 5

Predictors and Causes of Hospital Readmissions after Acute Ischaemic Stroke: a Local Cohort Study

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Background: Patients who are admitted for acute ischaemic stroke often have residual neurological deficits and other comorbidities, which may lead to an increased risk of hospital readmission. This study looked for the predictors and the causes of hospital readmission within the first year of discharge for index ischaemic stroke.

Methods: A total of 1797 patients were admitted to Tuen Mun Hospital from 1 January 2009 to 31 December 2009 for acute ischaemic stroke. Four hundred of these patients were sampled by simple randomisation for retrospective cohort analysis. Their hospital records were studied in detail. The time to their next hospitalisations within the first year after hospital discharge was determined. These patients were then dichotomised into those with hospital readmission and those without. Their clinical data were collected and analysed for the predictors and the causes of next hospital readmission.

Results: A total of 400 patients were studied in detail, but after exclusion, 334 patients were recruited for this study. Of these patients, 168 (50.3%) were found to have hospital readmission in the first year of discharge for index acute ischaemic stroke. The predictors of hospital readmission included old age of >72 years (odds ratio [OR]=1.7; 95% confidence interval [CI], 1.037-2.733; P=0.001), cardioembolic stroke (OR=5.0; 95% CI, 1.558-16.082; P=0.007), diabetes mellitus (OR=2.1; 95% CI, 1.169-3.817; P=0.035), complications occurring during index admission (OR=1.9; 95% CI, 1.218-3.117; P=0.013), and NIHSS >5 (OR=2.7; 95% CI, 1.654-4.321; P<0.001). Among these patients, 50 (14.9%) were readmitted early within the first month, and 118 (35.5%) were admitted late. Predictors of early readmission included those who were not discharged home, but to an institution (OR=3.0; 95% CI, 1.255-7.34; P=0.013), NIHSS >5 (OR=3.4; 95% CI, 1.599-7.322; P=0.001), and diabetes mellitus (OR=2.2; 95% CI, 1.113-4.545; P=0.023). Predictors of late readmission include those with ischaemic heart disease (OR=2.0; 95% CI, 1.002-4.038; P=0.048), cardioembolic stroke (OR=6.4; 95% CI, 1.969-20.943; P=0.001), any complications that arose during index admission (OR=2.1; 95% CI, 1.135-4.056; P=0.018), age >72 years (OR=1.9; 95% CI, 1.15-3.26; P=0.013), and NIHSS >5 (OR=2.2; 95% CI, 1.328-3.807; P=0.002). The commonest causes of hospital readmission were infection and recurrent stroke.

Conclusion: Patients who were admitted to hospital for acute ischaemic stroke are at increased risk of readmission after the index event. There were different risk factor profiles of early hospital readmission (within the first month) and late hospital readmission (2 months to 1 year). These findings may help us to identify high-risk patients so that we may enhance their post-discharge care plan in order to improve their physical conditions and prevent re-hospitalisation.

DH 6

Angiographic Distinctions and Collateralisation in Symptomatic Craniocervical Occlusive Radiation Vasculopathy: a Case-referent Study

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Background: Occlusive radiation vasculopathy (ORV) predisposes survivors of head-and-neck cancers to refractory ischaemic strokes. Understanding the angiographic attributes and collateral circulations of ORV may help to elucidate the stroke mechanism.
Methods: From September 2005 to February 2012, we recruited 92 patients who developed first-ever ischaemic stroke attributed to ORV for digital subtraction angiogram (DSA). Another 112 patients who had symptomatic carotid stenosis (>70%) without prior radiotherapy were enrolled within the same period as referent subjects. DSA was performed within 2 months from the stroke onset and delineated carotid and vertebro-basilar circulations from aortic arch up to intracranial branches. A stroke neurologist and a neuro-radiologist blinded to group assignment categorised all vascular lesions, graded the collateral status, and recorded the anatomic variants that might forbid or mimic collateral development.
Results: ORV patients were younger and had significantly less atherosclerotic risks in terms of hypertension, diabetes mellitus, and hyperlipidaemia. The mean interval between radiotherapy and stroke was 15 years (interquartile range, 9.8 years). In contrast to referent subjects who mostly had focal high-grade (>70%) steno-occlusion at proximal internal carotid artery (123/143, 86%), stenoses in ORV patients tended to diffusely involve common carotid artery (70/176, 40%) and internal carotid artery (63/176, 36%), and were more frequently bilateral (53% vs 23%), tandem (23% vs 10%) and with concurrent vertebral artery steno-occlusions (27% vs 14%) [all $P<0.05$]. ORV patients also showed more dissecting and ulcerative lesions. With comparable rates of vascular anomaly, ORV patients had more established collateral circulations through leptomeningeal arteries and retrograde flow of ophthalmic artery.
Conclusion: Compared with spontaneous atheromatous carotid disease, ORV patients had more steno-occlusions over carotid and vertebral arteries amid mature collateral circulations at stroke onset. Decompensation of collateral flows may precipitate stroke in ORV.

DH 7

Seroprevalence of Aquaporin-4 Antibody in Optic Neuritis Patients and Its Clinical Correlation

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Background: Epidemiologic studies have suggested different prevalence of aquaporin-4 antibody in optic neuritis patients in different ethnic groups. However, data on the prevalence of aquaporin-4 antibody in Hong Kong are scarce. The clinical significance of aquaporin-4 antibody in optic neuritis patients is also unknown. This study aimed to obtain the prevalence of aquaporin-4 antibody in patients with optic neuritis in Hong Kong Chinese and to evaluate the clinical significance of aquaporin-4 antibody in optic neuritis patients.

Methods: This is a single-centre prospective cohort study. We prospectively recruited and followed up a total of 22 optic neuritis patients from November 2010 to December 2011 in the Kowloon West Cluster of Hong Kong Special Administrative Region (HKSAR), China. The detection of aquaporin-4 antibodies was by indirect immunofluorescence method using monkey cerebellar transfected HEK293 cells which express human aquaporin-4 on their cell membranes. The relation between the clinical diagnosis and the aquaporin-4 antibody serologic status was analysed.

Results: Among the 22 optic neuritis patients which constituted 27 episodes of acute neuritis, four (18.2%) were tested to be aquaporin-4 antibody positive. Three out of the 22 optic neuritis patients fully met the 2006 Wingerchuk criteria and were diagnosed to have neuromyelitis optica (13.6%), in which two of them were tested positive for aquaporin-4 antibody. Among the four seropositive patients, 75% of them developed recurrent optic neuritis ($P<0.02$). All four seropositive patients developed thinning of retinal nerve fibre layer thickness (55.4±15.85) compared to the seronegative group (89±7.5). All of the seropositive patients developed severe visual impairment (20/200) [$P=0.002$], with visual acuity of 0.36±0.3, in contrast to 0.59±0.14 in the seronegative group at 3-month follow-up ($P=0.446$). Five out of the 22 patients had recurrent optic neuritis, in which three of them were tested positive for aquaporin-4 antibody. Bilateral eye involvement was found in three (75%) out of the four seropositive patients and in two (11.1%) out of the 18 seronegative patients respectively ($P=0.023$). Diagnosis of multiple sclerosis was made in 13.6% of all optic neuritis patients. Among the seropositive patients, 25% of the seropositive group had the presence of cerebrospinal fluid pleocytosis ($P=0.4$), while none of them showed oligoclonal band ($P=0.66$).

Conclusion: The prevalence of aquaporin-4 antibody in Hong Kong Chinese optic neuritis patients is halfway in between the data from Caucasian and Asian population. The seropositivity of the test was associated with bilateral optic nerve involvement, higher chance of recurrent optic neuritis, and more severe reduction of optic nerve fibre layer thickness.

Novel Oral Anticoagulants (OAC) in Secondary Stroke Prevention in Atrial Fibrillation—from Trials to Clinical Practice

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Ischaemic stroke is the main complication of non-rheumatic atrial fibrillation. For decades, an effective secondary prevention was available, oral vitamin-K antagonists (VKA), which leads to an almost 70% reduction in stroke events.

However, use of VKA oral anticoagulants was limited. As a rule of thumb in most developed regions of the world only about half of the patients who should be on VKA's for stroke prevention actually receive anticoagulation, and of them only one half is in a therapeutic range of the international normalised ratio (INR).

There is a major problem with underuse and underperformance in oral anticoagulation. This may be in part caused by several downsides of VKA's. Among them are fear of haemorrhage, the difficulty of regular INR monitoring, extensive food and drug interaction, and the relatively long half live, just to name a few.

Several novel oral anticoagulants have been developed over the last decade. They belong to two classes, direct thrombin inhibitors and factor xa inhibitors. One direct thrombin inhibitor Dabigatran, and two factor xa inhibitors, Rivaroxaban and Apixaban have been studied in large clinical outcome studies that have already been published. Two of the substances are already approved in some parts of the world.

In my presentation I will give an overview of the three pivotal trials and the results for their main safety and efficacy endpoints. I will underline, that all three trials have generated a similar pattern of results, although the patient cohorts were substantially different. I also will highlight the fact that, in addition to prevention of ischaemic events the most impressive advantage of the new anticoagulants is the significantly lower rate of intracranial bleeding complications.

My conclusion will be, that with the new oral anticoagulants, we have alternatives that are at least as effective as VKA's, safer when it comes to intracranial bleeds, and easier to use.

Early Diagnosis of Parkinson's Disease

S 2

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To date a clinical diagnosis of Parkinson's disease (PD) requires the presence of at least two of the cardinal motor features of bradykinesia, resting tremor and rigidity. However, a growing body of evidence from epidemiological, clinical, genetic and pathological studies now suggests that PD-specific pathology and neuronal dysfunction likely start well before the earliest clinical diagnosis of definitive motor parkinsonism can be confidently established. Thus, at the time of diagnosis about 60% of the dopaminergic neurons of the substantia nigra have already degenerated. Increasing recognition that PD may start outside of the substantia nigra affecting the nervous system in an ascending way in many cases has led to a rapidly expanding effort to define PD before motor signs permit classical diagnosis. Many of these efforts are engaged with the identification of clinical non-motor symptoms and signs of disease. There is now clear evidence that olfaction, REM sleep behaviour disorder, constipation and depression are all associated with an increased risk for PD. In addition, there is suggestive evidence that visual changes, other autonomic symptoms, and subtle cognitive changes may also antecede the disease and thus add to the premotor markers. Critical issues in using these markers, however, are sensitivity, specificity, and positive and negative predictive values. Although these have yet to be fully defined, olfactory deficits, some visual changes, and autonomic symptoms occur in the majority of PD patients at diagnosis, suggesting good potential sensitivity. However, with the exception of REM sleep behaviour disorder and perhaps some specific autonomic measures, specificity and positive predictive value of these markers are insufficient to be used alone as identifiers of pre-motor disease. Thus, assessment batteries, combining several markers may be of interest and are currently investigated. Importantly, there is increasing evidence that changes in the motor system may also add to the identification of individuals in the early stages of neurodegeneration. Relatively subtle deterioration of the motor system typically occurs well before the patient fulfils established criteria for clinical diagnosis of PD. Powerful compensatory mechanisms may mask these clinical symptoms and make them difficult to identify and evaluate. However, using unobstrusive, objective and quantifying assessment devices, identification of early motor symptoms may be feasible. These methods are currently under investigation. To better understand the validity of markers, large cohort studies are currently performed. All these markers have been derived from and are currently investigated with regard to their validity in large cohort studies. Examples for population-based cohorts designed to identify potential biomarkers for PD are the Honolulu-Asia Aging Study (HAAS) and the PRIPS (Prospective Validation of Risk factors for the development of Parkinson Syndromes) study. To evaluate specificity and predictive value of markers enriched risk cohorts have been designed like the PARS (Parkinson Associated Risk Study) and the TREND (Tübinger evaluation of Risk factors for the Early detection of NeuroDegeneration) study. Although there is still a long way to go, studies designed according to these concepts might eventually provide sufficient data to form the basis for future screening programs for PD risk to be applied at a population level.

Occupational Life Style Redesign (OLSR) Program for Patients with Parkinson's Disease

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Parkinson's disease (PD) is a chronic, progressive neurodegenerative disease that leads to deterioration in quality of life because of its motor and non-motor symptoms. Because of the ameliorating medical and surgical intervention, symptoms of the disease are better managed. In spite of the physical disability, it is recognised that psychosocial factors rather than the disease severity itself also impact on patient's quality of life. Occupational Life Style Redesign (OLSR), an emotion-focused, acceptance-based, lifestyle approach program was introduced to promote both mental health and physical functions for patients with PD.

OLSR is a clinical program developed locally by the Occupational Therapy Service in the Kowloon Central Cluster since late 2006. It is tailor-made to enhance physical and mental health of patients with chronic illness and disabilities who are under the influences of residual symptoms and functional limitations. OLSR is a form of occupational therapy program that works within the realm of positive psychology and occupational therapy, and is guided by the concepts of developing personal strength, fostering personal growth, and pursuing authentic happiness, irrespective to symptoms and functional limitations.

The program consists of an intensive 3-month core program that comprises weekly group coaching sessions and several individual coaching sessions. Two follow-up sessions are conducted at 3 months after completion of the core program.

The key therapeutic component of the OLSR program is the weekly action plan that focused on the pursuit of happiness and meaning-inducing activities. The PD patients are encouraged to explore, implement, and feedback on the flow or meaning-inducing activities which is compatible with their physical and mental capabilities, personal resources, and environmental constraints. The PD patients are guided to apply techniques including task analysis, problem solving, adaptive strategies and activity scheduling for overcoming potential barriers of activities and to ensure successful complementation of the weekly action plan. They are taught to focus on the positive emotions generated by successful implementation of the action plan. The positive feelings generated can act as the driving force of further activity engagement. The overall quality of life can thus be improved through gradual improvement in participating different life domains (family, work, social and leisure domains) of the patients.

The OLSR program was conducted for PD patients recruited from the neurology and deep brain stimulation clinics of Queen Elizabeth Hospital. Life Satisfaction Scale (LSS), General Happiness Scale (GHS), WHO-5 Wellbeing scale and Life Functioning Assessment Instrument (L-FAI) were used as the main outcome measures. Improvements were shown on the level of life satisfaction, happiness, life functioning and patients' quality of life after completion of the program. The OLSR program showed positive impacts on the psychosocial aspect and quality of life of the PD patients.

Progression of Parkinson's Disease

S 4

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Disease-modifying therapies are a major issue for Parkinson's disease (PD), a still relentlessly progressive neurodegenerative disorder. Thus, meaningful disease progression markers are required and valid assessments need to be established and agreed on. Research in the last years has primarily focused on the progression of motor symptoms providing evidence that bradykinesia and rigidity deteriorate faster at the beginning of the disease, which is paralleled by a decline in functional presynaptic dopaminergic imaging. In contrast other symptoms related to the motor systems like speech and gait difficulties may progress rather linearly. Importantly, however, it is increasingly recognised that non-motor symptoms are not only a major impact on the quality of life in PD, but may also serve as progression markers for a better understanding of the course and spreading of the disease. Therefore recognition of their onset as well as progression is crucial. There is increasing evidence that besides neuropsychiatric and sleep abnormalities, olfaction, constipation and other autonomic symptoms as well as visual changes may even antecede the onset of motor symptoms. However, prevalence of these symptoms at the early disease stages differs by large and rate of progression is not comparable. While for example hyposmia and disturbances of visuospatial and colour discrimination may affect all PD stages and have no/very limited or a rather linear decline, reduced heart rate variability, orthostatic dysfunction, urinary symptoms, cognitive decline and visual hallucinations are rarely prevalent in the early course of PD but show a relevant increase of occurrence and severity in the later course. Others like depression have been shown to occur with higher incidence already in the early and even premotor stages but incidence and severity of symptoms may not relevantly change during the disease course. For some symptoms like REM Sleep Behaviour Disorder, differences in prevalence and severity during the disease course need to be considered. While the prevalence of this sleep disturbance increases in the course of the disease, severity decreases, making the initially disturbing symptoms often irrelevant to patients and their caregivers. To date, structural imaging and biomarkers assessed in body fluids do not add relevant information to our knowledge of PD progression. Thus it is rather the heterogeneity of symptoms occurrence and progression that underscores the view of PD as a multisystem disorder, affecting different systems at different times and to different degrees. Standardised quantitative assessment of motor and non-motor symptoms is currently performed in ongoing studies to better understand the underlying pathophysiology and develop therapeutic strategies.

State of the Art of Thrombolytic Treatment for Acute Stroke

S 5

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Intravenous (i.v.) rt-PA in a time window up to 4 ½ hours is an evidenced-based treatment for acute ischaemic stroke. The dosage approved worldwide a 0.9 mg/kg body weight. The selection of patients is performed with plain CT ruling out intracranial bleeding and major early infarct signs. Unfortunately, i.v. thrombolysis does not work in every patient and there may be subgroups of patients that need a more aggressive treatment even in the first 4 ½ hours. This would require vascular imaging such as CTA and MRA. In addition, for patients arriving after 4 ½ hours, standard i.v. rt-PA treatment is not adequate. There may still be patients after 4 ½ hours that have tissue at risk that can be saved with recanalisation, but this needs additional imaging such as diffusion perfusion mismatch or CT perfusion and CTA. However, neither for the treatment of patients after 4 ½ hours nor for the treatment of patients with more aggressive transvascular methods does sufficient clinical evidence exist.

In my review I will describe the status of i.v. rt-PA and discuss the pro and cons of a reduced dosage of rt-PA for Asian patients, and I will review the current state of the art for both imaging-based expansion of the time window and interventional treatment of acute ischaemic stroke. Here I will mention a number of ongoing prospective randomised clinical studies that may bring us new evidence in the near future.

Current Situations and Strategies on the Management of Intracerebral Haemorrhage (ICH) in Mainland China

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1. **Background of ICH in Mainland China: existing problems and challenges**
   The proportion of ICH in stroke in Mainland China remains high (reaching as high as 50% in some areas) and is much higher than that in some western countries. The reason for this phenomenon is unclear. There is still room for improvement in the prevention and management of ICH. Minimally invasive techniques (MIT) are widely used nowadays, but this technique should be further optimised.
2. **Pre-emergency and emergency treatment**
   Rapid diagnosis and assessment are critical. The importance of pre-hospital intervention and fast-track service should be emphasised.
3. **ICH caused by antithrombotic therapy**
   Treatment strategies about ICH caused by anticoagulants and antiplatelet agents, and significance of new anticoagulant agents would be discussed further.
4. **Existing problems and technical optimisation about MIT treating ICH**
   In the presentation, the following will be highlighted: significances and difficulties of haematoma clearing; challenges with dynamic monitoring of the haematoma; prospect of intracranial pressure (ICP) monitoring; problems about MIT and the feasibility of technical optimisation; exploration about its pathophysiology and biological markers.
5. **Primary and secondary prevention of ICH**
   Primary and secondary prevention of ICH is of utmost importance and should be improved. The core issue is to prevent the modifiable risk factors. Comparing with ischaemic stroke, researches on the risk factors of ICH have been lagging behind. Thus strategies targeting on its primary and secondary prevention should be enhanced.
6. **Others**

中國內地腦出血防控存在的問題與策略

張蘇明
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1. **中國內地腦出血的背景情況：存在的問題與挑戰**
   在我國，腦出血佔腦卒中的比率遠高於歐美國家，某些地區高達50%，防控陷困境。其中原因不明，防控策略待完善。大量使用微創技術，但該技術有待完善與優化。
2. **急診前與急診問題**
   快速診斷和及時評估是關鍵，院前干預和綠色通道的重要性。
3. **抗栓治療引起的腦出血**
   抗凝治療和抗血小板治療引起的腦出血的治療策略，展望使用新型抗凝劑的作用與意義。
4. **微創治療腦出血存在的問題與技術優化改良**
   血腫清除處理的意義與困難，血腫動態監測的挑戰。顱內壓的監測實施的展望。闡述微創治療腦出血存在的問題與技術優化改良的可行性。其他病理生理與生物標誌物的研究與探索。
5. **關鍵是完善一級預防與二級預防措施**
   對各種證據充分的可干預危險因素進行干預是一級預防的核心問題，但相對於缺血性卒中，出血性卒中危險因素的研究相對滯後。完善一級預防與二級預防措施。
6. **其他**

A Hundred Serving the Million: Delivery of TPA through Telemedicine

S 7

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Intravenous thrombolysis is the most effective treatment for acute ischaemic stroke which significantly improves functional outcome at 3 months. Although the therapeutic time window for intravenous thrombolysis has been extended from 3 to 4.5 hours, the triage procedure is labour-intensive that the treatment option may not always be available at hospitals that are underserved with neurologists.

The application of telemedicine in the treatment of acute stroke (ie TeleStroke) has been proposed few years after the NINDS study in 1999. Evidence has shown that patients treated by TeleStroke in the spokes hospital have comparable outcome to patients treated at the hub hospitals.

With 100 neurologists serving over 7 million populations in Hong Kong. TeleStroke, which is technically intensive rather than labour-intensive, may help extend the treatment option of thrombolysis to many community hospitals. The COMPASS Study is underway to evaluate the clinical application of TeleStroke in Hong Kong.

Alzheimer's and Vascular Dementia: the Preclinical Stage

S 8

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Dementia burden is expected to escalate with an ageing society. In China, the proportionate increase in dementia prevalence in the next 30 years was estimated to be 300%. Devising effective measure to prevent dementia is thus an imminent task for the medical community. Since primary prevention offers the greatest opportunity to reduce the dementia burden, substantial research effort over the last decade has been devoted in the study of the preclinical stage of Alzheimer's and vascular dementia using various biomarkers (eg magnetic resonance imaging, positron emission tomography, cerebrospinal fluid parameters, transcranial Doppler ultrasound). The ultimate hope of this paradigm shift is to prevent onset of disability before the disease gains momentum. This lecture will update the latest knowledge regarding defining and detecting the preclinical stages of Alzheimer's and vascular dementia.

Cognitive Assessment for Vascular Cognitive Impairment

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Vascular cognitive impairment (VCI) refers to any cognitive dysfunction due to vascular changes in the brain.[1] Compared to the old term 'multi-infarct dementia', VCI in an umbrella term that encompasses the full cognitive spectrum ranging from mild cognitive symptoms in 'brain-at-risk' patients to full-blown dementia from recurrent strokes. In contrast to Alzheimer's disease (AD), which has a uniform and predictable disease progression, the clinical and neuropsychological features of VCI are much more heterogeneous, which depends on the nature, location, and size of the vascular lesions. Recent research showed that the cognitive profile of VCI is characterised by a predominance of executive dysfunction (eg difficulties in planning, organisation and flexible thinking) and slowed information processing speed. This profile is in contrast to that observed in AD in which episodic memory and other cortical impairment (eg aphasia and apraxia) dominates the clinical picture.[2,3] Logically, traditional cognitive assessment such as the Mini-mental State Examination (MMSE) or the Alzheimer's Disease Assessment Scale Cognitive Subscale (ADAS-Cog), which are developed to measure cognitive features of AD, are not suitable for VCI assessment, especially when it is mild.[4] A good VCI assessment battery needs to be developed using a ground-up approach by empirical validation, and such battery must be clinically feasible in the target population. When applied to the local context, tests selected for VCI assessment must have relatively low demand on literacy and assessment time as well.

In recent years, significant progress has been made in the development of VCI assessment instruments worldwide and locally. For example, we previously validated the Hong Kong Montreal Cognitive Assessment (HK-MoCA) in VCI patients.[6] The HK-MoCA is currently used as a standard cognitive test in our STRIVE-Cog study, which is a longitudinal study on cognitive decline in stroke in more than 1000 consecutive patients admitted to our stroke unit.[7] In an important milestone in 2005, the National Institute of Neurological Disease and Stroke (NINDS) and the Canadian Stroke Network (CSN) sponsored a harmonisation workshop on VCI, with goals to unify the conceptualisation of VCI disease construct and its study methods globally.[8] Its neuropsychology working group has recommended a set of three neuropsychology protocols to fulfil different purposes of VCI assessment. The 60-minute protocol comprehensively assesses four cognitive domains, namely executive/activation, visuospatial functions, language/lexical retrieval and memory/learning, allowing a breakdown of cognitive domains for detailed cognitive profiling. The 30-minute protocol contains a subset of the tests in the 60-minute protocol for screening of domain dysfunction. The 5-minute protocol is a quick screening tool for VCI that are best suited for busy clinics and large epidemiological studies with potential for administration over telephone. Our group had adapted and validated the Chinese version of the NINDS-CSN VCI protocols in 100 non-stroke controls and stroke patients. Encouraging results showed that all three protocols are reliable and valid in VCI detection and predictive of functional levels in stroke patients (submitted). Further analyses are underway to examine the relationship between protocol performance with structural and functional neuroimaging measures.

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Dementia in Asia

S 10

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Objective: A huge burden created by dementia is challenging Asia due to its high population base and rapid ageing speed. We attempt to provide a review of dementia in Asia mainly from epidemiological perspective.
Methods: We search the PubMed database by using combinations of search terms, including "dementia", "mild cognitive impairment", and "epidemiology" for Asian countries defined as the countries of the WHO Western Pacific region and WHO Southeast Asian region.
Results: Investigation results from Asian countries yield large variations. It seems that the prevalence of dementia in Japan and Korea is higher than in China, whereas other less developed Asian countries have relatively lower prevalence. Additionally, Alzheimer's disease and vascular dementia demonstrate different morbidity ratio. Epidemiologic studies of good quality on mild cognitive impairment (MCI) are scanty in Asia. China Cognition and Aging Study reports that the prevalence for total MCI is 17.9% in urban population and 25.1% for rural population. Management and care service for dementia in Asia is less developed compared to western countries.
Conclusions: The survey results of dementia from Asian countries should be interpreted with caution since methodological factors always impact it. MCI could have been underdetected due to considerable heterogeneity regarding the clinical presentations and aetiologies. Substantial economic disadvantage and poor public awareness may account for limited management and care service for dementia in Asia. To raise public awareness of dementia and develop national strategies to provide services and support for patients with dementia and their families, therefore, is imperative.

Epilepsy: How Big is the Burden?

S 11

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Epilepsy is one of the big four (the others are stroke, Parkinson's disease, and dementia) in terms of burden and impact to the society. The burden actually extends from the patient's own perspectives (including seizure episodes especially if pharmaco-resistant, long-term medication and its adverse effects, impact on daily activities, comorbidities and mortality, psychosocial effect, occupational and financial limitations) to the more global health care and social perspectives (including growing number of new cases with its chronicity, the increasing antiepileptic drug costs, hospitalisation due to breakthrough seizures, injury and loss of working populations). I will try to illustrate these points in my presentation.

How to Run a State-of-the-art Epilepsy Care Program: US Experience

S 12

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A specialised epilepsy centre is one which not only provides medical care to individuals with epilepsy, but also specialises in providing comprehensive diagnostic and treatment services particularly to those with uncontrolled or refractory seizures. The first step is accurate diagnosis, by appropriate diagnostic tests often requiring video-EEG or other forms of extended EEG monitoring, to separate epileptic from non-epileptic events, and differentiate focal from generalised epilepsy. Comprehensive treatment services need to include expertise in antiepileptic drug therapy, presurgical evaluation for epilepsy surgery, and where surgery is not advised, the potential to explore stimulator devices that can offer palliation, or entry into investigational drug or device trials. Also needed are means to assess cognitive dysfunction, treat psychiatric comorbidities, evaluate for social support services, and provide education specific to epilepsy. Vital to the success of such a comprehensive centre is a diversity of experts in epileptology, neurophysiology, neurosurgery, neuropsychology, psychiatry, radiology, pharmacology, as well as nurses, technologists and other coordinators, all committed to common goals and working together as a team.

There are currently about 125 Level 4 Epilepsy Centers in the United States offering comprehensive services including intracranial EEG evaluation for epilepsy surgery. Nevertheless, the delay in seeking evaluation at specialised centers has not shown consistent decrease over time. For patients with medically refractory focal epilepsy, the number of surgical procedures only modestly increased. Barriers to access range from geography, socioeconomic status, insurance coverage, lack of information, and cumbersome process of referral. Although a larger number of epilepsy centres can reduce delay in entry and provide healthy competition, at the same time it can lead to wasteful duplication of resources and dilution of skills from a reduced case load.

We will review a cohort of patients who underwent epilepsy surgery at the Cleveland Clinic Epilepsy Center in 2010 with an analysis of resource utilisation. We will give an overview of our current physical and personnel set-up, with directions for the future. We will share admission protocols and monitoring procedures designed to ensure patient safety.

Regional Epilepsy Surgery Service: Local Experience

S 13

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We report a regional service in Kowloon Central Cluster of Hospital Authority, to provide comprehensive epilepsy surgery program to patients with uncontrolled seizures. The referrals came from all public hospitals in Kowloon region as well as some from private sector.

A designated epilepsy clinic running at weekly basis (in Queen Elizabeth Hospital) will provide clinical assessments, patient counselling and arrangement of subsequent investigations. All potential candidates with favourable results will be discussed in surgical conference for seeking consensus among different personnel. The key to success is the appropriateness of patient selection, timely arrangement of electro-diagnostic and imaging investigations.

In the past 10 years, 17 anterior temporal lobectomies were performed for temporal lobe epilepsy with various aetiologies. Four patients with either subtle or non-lesional epilepsies were operated on with aids of invasive EEG recording and one patient underwent corpus callostomy. Overall, 16 (73%) among them enjoyed good surgical outcome (Engel Class IA); 7 and 14 patients had been followed up for more than 5 and 3 years, respectively.

We are striving for better learning curve by analysing more non-lesional cases. Anyhow, the potential hurdles are relative shortage of video-EEG monitoring units, difficult access to modern functional imaging modalities for localisation and expertise manpower.

Treating refractory epilepsy patients with surgical intervention requires multi-disciplinary approach and is labour intensive. For better development and quality of service, more manpower and resources input are needed. General physicians' awareness for early referral is also crucial. It is particularly important for those non-lesional cases as we rely much on some sophisticated investigations like magneto-encephalogram to guide the subsequent planning.

Current Advances in Biomarkers in Multiple Sclerosis

S 14

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Multiple sclerosis (MS), the most important inflammatory demyelinating central nervous system (CNS) disease complex, is characterised by heterogenous immunopathogenetic pathways, various clinical entities and disease courses, and finally, inhomogeneous and unpredictable treatment effects. Therefore, identification of MS-specific biological markers has continuously gained importance over the last decade.

There is accumulating evidence from immunological, pathological, and therapeutic studies that B cells (and antibodies) are critically involved in the pathophysiology of MS. B cells (and antibodies) seem to play various roles in the initiation and propagation of inflammatory demyelinating processes at different disease stages of MS and its variants. Recent therapeutic trials indicated that monoclonal antibodies that specifically target B cells are effective in MS and neuromyelitis optica (NMO).

This lecture will review the current status and (potential) applicability of antibodies in cerebrospinal fluid (CSF) and/or serum as biological markers for:

(1) diagnosis: value of CSF oligoclonal IgG bands for MS (differential) diagnosis, value of anti-MOG and –AQP4 antibodies to distinguish different CNS demyelinating disorders (paediatric and adult ADEM, CIS and NMO)
(2) disease progression: value of antibodies to myelin (eg MOG, MBP) and non-myelin antigens (eg neurofascin)
(3) repair and regeneration: IgM antibodies promoting remyelination, antibodies blocking inhibitory molecules, eg NoGo
(4) monitoring disease-modifying therapies: neutralising antibodies (against interferon beta and natalizumab), risk assessment and treatment stratification (anti-JC virus antibody assays)

Treatment of Central Nervous System Inflammatory Demyelinating Disorders: Bedside to the Bench

S 15

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Central nervous system inflammatory demyelinating disorders (CNS IDD) are important diseases affecting patients of a wide age range, and are potentially treatable. CNS IDD can result in major neurological disabilities and even mortality. Both classical multiple sclerosis (CMS) and neuromyelitis optica are predominantly characterised by relapsing attacks of CNS inflammatory demyelination. The diagnosis of which may be difficult especially in the early phase. Excitement has arisen from increasing numbers of disease-modifying drugs (DMDs) available for CMS in recent years. Beta-interferon and glatiramer acetate are certainly first-line DMDs. Natalizumab, fingolimod and mitoxantrone are approved second-line DMDs for relapsing multiple sclerosis patients. Other DMDs that may be used in refractory patients include alemtuzumab, teriflunomide and rituximab. However, availability, costs and rare but serious side-effects are practical issues that may limit the choice of treatment for these patients. How about novel therapies?

Laboratory Investigations in Patients with Multiple Sclerosis and Neuromyelitis Optica

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Interferon β is currently used to treat relapsing-remitting multiple sclerosis. Being a foreign protein, antibodies to interferon β frequently develop after a period of treatment. These antibodies are divided into two groups: binding antibodies (BAB) and neutralising antibodies (NAB). Expert panels had formulated guidelines in measuring these antibodies. BAB is recommended to be the screening assay. Positivity of BAB, if confirmed to be also NAB+, may be an indication or prediction of treatment failure. While BAB can be screened by ELISA, NAB is commonly measured by the blocking effect of myxovirus-resistant protein A (MxA) production. MxA is a protein inducible by interferon β. The data of these antibodies, together with clinical and imaging information, are incorporated into therapeutic decision making.

Neuromyelitis optica (NMO, Devic's disease) is a demyelinating disease characterised by optic neuritis and myelitis involving several cord segments. An autoantibody, initially called NMO-IgG, is a diagnostic marker of this disease. The target antigen was later found to be the aquaporin-4 (AQ4) water channel the gene of which has been cloned. Nowadays tests of NMO-IgG are usually performed using cells transfected with the aquaporin-4 gene. Assays based on AQ4-transfected cells generally have better predictive values than the immunohistochemistry test utilising brain, kidney and stomach sections. With the availability of anti-AQ4 test the distinction of NMO and its related disorders, such as Asian optic-spinal multiple sclerosis, recurrent myelitis associated with longitudinally extensive spinal cord lesions, recurrent isolated optic neuritis, and optic neuritis or myelitis associated with rheumatological and non-rheumatological autoimmune diseases is now clear.

The Rapidly Changing Spectrum of Autonomic Disorders in the New Millennium

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The last four decades has seen considerable advances in the recognition, diagnosis, pathophysiology and evidence-/investigation-based treatment of autonomic disorders. I have had the enormous privilege of being associated with the field over this period of time. The 1970's and 1980's witnessed the creation and development of clinical autonomic laboratories in major centres. These dealt largely with neurological patients, focusing mainly on cardiovascular and sudomotor autonomic function, and with an emphasis on primary autonomic disorders, such as multiple system atrophy and pure autonomic failure. Increasing awareness and understanding of autonomic disturbances in other conditions, such as spinal cord injuries, contributed substantially to realisation that other organs and systems (such as the gastrointestinal, urogenital and sudomotor systems) controlled also by the autonomic nervous system, interacted closely with the cardiovascular system and thus needed consideration for better understanding of normal and abnormal autonomic function. They emphasised the necessity of multidisciplinary management to benefit the patient, especially in generalised disorders of autonomic failure.

Previously most autonomic disorders were considered to result from neuronal damage, and thus predominantly were irreversible. This changed in the 1990's, with fuller realisation that common conditions, previously thought to be cardiogenic such as vasovagal syncope, were due to intermittent autonomic dysfunction and thus were distinct from classical autonomic failure. It is now agreed that over 50% of syncopal events are likely to have an autonomic aetiology, with an even greater percentage in certain age-groups, such as teenagers. Autonomic mediated syncope, which embraces these conditions, includes situational, vasovagal and carotid sinus hypersensitivity syncope, with the last predominant in the elderly.

In the late 1990's and new millennium there was increasing awareness of the postural tachycardia syndrome (PoTS), now considered as being widely prevalent. A major advance has been description of the phenotype in association with the joint hypermobility syndrome/Ehlers Danlos III (EDS III). PoTS serves as a biomarker of a multi-system disorder, that may present to a variety of specialists, as it can involve other organs, such as the gastrointestinal tract and urinary bladder. This recognition is substantially changing autonomic and clinical practice, and management of many patients who previously had repeated and unnecessary investigations with ineffective treatment, and in some a diagnosis of a psychological disorder.

There will be newer classifications of autonomic disorders, some based on natural history and intervention. The lecture will cover the importance of early diagnosis and prevention (as in diabetes mellitus), the integration of other treatment (to reduce the non-motor features of Parkinson's disease), the halting and partial reversal of autonomic deficits (by organ transplantation in familial amyloid polyneuropathy and diabetes mellitus), and the reversal of autonomic deficits by autonomic neuro-immunotherapy (in immune-mediated autonomic failure). The importance of recognising autonomic involvement in the elderly, to include diffuse Lewy body disease, will also be considered.

This lecture will cover the rapidly changing spectrum of autonomic disorders, and how this superspeciality is continuing to evolve and expand further in the new millennium.

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Frequency and Significance of Elevated Troponin Level and Arrhythmia in Acute Stroke Patients

S 18

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Interpretation of elevated troponin T or I levels in patients suffering from acute stroke remains controversial and poses both diagnostic and treatment dilemma. Elevated troponin level is assumed to occur in up to one out of six patients presenting with acute stroke and are reported to be associated with stroke severity, unfavourable short-term and long-term clinical outcome. Two candidate mechanisms are regarded to be relevant for troponin elevation in acute stroke. Coincident acute coronary syndrome may lead to focal ischaemic myocardial necrosis by means of thrombotic occlusion of a coronary vessel. Second mechanism proposed is stroke-induced autonomic imbalance with subsequent surge of catecholamine could induce global damage and dysfunction of myocardial tissue and the release of troponin. No matter the cause, the consequence is a cardiac injury that may predispose to new-onset arrhythmia such as atrial fibrillation (AF). There may be some variability in the type of arrhythmia induced according to the underlying brain pathology. In subarachnoid haemorrhage (SAH) for example, elevated troponin is associated with persistent QTc prolongation and ventricular arrhythmia but not AF. The temporal association of ischaemic stroke with new-onset AF might indicate a neurogenic-induced arrhythmia or may represent a window for the discovery of previously undiagnosed AF in these patients.

Local data from our hospital revealed that troponin I was elevated (defined as level of >0.04 μg/L), when taken within 72 hours, in 11% of acute stroke patients excluded those with pre-existing cardiac diseases (CAD, arrhythmia or valvular diseases), renal impairment and active sepsis. Significant association was found with stroke severity, insular involvement and new-onset paroxysmal or persistent atrial fibrillation. Echocardiogram performed showed no associated systolic dysfunction. Close to 60% of 6-month mortality can be explained by stroke severity and elevated troponin I level. It remained significant when stroke severity and other confounders were controlled. Current study failed to find a correlation between positive troponin and functional recovery or discharge destination when stroke severity was adjusted.

There are still many unanswered questions in this area. The ongoing prospectively designed TRELAS study investigating the coronary status of stroke patients with increased troponin level will hopefully bring some insight into the prevalence, possible aetiological causes and significance in positive troponin in acute stroke patients.

Skin Sympathetic Response: Clinical Application and Limitations

S 19

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Skin sympathetic response (SSR) is a relatively simple clinical test used in evaluation of somato-sympathetic reflex, which involves a spinal, a bulbar and a suprabulbar component but its precise pathways in humans are not well-defined yet. The test is easily recorded from an EMG machine with electrodes placed in the palm or sole with reference over the dorsum of the respective body part. Stimuli including electrical, cough gasp, noise, and magnetic could be used. A variety of clinical conditions including peripheral causes such as familial, diabetic and alcoholic neuropathy and neuropathy due to chronic renal failure and connective tissue diseases, and central causes such as lesions in right hemisphere, Parkinsonism and spinal cord injury have shown abnormal results in SSR recordings. However, there is controversy about the markers of abnormality. Latency, amplitude abnormalities or absence of response have been used in different reports, but the main clinical consideration remains the presence or absence of the response. Furthermore, many factors such as age, temperature, skin potential level, stimulus strength, emotional state, and habituation of repeated stimulation could affect the response. Controlling of these factors in the neurophysiological laboratory may enhance the reliability of SSR response. The variability of response in an individual person such as absence in some patients above 60 could render its reliability for making diagnosis for individuals. Nevertheless, SSR changes could be significant when large cohort patients were compared to control population. An example was that abnormal SSR was reported in significant proportion of patients with stroke. Our recent cohort study showed similar large portion of abnormal SSR in patients with stroke but the total number was less although still significant when the autonomic function was evaluated with finemetery. This implies that autonomic dysfunction, which might not be clinically symptomatic, was common after stroke and the SSR seems to over-estimate the number. Finally, there are occasional reports on the potential clinical use of SSR in diagnosis of post-stroke Complex Regional Pain Syndrome (CRPS) with an abnormal large amplitude response on the affected hand.

P 1

HLA-B Alleles Associated with Severe Cutaneous Reactions to Antiepileptic Drugs in Han Chinese

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Background: HLA-B*15:02 screening is recommended before starting carbamazepine in Han Chinese and South-East Asians because the allele is strongly predictive of Stevens-Johnson syndrome (SJS)/toxic epidermal necrolysis (TEN) induced by the drug. We examined whether other HLA-B alleles are also involved and whether the association extends to other antiepileptic drugs (AEDs).
Methods: Cases of SJS/TEN induced by any AEDs were recruited and matched (1:5) with AED-tolerant controls. Carrier rates of HLA-B alleles, detected by direct sequencing, were compared between cases and controls. Results were meta-analysed with previous studies to examine the associations between HLA-B*15:02 and SJS/TEN induced by phenytoin and lamotrigine.
Results: A total of 55 cases (27 carbamazepine, 15 phenytoin, 6 lamotrigine, 7 other AEDs) and 275 controls were recruited. In drug-specific analysis, the carrier rate of HLA-B*15:02 was significantly higher in carbamazepine-SJS/TEN cases compared with carbamazepine-tolerant controls (92.3% vs 11.9%; $P=3.51\times10^{-18}$; OR=89.25; 95% CI, 19.25-413.83), and also in phenytoin-SJS/TEN cases compared with phenytoin-tolerant controls (46.7% vs 20.0%; P=0.045; OR=3.50; 95% CI, 1.10-11.18). Meta-analyses showed a strong association of HLA-B*15:02 with phenytoin- ($P<1\times10^{-5}$; OR=5.41; 95% CI, 2.59-11.27) and, to a lesser extent, lamotrigine-SJS/TEN (P=0.03; OR=3.59; 95% CI, 1.15-11.22). Compared with drug-tolerant controls, the carrier rates of HLA-B*40:01 and HLA-B*58:01 were lower in cases of SJS/TEN induced by carbamazepine (P=0.004) and other AEDs (P=0.009), respectively.
Conclusions: HLA-B*15:02 should be screened prior to commencement of both carbamazepine and phenytoin in Han Chinese. Possible protective associations with HLA-B*40:01 and HLA-B*58:01 warrant further investigation.

Crowned Dens Syndrome

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Madam Lo is a 60-year-old lady who has a history of hypertension. She does not have any history of peripheral joint arthropathy.

She presented to our unit in May 2012 for four-limb numbness and hand clumsiness without sphincter disturbance. Physical examination revealed normal four-limb power, brisk bilateral lower limb jerks, right ankle clonus, and bilateral upgoing plantar. No definite sensory level was detected.

Her blood test including complete blood picture, electrolytes, bone profiles, vitamin B12, folate, VDRL, and thyroid function test were unremarkable. The plain X-ray cervical spine was done as shown in Fig 1.

Her CT cervical spine revealed soft tissue density with calcification at C1/2 periodontoid region with canal stenosis (Fig 2). MRI C spine showed T2 hypointense calcification at C1/2 level around the dens, a 2.4-mm subchondral cyst of the dens, calcified posterior located transverse ligament and ligamentum flavum. The central canal was narrowed with mildly atrophic cord. Fluffy T2 hypointense signal noted at the cranio-cervical junction to C2 level suggestive of myelomalacia. Radiological findings were typical of calcium pyrophosphate dihydrate (CPPD) deposition disease with crowned dens syndrome (Fig 3).

She had posterior spinal fusion done on 4 June 2012. She completed a course of rehabilitation and was discharged in late June 2012. She was able to walk unaided with good hand function.

CPPD deposition disease is a spectrum of disease, ranging from asymptomatic crystal deposition, acute inflammatory arthritis (pseudogout) to chronic arthropathy. Elderly and female are more commonly affected. Other predisposing conditions include metabolic and endocrine disorders such as haemochromatosis and hyperparathyroidism. Most frequently involved joints include knee, wrist, metacarpal phalangeal joints and hips. Cervical spine involvement is characterised by CPPD deposition in periodontoid process, posterior longitudinal ligament, ligamentum flavum and intervertebral disc. Patients having periodontoid deposition can present with acute neck pain, leukocytosis and elevated inflammatory marker, which termed crowned dens syndrome. The condition responds to non-steroidal anti-inflammatory drug and steroid. The inflammatory soft tissue mass around the dens can cause cervical cord compression requiring surgical decompression.

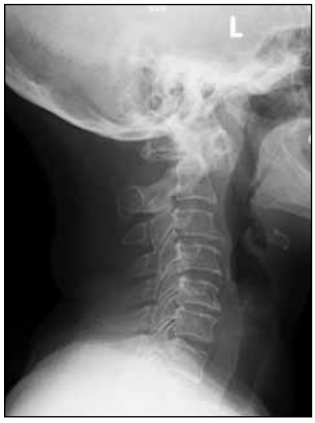

Fig 1. Plain X-ray cervical spine

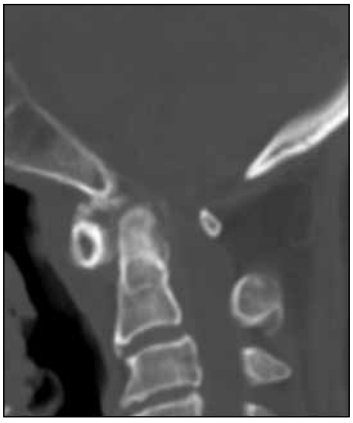

Fig 2. CT C spine.

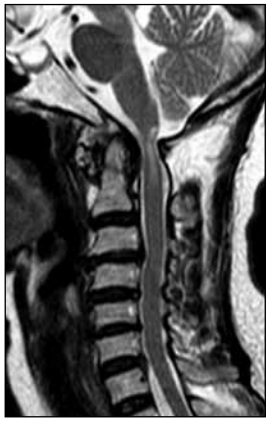

Fig 3. MRI C spine.

Dermatomal Somatosensory-evoked Potentials in Assessing Lumbosacral Radiculopathies

P 3

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Background: Radiculopathies have been a major source of human suffering and confirmatory tests are desirable. Somatosensory-evoked potentials (SEPs), which test the functions of proximal portions of the sensory component of the peripheral nervous system, are therefore studied. Sensory nerve conductions are normal in a radiculopathy, since nerve root damage occurs proximal to the dorsal root ganglion. F wave and needle EMG abnormalities, including those encountered in paraspinal muscles, reflect only dysfunction of the motor root.
Methods: Dermatomal SEPs were evaluated in 20 consecutive patients (mean age, 65.3 years), who had clinical signs and neuro-imaging abnormalities indicating L5 radiculopathy either alone or with additional lumbosacral radiculopathies. The lateral femoral, saphenous, superficial peroneal and sural nerves were selected to represent the third, fourth and fifth lumbar and first sacral roots, respectively. The responses on both sides were recorded with surface electrodes and the latencies of the individual components were examined. In addition, the presence or absence of individual components and their amplitudes were determined. Although changes in morphology and in the degree of dispersion of the response may reflect lesions of the somatosensory pathways, defining the boundaries of normality is difficult. Therefore, this part was not entertained.
Results: Of these patients, 15 (75%) had abnormal findings of the SEPs in form of either absence of response or latency prolongation regarding L5 response. Related to the vulnerability of the cauda equina, multiple radiculopathies were common. Bilateral involvements were frequent but often asymmetrical. The electrophysiological abnormalities were supported by neuro-imaging findings.
Conclusions/Implications: Dermatomal SEPs are useful in detecting lumbosacral radiculopathies, as SEPs elicited by cutaneous nerve stimulation are segmentally specific. Since they work through a mechanism which is functional rather than anatomical, they are complementary techniques for the detection of lumbosacral radiculopathies. Nonetheless, the overall effect is that they are less sensitive than lumbosacral imaging in revealing the abnormalities.

Peripheral Nerve Dysfunction in Patients with Diabetes Mellitus

P 4

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Background: Diabetic neuropathy occurs much more often in patients with poorly controlled than in those with well-controlled diabetes. The onset of polyneuropathy is not always gradual, as symptoms may appear subacutely or even rapidly after the onset of diabetes.
Methods: Peripheral nerve functions were evaluated in 46 patients with diabetes mellitus (mean age, 57 years). Patients with positive family history of neuropathy, pes cavus, monoclonal gammopathy in serum, positive rheumatoid factors or antinuclear antibody and elevated ESR were excluded. The electrophysiological parameters included (1) amplitudes and latencies of compound muscle action potentials (CMAPs) and nerve conduction velocities of the motor component of the median, ulnar, tibial and peroneal nerves; (2) F-wave responses of the above nerves; and (3) amplitudes and latencies of sensory action potentials (SAPs) and nerve conduction velocities of the sensory component of the median, ulnar and sural nerves.
Results: (1) The most frequent abnormality was slowing of the sensory nerve conduction velocity with reduction in SAP amplitude. (2) A diffuse abnormality of motor nerve function affecting the entire length of the nerve fibres could be asymmetrical, and was more severe in distal segments of the longer motor nerves (those in the lower extremities). (3) While close correlations were found between the electrophysiological abnormalities and the duration of diabetes, mild abnormalities of motor and sensory nerve conduction were occasionally detected in subjects without symptoms in the lower extremities. (4) There was a proneness to entrapment neuropathy particularly carpal tunnel syndrome. (5) Persistent pain occurred in two (4.3%) of the patients with neuropathies.
Conclusion: Electrophysiological technique is a sensitive, yet non-invasive, method for the detection of subclinical nerve impairment in diabetes. Given that painful neuropathies may exert a substantial impact on the quality of life, its occurrence is not in parallel with neuropathy severity. All these findings may serve as the basis for a conceptual framework in regard to the pathogenesis.

P 5

Segmentally Specific Somatosensory-evoked Potentials in the Evaluation of Cervical Radiculopathies

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Background: Subacute cervical radiculopthies are more common than the acute variety. In this regard, neurologists often are being placed in the position of the primary treating physicians. However, nerve conduction studies, frequently performed by neurologists, are not usually of primary importance in the electrodiagnosis of radiculopathy. Proximal responses using F waves add little to the study, unless the clinical picture suggests proximal demyelination. In this study, segmentally specific somatosensory-evoked potentials were the means for assessing patients with cervical radiculopathies.
Methods: Somatosensory-evoked potentials by stimulating cutaneous nerves in the upper limbs were evaluated in 12 patients (mean age, 61.8 years), who had clinical signs and neuro-imaging abnormalities indicating C7 radiculopathy either alone or with other cervical radiculopathies. The musculocutaneous nerve, the median nerve fibres in the thumb and adjoining surfaces of the second and third digits, and the ulnar nerve fibres in the fifth digit were the means of evaluating the C5, C6, C7 and C8 segments, respectively. The responses on both sides were recorded with surface electrodes and the latencies of the individual components were examined. In addition, the presence or absence of individual components and their amplitudes were determined. Abnormalities of wave morphology are difficult to quantitate, and thus they were not assessed.
Results: Seven (58%) of the patients had abnormal findings of the somatosensory-evoked potentials in form of either absence of response or latency prolongation as C7 response was concerned. The electrophysiological abnormalities were simultaneously supported by neuro-imaging findings.
Conclusion: Since patients with C7 radiculopathy often experience paresthesias in the median innervated fingers, they are often mistakenly thought to have carpal tunnel syndrome whenever neck pain is not prominent. This study shows segmentally specific somatosensory-evoked potentials have a potential diagnostic advantage. Maybe the approach to patients with suspected radiculopathies should incorporate data from various sources.

P 6

Intensify Secondary Stroke Prevention with Function Restoration in Active Lifestyle Therapeutic Exercise Program

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Background: Stroke survivors commonly have cardiovascular deficits predisposing them to sedentary lifestyle, increased risk for additional secondary complications, and subsequent stroke recurrence. The 1-year recurrence rate was as high as 21.2%.[1] An action 'Intensify Secondary Stroke Prevention' with Active Lifestyle Therapeutic Exercise Program (ALTEP) was implemented in Physiotherapy Stroke Clinic. It targeted on physical and functional rehabilitation, active healthy lifestyle modification for underlying vascular risk factor control in secondary stroke prevention. Together with knowledge, skill empowerment and engagement, self-care management was emphasised. It provided prompt early discharge support for post-stroke clients discharged from Acute Stroke Unit (ASU). Effective strategies in stroke prevention were endorsed with a coordinated and seamless pathway to liaise with the Integrated Stroke Clinic in the Department of Medicine. This study aimed to (1) determine the effect of ALTEP on various health-related outcomes, like physical endurance, ambulatory function and quality of life (QoL), and (2) vigorously compare the control of vascular risk factors and 1-year recurrence rate among the 'ALTEP' and 'usual care' groups.

Methods: Single-blind clinical controlled trial was conducted to compare the effectiveness of ALTEP versus usual care in modifying stroke vascular risk factors. A total of 142 patients directly discharged home from ASU in 2009 to 2011, who were willing to comply in the ALTEP, were recruited as 'ALTEP' group. Those did not comply in the ALTEP were treated as 'usual care' group (n=68). Both received standard medical specialty out-patient services.

Results: The total energy expenditure in moderate-intensity physical activities was significantly increased, from 1217 kcal/week to 2584 kcal/week. Such increment of energy expenditure was effective for further stroke risk decrement. The physical endurance (distance of 6-minute walk test), ambulatory function (comfort gait speed), quality of health wellbeing (SF 36), blood pressure, fasting blood glucose, and lipid profile were significantly improved after completing ALTEP ($P<0.01$ with Bonferroni adjustment, repeated measured ANOVA). The stroke recurrence rate was significantly lower in the ALTEP group ($P=0.000$, Mann-Whitney *U* test) with 4.2% (n=6) in ALTEP group and 26.4% (n=18) in the 'usual care' group. The fasting blood glucose and lipid profile were significantly improved in the ALTEP group ($P<0.01$, Bonferroni adjustment, independent-*t* test).

Conclusion: The physical activity levels of patients in ALTEP were actively increased. They achieved the recovery of functions, ambulation, and quality of life wellbeing. Together with pharmacologic treatment, it enhanced better control of vascular risk factors with lower recurrence rate in overall secondary stroke prevention management.

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A Rare Cause of Limbic Encephalitis

P 7

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A 16-year-old female first presented as generalised tonic-clonic convulsion in November 2011. She had two more attacks afterwards. She was admitted into the intensive care unit in December for status epilepticus. There was low-grade fever. Neurological examination revealed no focal neurological deficits. Computed tomography of brain was unremarkable. Lumbar puncture (LP) showed normal protein level and leukocyte count. Intravenous acyclovir and ceftriazone were started empirically. Electroencephalography (EEG) showed subclinical bitemporal independent seizure without generalisation. MRI brain showed symmetrical increased T2-signal intensity involving both mesial temporal lobes, suggestive of limbic encephalitis. CSF HSV PCR was negative. A course of intravenous immunoglobulin was given because autoimmune limbic encephalitis was suspected. Voltage-gated potassium channel antibody, anti-NMDA receptor antibody turned out to be negative. CSF later revealed positive VDRL. Serum VDRL was negative and FTA was reactive. HIV antibody was negative. A course of penicillin G was initiated. Serial EEG showed resolved epileptiform activities. However she had episodic fluctuation of conscious level. Five sessions of plasmapharesis were given. She gradually recovered and repeated LP showed negative VDRL and follow-up MRI brain showed resolution of both temporal lobe lesions. She later confessed that she had unprotected sex with two to three sexual partners. She returned to school and remained seizure-free till last follow-up in July 2012.

A high index of suspicion is necessary to make a correct diagnosis of neurosyphilis, especially when approaching a young patient presenting with limbic encephalitis. Negative serum RPR and HIV testing, negligible sexual history and absence of CSF leukocyte hampered a prompt recognition of neurosyphilis in our case. Early diagnosis and treatment are important because the infection can be treated with appropriate antibiotic.

Dravet Syndrome: Genetic Analysis of SCN1A and PCDH19 Mutations for 17 Chinese Children

P 8

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Background: For Dravet syndrome (DS), 80% had mutation in SCN1A gene, which encoded a voltage-gated sodium channel. Recent study demonstrated that 16% of SCN1A-negative patients had mutations in protocadherin-19 (PCDH19) genes. The present study examined the genetic mutations in Chinese DS children and assessed the relationship between mutation and phenotype.
Methods: DNA of 17 DS in the University of Hong Kong was screened for SCN1A mutation using polymerase chain reaction and direct sequencing. SCN1A-negative female patients were then screened for PCDH19 mutation.
Results: For DS, 82% (14/17) had SCN1A mutations—truncating mutations (6), splice site mutations (2) and missense mutations (6). These mutations affected Nav1.1 protein functions by pathogenicity assessments including conservative, SIFT and Align-GVGD analyses. We found a relationship between the type of mutation and the degree of intellectual disability ($P<0.05$), with truncating/splice site mutations associated with moderate/severe mental retardation. At the evolution of the disease, 79% (11/14) of DS patients with SCN1A mutations had features which fit into the diagnostic criteria of autism spectrum disorder (ASD). 57% (8/14) had a history of vaccination-induced seizures. One of the two female SCN1A-negative patients had PCDH19 mutation.
Conclusion: High percentage of genetic mutations was identified in our Chinese cohort of DS. Pathogenicity assessment demonstrated that the mutations were linked to the phenotypes of DS. Our detection of high frequency of ASD (79%) and vaccination-induced encephalopathy (57%) in those DS with SCN1A mutation suggested evaluating ASD with epilepsy or vaccination-induced encephalopathic children for any relationship between SCN1A mutations.

P 9

Pilot Study for Subgroup Classification for Autism Spectrum Disorder Based on Dysmorphology and Physical Measurements in Chinese Children

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Background: Previous autism spectrum disorder (ASD) researches indicate that early identification combined with a targeted treatment plan involving behavioural interventions and multidisciplinary therapies can provide substantial improvement for ASD patients. Currently there is no cure for ASD, and the clinical variability and uncertainty of the disorder still remains. Hence, the search to unravel heterogeneity within ASD by subgroup classification may provide clinicians with a better understanding of ASD and to work towards a more definitive course of action.
Methods: In this study, a norm of physical measurements including height, weight, head circumference, ear length, outer and inner canthi, interpupillary distance, philtrum, hand and foot length was collected from 658 typical developing (TD) Chinese children aged 1 to 7 years (mean, 4.19 years). The norm collected was compared against 80 ASD Chinese children aged 1 to 12 years (mean, 4.36 years). We then further attempted to find subgroups within ASD based on identifying physical abnormalities; individuals were classified as (non)dysmorphic with the autism dysmorphology measure (ADM) from physical examinations of 12 body regions.
Results: Our results show that there were significant differences between ASD and TD children for measurements in: head circumference (P=0.009), outer (P=0.021) and inner (P=0.021) canthus, philtrum length (P=0.003), right (P=0.023) and left (P=0.20) foot length. Within the 80 ASD patients, 37 (46%) were classified as dysmorphic (P=0.00).
Conclusion: This study attempts to identify subgroups within ASD based on physical measurements and dysmorphology examinations. The information from this study seeks to benefit ASD community by identifying possible subtypes of ASD in Chinese population, and seeks for a more definitive diagnosis, referral and treatment plan.

P 10

Klein Levin Syndrome is a Steroid-responsive, Non-N-methyl-D-aspartate Receptor-mediated Encephalitis

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Background: Klein Levin syndrome is a rare neuropsychiatric disorder with periodic hypersomnia, cognitive and behavioural disturbance. It is postulated to be triggered by a viral illness or is a post-infectious immune-mediated encephalitis. With an increasing awareness of immune-mediated encephalitis in the past 10 years, especially N-methyl-D-aspartate receptor (NMDAR)–mediated encephalitis, testing for the presence of NMDAR antibodies in patients with Klein Levin syndrome might give us more understanding about the relationship between these two disease entities. Immunotherapy has not been reported to be a treatment option. Current evidence suggested the use of lithium to improve the abnormal behaviour with recovery of symptoms in patients with Klein Levin syndrome, including a decrease in duration of each attack and frequency of relapses.
Methods: A 15-year-old boy with Klein Levin syndrome presented with episodic attacks of repetitive excessive masturbation, hypersomnia, short-term memory loss, compulsive water drinking, and fluctuation in blood pressure was being investigated. Clinical course and treatment was given to the patient.
Results: Intravenous pulse methylprednisolone was given for 3 days, followed by a 4-week course of oral prednisolone. The boy went into complete remission few days after treatment. However, the neuropsychiatric symptoms recurred twice upon tapering of the oral steroid. Again, complete remission could be achieved after optimising the dose of oral prednisolone back to 1 mg/kg/day. Currently, his condition is well controlled with lithium while oral prednisolone was successfully tailed off.
Conclusion: This is the first reported case on the successful treatment of Klein Levin syndrome with steroid. We would like to support that Klein Levin syndrome, a neuropsychiatric disorder, is a steroid-responsive immune-mediated encephalitis. However the underlying mechanism is not NMDAR antibody mediated. Further study on a larger group of patients would help to elucidate the underlying aetiology, treatment and the prognosis of this disease.

Anti GQ1b Antibody Disorder

P 11

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A 75-year-old woman presented to our Accident and Emergency Department in March 2012 for 4-day history of dizziness with bilateral lower limbs weakness. She did not report any ophthalmic symptoms at presentation. There were no prior recent coryzal or bowel symptoms. Her past medical history included diabetes mellitus for 10 years, hypertension and hyperlipidaemia being put on atenolol 50 mg daily, metformin 250 mg twice a day, and zocor 10 mg at night.

On admission, there was complete ophthalmoplegia on ocular examination. Limb muscle power was full. Deep tendon reflexes of both lower limbs were absent. Plantar responses were bilaterally flexor. She walked with ataxic gait. Nerve conduction study performed 2 days after admission showed absent bilateral median sensory nerve action potential (SNAP), small bilateral sural SNAP. Magnetic resonance imaging (MRI) orbit and brainstem showed no abnormality.

Anti-GQ1b immunoglobulin G antibodies later came back to be strongly positive and the clinical diagnosis of Miller Fisher syndrome (MFS) was confirmed. She refused lumbar puncture. The patient was given a course of intravenous immunoglobulin therapy. Her ocular movement and gait improved afterwards. The patient regained full extraocular eye movement around 6 weeks after presentation.

Our case illustrated classical presentation of triad including ataxia, acute ophthalmoplegia, and areflexia. Antibody to the ganglioside GQ1b are often associated with MFS. Over 90% of MFS cases have acute-phase anti-GQ1b ganglioside antibodies which are particularly associated with ophthalmologic disease.[1] This condition should be considered when there is a combination of diplopia, ataxia, and loss of deep tendon reflexes.

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Time Management and Outcomes for Acute Ischaemic Stroke Patients Treated with Intravenous Thrombolysis (rTPA) Therapy in Kwong Wah Hospital

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Objectives: To evaluate the time management and outcomes in delivering intravenous thrombolysis (rTPA) therapy to acute ischaemic stroke patients after collaboration with Accident and Emergency Department (AED) of Kwong Wah Hospital (KWH).
Methods: This is a retrospective analysis in Kwong Wah Hospital Acute Stroke Unit (February 2011 to April 2012). We evaluated the door-to-stroke team, door-to-CT time, door-to-CT interpretation, door-to-needle and onset-to–thrombolysis time in patients who received intravenous thrombolysis (rTPA) therapy.
Results: Primary outcome measure included modified Rankin Scale (mRS) at 3 months. Secondary outcome measures included symptomatic intracranial haemorrhages (sICH), major systemic haemorrhages, and mortality rate at 3 months. After the era of collaboration between our stroke team and KWH AED in 2011. We received a total of 66 stroke calls from AED between the period of February 2011 and April 2012 for patients presented with symptoms of suspected stroke. Of these, 10 (15%) patients were given intravenous thrombolytic therapy with NIHSS ranged from 6 to 22 after individual case review. Reasons of not giving thrombolytic therapy in the remaining 56 patients included mild stroke symptoms with NIHSS <5 in 17 (30%), intracerebral haemorrhage by CT scan in 13 (23%), patients presented beyond time window in 4 (7%), wake up stroke or time of onset uncertain in 3 (5%), advanced age in 4 (7%), etc. Baseline demographics of patients who received thrombolytic therapy were as follows: median (IQR) age 70.5 (52-79) years, male gender 6 (60%), median (IQR) NIHSS 11.5 (6-22), diabetes mellitus 4 (40%), hypertension 5 (50%), atrial flutter or fibrillation 1 (10%), hyperlipidaemia 3 (30%), history of previous stroke 1 (10%), and history of smoking 3 (30%). Median (IQR) time management in patients treated with intravenous rTPA in minutes were: door-to-stroke team time 10 (5-24), door-to-CT time 33 (26-41), door-to-CT interpretation time 38 (31-52), door-to-needle time 71 (55-82), onset-to-thrombolysis time 118 (105-150). Primary outcome measure with mRS at 3 months was 2.0. Three patients developed symptomatic haemorrhage while two patients required craniotomy for clot evacuation and one patient was being treated conservatively (data included based on nine patients only, as one patient died within 3 months after acute stroke). Major systemic haemorrhage occurred in one patient with gastro-intestinal bleeding after rTPA treatment. One patient died at 3 months after acute stroke due to secondary infection.
Conclusion: Before the era of collaboration between our AED and stroke team, currently paramedics are trained to triage patients with suspected stroke. Each step in the stroke thrombolysis pathway is essential to provide timely treatment to patients who are eligible for thrombolytic therapy. This helps improve the door-to-needle time (calculated as the difference in time between patient arrival in the emergency department and the administration of intravenous thrombolytics therapy). Again, public education is essential to shorten the onset-to-thrombolysis time as outcome is closely related to the time of treatment.

AUTHOR INDEX

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