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Factors Associated with Clinical Outcomes of NMOSD Patients in King Chulalongkorn Memorial Hospital

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Introduction: Since the discovery of aquaporin-4 IgG (AQP-4) antibody in 2004. The incidence of neuromyelitis optica spectrum disease (NMOSD) in Thailand continue to rise. However, the local demographic and clinical data of this diseaseis still scarce.

Objectives: To present data on NMOSD patients with regards to demographics, clinical presentation, laboratory investigation, and treatment outcome.

Materials and Methods: We reviewed records of 49 patients diagnosed with NMOSD with positive AQP-4 antibody test results who received treatment at King Chulalongkorn Memorial Hospital between January 2010 and September 2019. We retrieved data on demographics, underlying illnesses, laboratory test results, clinical characteristics, treatment prognosis, and related complications. Statistical analyses included descriptive analyses and univariate and multivariate logistic regression analyses of factors associated with EDSS score improvement and relapse of NMOSD.

Results: Patients were mostly female (87.8%) with the mean (±SD) age of 44.46 ± 16.16 years. Patients had 57.4% reduction in EDSS score after treatment compared to before treatment. One-third (36.7%) of patients relapsed within the first year of treatment, with the mean (± SD) duration to first relapse was 12.8 ± 19.3 months. Increase in EDSS score was associated with clinical presentation of bilateral optic neuritis (Adjusted OR = 6.1; 95% CI 0.94-39.6) and adverse events during course of treatment (Adjusted OR = 5.73; 95% CI 1.51-21.81). Relapse was associated with only bilateral optic neuritis (Adjusted OR = 16.92; 95% CI 1.87-152.77).

Conclusion: We presented factors associated with clinical outcomes of NMOSD patients from the tertiary care hospital in Thailand. This can be useful for prognostic assessment and management of each patients. Our study excluded NMOSD patients without AQP-4 antibody test results, and the potential selection bias due to this exclusion should be taken into consideration.

Pattern of Cortical Thinning in Patients with Mild Cognitive Impairment Associated with Obstructive Sleep Apnea Compared to Patients with Age Associated Mild Cognitive Impairment

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Background: Obstructive sleep apnea (OSA) is another reversible cause of mild cognitive impairment (MCI). There are evidences that OSA associated with decline of brain cortex. The pattern of cortical thinning in OSA associated MCI has not been well characterized.

Objectives: To assess pattern of cortical thinning in MCI patients with OSA (MCI-OSA).

Material and Methods: MCI-OSA and age associated (MCI-AA) patients were recruit from Neurocognitive Clinic Chulalongkorn Hospital. The baseline characteristics of were compared. All patients had magnetic resonance images (MRI) performed. We analyzed MRI to determine difference in cortical atrophy pattern between the two groups. Firstly, cortical surfaces were reconstructed from individual MRI. Cortical thickness measurement was then reconstructed. Finally, the cortical thickness comparison between the two groups was performed using vertex-by-vertex general linear model (GLM) and standard t-test.

Results: Compared to MCI-AA, MCI-OSA patients has larger brain volume ($p=0.002$). Using GLM, we found 3 large clusters in the left anterior cingulate, the left and right lateral occipital cortices that were significantly thinner in MCI-OSA ($p<0.001$, $p=0.005$, $p=0.001$, respectively). Using t-test, we found 11 cortical regions with different thicknesses between the two groups. Only the left anterior cingulate cortex remained significantly thinner in the MCI-OSA group using both methods.

Conclusion: We demonstrated that MCI-OSA patients had significant thinning of left anterior cingulate gyrus as compared to MCI-AA despite having larger brain volume.

Cognitive Fatigue from Attention Cognitive Load in Parkinson's Disease

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Background: Fatigue is one of the most frequent non-motor complaints in Parkinson's disease which had great impact on patient's cognition, performance and quality of life. Due to lack of objective measurement of cognitive fatigue, this problem was hard to solve and ignored by physicians in clinical practice.

Objective: To determine cognitive fatigue in Parkinson's patient after attention demanding task and stress and to investigate predictors of cognitive fatigue.

Materials and Methods: We perform a quasi-experimental study of 40 non dementia Parkinson's patients and 40 control subjects to determine different of cognitive performance before and after cognitive stress. The accuracy and reaction time (answer time) used to solve stroop color test was used to measure cognitive performance and PVSAT was used to be cognitive loading stress. Independent T test was used to determine the difference between groups. Baseline characteristic, TMSE score, PSQI score and PDQ-8 score were recorded to determine association between these variables and cognitive performance by linear regression model.

Results: The percentage change of minimal and mean answer time between pre- and post-cognitive load was significantly higher in Parkinson's group than in control group ($p = 0.047$) ($p = 0.008$) respectively. In linear regression model, age, TMSE score and PSQI score were not factors contributed to the change of percentage. The complaining symptoms, disease duration, disease staging were not predictors of increased answer time. There was also a significant positive correlation between PSQI score and PDQ-8 score in Parkinson's group ($r = 0.66$, $p < 0.001$).

Conclusion: Fatigue is an important non-motor symptom in Parkinson's patients which affect cognitive performance. We demonstrated impairment of ability to maintain cognitive performance in stroop task after cognitive stress in Parkinson's patients compared to controls. This may be an essential clue in development of tools to measure cognitive fatigue objectively.

Impaired Finger Dexterity in Parkinson's Disease: The Utility of Keyboard Typing Test

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Introduction: Impaired motor dexterity is one type of bradykinesia commonly observed in Parkinson's disease (PD). An objective assessment with a keyboard typing test might be a useful tool rather than a subjective finger tapping test to detect these abnormalities in PD.

Objectives: To evaluate finger dexterity in Parkinson's disease (PD) by a keyboard typing test.

Materials and Methods: 59 PD patients, 47 age-matched controls were recruited in the study. Objective evaluation of finger dexterity was assessed by an in-house typing kit that was connected to a keyboard to determine a typing performance. A side-by-side typing was evaluated for the dexterity of the distal limb while a far-reach typing was determined for the proximal part. Objective outcomes including accumulative frequency, typing velocity, accumulative error, accumulative repetition of keys and digraph duration were analyzed and compared between groups.

Results: PD patients had significantly lower accumulative frequency and typing velocity than controls in both side-by-side ($p=0.02$, 0.03) and far-reach typing ($p=0.003$, <0.001). The digraph duration and digraph rate were significantly higher in PD than controls (side-by-side;$p=0.001$, 0.004 and far-reach typing; $p<0.001$ respectively). The accumulative repetition of typing keys was significantly greater only in side-by-side typing ($p=0.03$) in PD than controls Typing velocity and digraph rate were moderately correlated with HY stage, UPDRS part III and bradykinetic scales.

Conclusion: Our study demonstrated the utility of the keyboard typing test as the objective evaluation of impaired finger dexterity in PD, leads to a promising screening and rating tool of bradykinesia in the future.

The Study of Different in Pupillary Diameter between Off and On Period in Parkinson's Disease by Using Pupillometry Test

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Background: Motor fluctuation is a problem occurred in most Parkinson's disease (PD) patients within a few years after diagnosis and start the treatment. Effect of medication can be varied between good symptoms control (on period) and return of motor symptoms (off period). Whereas it reduces the motor symptoms efficiently, its effect on autonomous nervous system is not clear. Pupil light reflex (PLR) may reflect autonomic dysfunction in PD. Currently, there is no conclusion about PLR impairment in PD patients and whether improvement of PLR during levodopa challenge.

Objective: To determine the difference in pupillary diameter during off and on period in Parkinson's disease by using pupillometry and evaluate changing in the pupil diameter during PLR as an early clinical biomarker for identification of on period in PD patients.

Materials and Methods: This study was a cross-sectional study involving 30 PD patients who were Levodopa-responsive patients refers to switch motor symptoms between on and off period. The pupillometry test was record by the EyeMax™ video, then analyzed events the change in pupil diameter size as a percentage change according to the specific formula. The light stimulation was performed 3 times for 'off' and 'on' periods.

Results: Participants had a mean age of 57.47 years (SD 10.97) and a mean disease duration was 8.7 years (SD 8.31). The significant different in pupillary size were identified between off and on period for both eyes ($p < 0.05$). However, when comparing ocular parameters between PD without postural instability and with postural instability groups, there were no different in average percentage of changing of pupil diameter size of PLR between 'off' and 'on' period ($p > 0.05$)

Conclusion: Our study demonstrated the significant change in pupil size in PLR after levodopa challenge. Changing in pupillary diameter during PLR may become as an early clinical biomarker for identification of on period in PD patients.

Exploring the Efficacy of Font Sizes, Styles, and Color Upon Reading Abilities in Patients with Parkinson's Disease: A Study of Newspaper Readability

Introduction: Reading ability affect to daily life among individuals. Reading performance in Parkinson's patients is influenced by many factors such as impairing of eye movement, visual acuity, color discrimination including cognitive dysfunction.

Objectives: To delineate the font sizes, styles, and color that effect to reading performance in patients with Parkinson's disease.

Materials and Methods: This study was a cross-sectional study involving 20 PD patients and 20 healthy control (HC) participants. The eye movement was tracked by the Argus science ET mobile eye tracking device. The standard testing protocols (ten pages of reading task) were applied in all subjects. Clinical demographics, rating scales, and eye movement parameters (reading duration, delay time, fixing duration, accuracy and eye movement pattern) were collected for further analysis.

Results: Participants consisted of 20 PD patients and 20 HC subjects. There were no difference in age between two groups. By comparing among PD and HC were identified the significant difference in delay time and fixing duration. PD showed significant higher delay times than HC in black color (p=0.006) and purple color (p=0.012). PD showed significantly shorter fixing duration than HC in 4 colors including blue (p=0.028), orange (p=0.021), purple (p=0.004), and green (p=0.028).Comparison among 3 font types and 7 colors in PD, "JS Angsumalin" showed the lowest total reading duration compared to other font types with no regard to font color (p <0.05). Orange, purple and green showed the lowest total reading duration compared to other font colors with no regard to font type (p<0.05). In all font types, black showed the longest total reading duration compared to other font colors (p<0.05).

Conclusion: Based on our study, PD showed significant deficiency in reading ability compared to age-matched HC. Among PD, JS Angsumalin font type in orange or purple or green was the most suitable font type and color. In addition, black was not a suitable font color for PD patients, even though it is commonly used in all kinds of printed materials. In case of needing to use black color for printing,"JS Angsumalin" was the most suitable font type to enhance reading ability among PD patients.

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Impact Factors for Early Arrival in Time of Acute Ischemic Stroke Patients within 4.5 Hours

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Introduction: Early thrombolytic therapy in acute ischemic stroke has proven to reduce the stroke morbidity. Previous studies were showed minimal rate of early arrival in time (<4.5 hours). Delay in hospital arrival after acute stroke is a main reason for an exclusion from receiving rt-PA, associated with less favorable outcome.

Objectives: To evaluate factors which are associated with early arrival in time of acute ischemic stroke patients in 4.5 hours.

Materials and Methods: An observational cross-sectional study involving 200 patients was conducted between July to December 2019 at King Chulalongkorn Memorial Hospital, Bangkok, Thailand. The data was collected by direct interview using a questionnaire designed to study factors such as demographic data, distances, transportation, stroke severity using the NIHSS, stroke awareness and knowledge of symptoms.

Results: 200 patients were included. 63% of patients were able to know symptoms of stroke but only 39% arrived the hospital within 4.5 hours. Early arrival in time less than 4.5 hours was significantly associated with 1) age < 45 years, 2) awareness (urgency), 3) the use of ambulance transportation and 4) clear of symptoms onset.

Conclusion: Age < 45 years, awareness (urgency), the use of ambulance transportation and clear of symptoms onset are associated with early arrival in time less than 4.5 hours in patients with acute ischemic stroke.

The Feasibility of the Simplified and Symptom-based Version of Electronic Parkinson's Disease Diary in Comparison with the Standard Paper Diary

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Introduction: Motor complications (MC) is one of the most important problem in patients with advanced Parkinson's disease (PD). A paper PD diary has been used as a standard tool for self-detecting MC in PD patients but had several limitations. A novel, simplified and symptom-based version of the electronic PD diary has been developed by our center.

Objectives: To determine the feasibility of the simplified and symptom-based electronic PD diary and compare with the standard paper diary.

Materials and Methods: A smartphone application with medication alarms and symptom-based self-assessments for different functional states of MC was developed to evaluate ON/OFF and dyskinesia in PD patients with MC. A training session for the application usage was conducted prior to using the home-based electronic PD diary. Each participant completed the electronic and the standard PD paper simultaneously at least 1 week for comparison.

Results: A total of 17 non-demented PD patients with MC with stable medication regimens were recruited in our study. The total ON/OFF/ dyskinesia time were not significantly different between the paper and the electronic version ($p=0.08$, 0.06, 0.50, respectively). The percentage correlations of the functional states between the paper and the electronic PD diary was 80.2 %. The accuracy of the electronic PD diary was 81.1% with sensitivity and specificity of 89.8% and 68.5% respectively.

Conclusion: Our pilot study demonstrated that the smartphone application of the symptom- based electronic PD diary is feasible for assessment of functional states of MC in PD patients with good accuracy compared to the standard paper.

The Correlation of Orthostatic Hypotension and Cognitive Dysfunction in Patients with Parkinson's Disease: A Cross-sectional Comparative Study

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Introduction: Orthostatic hypotension and cognitive dysfunction are among the most troublesome non-motor symptoms in Parkinson's disease. As orthostatic hypotension and cognitive dysfunction are often co-existed but whether the relationship is still unclear.

Objectives: To investigate the association of orthostatic hypotension and cognitive dysfunction in Parkinson's disease patients, and to compare the cognitive function tests in Parkinson's disease patients with and without orthostatic hypotension in Chiang Mai University hospital.

Materials and Methods: This cross-sectional comparative study included 49 Parkinson's disease patients. Blood pressure was measured at rest in the supine position then at 1 and 3 minutes after standing up. Cognitive functions were assessed by using the Thai Mental State Examination (TMSE) and Montreal cognitive assessment (MoCA) Thai version.

Results: Orthostatic hypotension was objectively confirmed in 13 out of 49 Parkinson's disease patients (26.5%). The prevalence of cognitive dysfunction (defined by MoCA score < 25) was 38 out of 49 patients (77.6%). The prevalence of major cognitive dysfunction (defined by TMSE score <24) was 9 out of 49 (18.4%). There was no significant difference in cognitive dysfunction between the non-orthostatic and the orthostatic hypotension groups (P = 1.000). Median MoCA score was 20 in the non-orthostatic group (IQR 17.00-24.00) and 21 in the orthostatic group (IQR 16.00-24.00) (P = 0.874). Median TMSE score was 26 in the non-orthostatic group (IQR 24.50-28.00) and 26 in the orthostatic group (IQR 25.00-29.00) (P = 0.882).

Conclusion: There was no correlation between orthostatic hypotension and cognitive dysfunction in PD patients. Cardiovascular autonomic dysfunction and cognitive impairment may progress independently. Prevalence of cognitive dysfunction in the study was very high so this emphasizes the importance of cognitive dysfunction screening in Parkinson's disease patients.

Study of Non-motor Symptoms in Thai Patients with Primary Focal or Segmental Dystonia: Prevalence and Impact on Quality of Life

Introduction: Dystonia is a movement disorder characterized by involuntary muscle contraction resulting in twisting, tremulous movements and/or abnormal posture. This condition impairs both quality and speed of voluntary movement. Recent studies have shown that, apart from the motor symptoms, there were many non-motor features in patients with primary dystonia which were increasingly recognized as an important determinant regarding quality of life.

Objectives: To evaluate the prevalence of non-motor symptoms in patients with primary focal and segmental dystonia and their impact on quality of life (QOL).

Materials and Methods: Cross-Sectional Analytic Study. Forty-two patients age ≥ 18 years with primary focal or segmental dystonia were enrolled. Motor symptoms were evaluated by the Fahn Marsden dystonia rating scale (FMDRS). Thai Hospital Anxiety and Depression Scale (HADS), Thai Montreal Cognitive Assessment scale (MoCA), Thai Pittsburgh Sleep Quality Index (PSQI), Visual Analogue Scale (VAS) were used to evaluate non-motor symptoms. QOL was assessed by the WHOQOL-BREF-THAI.

Results: 10 patients (23.8%) had depression, 13 patients (31%) had anxiety, 36 patients (81%) had cognitive impairment, 33 patients (78.8%) had impaired quality of sleep, 30 patients(71.4%) had pain perception ranging from mild to severe which pain severity was found to have a significant concordance to higher depression scores, p value 0.005. High FMDRS scores were significantly associated with anxiety and impaired sleep quality with a p value 0.023 and 0.038 respectively, correlation coefficient was 0.349 and 0.321 respectively. Overall QOL remained preserved in all patients but 11 patients (26.2%) had poor QOL in the social relationship domain and 2 patients (4.8%) had poor QOL in the physical and psychological domains. Depression, anxiety and impaired quality of sleep had a significant impact on both overall and sub-domains of QOL with p value of 0.006, 0.001, 0.014 and contingency coefficient of -0.418, -0.508 and -0.375 respectively.

Conclusion: Prevalence of non-motor symptoms was high in focal and segmental dystonia and they had a greater impact on an individual's quality of life than that of motor symptoms.

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Effects of *Helicobacter Pylori* Eradication on Symptoms of Parkinson's Disease with Motor Fluctuations

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Background and Objective: Recent studies have shown a high prevalence of *Helicobacter pylori* (HP) infection in Parkinson's disease (PD) that could affect levodopa absorption, resulting in motor fluctuations. This study aimed to evaluate the prevalence, associated factors of HP infection, and the effect of HP eradication on clinical symptoms of PD with motor fluctuations in advanced PD patients.

Materials and Methods: A prospective cohort study including 40 PD patients with motor fluctuations was conducted. The ^{13}C-urea breath test was used to diagnose a current HP infection. All patients with HP infection received standard triple therapy for 2 weeks. Demographic data, the Unified Parkinson's Disease Rating Scale (UPDRS)-motor score, levodopa onset time, wearing-off symptoms, daily on-off time, non-motor symptoms score, gastrointestinal symptoms score, quality of life score, and HP status were evaluated at baseline and 6-week follow-up.

Results: Twenty-two patients (55.0%) had a current HP infection. Patients with HP positive had a statistically significantly younger age, age of onset, poorer ADL scale, higher dose of anticholinergic, longer levodopa onset time, and higher frequency of tremor-associated wearing off symptoms than HP negative patients. Seventeen patients (77.3%) with confirmed HP eradication showed a significant decreasing daily 'off' time with increasing total 'on' time, improving total wearing-off symptoms, and GI symptoms scores from their baseline.

Conclusions: Our study showed a high prevalence of HP infection in advanced PD patients. Younger age, tremor-associated wearing off, and anticholinergic uses were related to HP infection. Eradication of HP can improve PD symptoms with motor fluctuations.

Relationship between Collateral Circulation, Occlusion Site and the Outcomes of Acute Ischemic Stroke due to Large Vessel Occlusion

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Objective: To assessed clinical outcomes in patients with large ischemic stroke based on collateral status and occlusion sites, evaluated by multiphase CTA and predictors of favorable outcome at 3 months.

Methods: Patients with anterior circulation, acute ischemic stroke caused by large vessel occlusion presented within 4.5 hours after onset were evaluated with multiphase CTA before treatment. Collateralization was studied. Clinical outcome was assessed by modified Rankin scale (mRS) at 3 months. Predictors of favorable outcome (mRS 0-2) was analyzed.

Results: 95 patients were included. Mean age was 66 years. Mean NIHSS was 15. The mean time from symptom onset to multiphase CTA was 152.23 minutes. Mean ASPECTS score was 7. Intravenous thrombolysis was given in 71 patients (71%) and mechanical thrombectomy was performed in 5 patients (5%). Favorable outcome was found in 35 patients (37%) at 3 months. 48 patients (51%) had intermediate-good collateralization. Multivariate analysis revealed that the favorable outcome was associated with younger age (<70 years) (odds ratio [OR] 7.46, 95% confidence interval [CI] 1.99-27.7, p=0.003) and location of occlusion. Patients with acute ischemic stroke, caused by middle cerebral artery (M1,M2 segment) occlusion had more proportion of favorable outcome as compared with those with internal carotid artery occlusion (53.33% vs 8.82%, OR 6.57, 95%CI 1.326-32.25, p=0.021). While patients with intermediate-good collateral circulation showed a trend of having favorable outcome as compared to those with poor collateralization (47.91% vs 25.53%, OR 1.22, 95%CI 0.32-4.60, p=0.76).

Conclusions: Favorable outcome was found in 37% of patients with acute ischemic stroke caused by large vessel occlusion. Younger age and location of occlusion were the predictive factors of favorable outcome.

Predictors of Unfavorable Outcome in Minor Ischemic Stroke/TIA in Thai Patients at Thammasat University Hospital

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Background: Minor ischemic stroke (NIHSS ≤5) or transient ischemic attack (TIA) are associated with a substantial risk of recurrent stroke and potential disabling.

Objectives: This study aimed to assess the predictive factors of unfavorable outcomes in Thai patients with minor ischemic stroke and TIA.

Methods: Patients with minor ischemic stroke and TIA were prospectively included. Baseline characteristics, stroke subtypes, white matter lesions, clinical course during admission, treatment and outcomes of patients at 3 months were studied. Factors which were associated with unfavorable outcome (modified Ranking scale of 2-6) were analyzed.

Results: There were 293 patients. Minor ischemic stroke and TIA were diagnosed in 265 (90%) and 28 (10%) patients, respectively. Mean age were 64 years. Unfavorable outcome was found in 69 patients (24%). Multivariate analysis revealed that prestroke disability (mRS ≥ 3) (odds ratio [OR] 12.82, 95% confidence interval [CI] 2.94-55.55, p-value < 0.001), moderate to severe white matter lesions (OR 2.06, 95% CI 1.05-4.03, P = 0.03) and clinical progression of stroke during admission (OR 12.65, 95% CI 5.34-29.41, P < 0.001) were associated with the unfavorable outcome.

Conclusions: Unfavorable outcome occurred in a quarter of patients who presented with minor ischemic stroke/TIA. Baseline disability, white matter lesions and clinical progression during admission were related to the unfavorable outcome.

Role of Inhibitory Neurosteroid as an Adjunctive Treatment in Refractory Status Epilepticus (phase IIa study): Efficacy, Safety, and Bioavailability of Allopregnanolone Converting from Oral Micronized Progesterone

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Objectives: To study bioavailability of oral micronized progesterone that convert to allopregnanolone (an inhibitory neurosteroid) and determine its efficacy and safety in treating Thai patients with refractory status epilepticus (RSE).

Materials and Methods: A prospective interventional study was conducted at Phramongkutklao Hospital. Patients diagnosed with RSE on midazolam infusion were assigned to receive oral progesterone 200 mg every 8 hours via nasogastric tube for 5 days. Standard treatments for RSE were maintained. Serum allopregnanolone levels were monitored. Outcomes including seizure terminations, hospital stays, mortality rates, and accumulated midazolam dosage were analyzed and compared with historical cohort.

Results: Total of 6 patients receiving oral micronized progesterone (intervention group), and 6 patients incontrol group were compared. Demographic data between groups were not different, mean age of 63 and 62.3 years old, respectively. It was shown that oral micronized progesterone clearly converted to allopregnanolone. Allopregnanolone significantly shorten the duration of RSE, 25.5 hours vs. 58.4 hours, *p*-value 0.004. The average duration of hospital and ICU stays were 57 days, 28.7 days for intervention group and 58.7 days and 44.5 days for control group, *p*-value 0.929 and 0.399, respectively. The mortality rate of intervention group was lower in intervention group, 33.3% vs. 66.7%, *p*-value 0.513. The intervention group required lower total accumulated midazolam infusion dosage, 87.5 mg vs. 330.4 mg, *p*-value 0.394. No any clinical adverse events nor worsening of laboratory profiles were reported.

Conclusion: Allopregnanolone, converted from oral micronized progesterone, demonstrated efficacy and safety in treating refractory status epilepticus.

Pharmacokinetics of Levetiracetam in Thai Epilepsy Patients undergoing Intermittent Hemodialysis

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Background: Levetiracetam (LEV) is primarily eliminated by kidney. In patients with kidney failure on hemodialysis (HD), LEV level reduces significantly.

Objectives: We aimed to conduct a pharmacokinetics study and to determine appropriate supplemental dosage for our Thai epilepsy population undergoing intermittent hemodialysis.

Methods: This was a single center prospective investigational cohort study; recruiting adult epilepsy patients with clinically indicated for intermittent hemodialysis. Intravenous LEV maintenance dose was given before hemodialysis. Serum LEV levels were monitored at 8 points over pre-dialysis, dialysis and post-dialysis periods. The supplement LEV dose (half of the maintenance dose) was administered at 1 hour after hemodialysis.

Results: Total of 12 patients, mean age was 64-year-old (SD 18), range 24-86, and male was 4 (33.3%). Maintenance LEV dosage was 1,000-1,500 mg/day. All the patients had serum LEV within therapeutic range (12-46 µg/mL) at C_{trough} level, C_{peak} level and just before starting hemodialysis. During intrahemodialysis period, the LEV levels were declined gradually over the time. At the end of hemodialysis, 5 patients (41.7%) had sub-therapeutic LEV levels. There was no predictor related to sub-therapeutic LEV level. After injections of supplemental LEV dose, serum LEV level of all the patients reached therapeutic level.

Conclusion: Intermittent hemodialysis dramatically eliminates levetiracetam. Supplemental dose as 50% of the maintenance dosage is recommended for maintaining levetiracetam therapeutic level.

The Relationship between the Absorption of Rivastigmine Patch, Skin Moisture, and the Area of Patch Attachment in Alzheimer's Disease Patients

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Objectives: To study the relationship between the absorption of rivastigmine patch, skin moisture, and the area of patch attachment in Alzheimer's disease patients.

Methods: This analytical experiment study was conducted at Phramongkutklao Hospital. The Alzheimer's disease patients who received rivastigmine patch during October, 2018 to December, 2019 were included. The outcome was to determine the relationship between the skin moisture and the amount of rivastigmine remaining in the used patch (presented as percentage) in four different body areas (chest, upper arm, upper back, and lower back). In addition, relationship between serum rivastigmine concentration and the residue amount of rivastigmine in the used patch was also studied.

Results: A total of 30 patients were included in this study. The averages of skin moisture on chest, upper arm, upper back, and lower back were 45.97 %, 42.91 %, 45.83 %,43.23 %,respectively. The average of the drug residue level on rivastigmine patch at chest, upper arm, upper back, and lower back were 50.5 %, 55.2 %, 53.28 %, 53.4 % respectively. Negative trend relationship with no significant statistical analysis were found between the amount of rivastigmine remaining in the used patch and the skin moisture on chest, upper back, and lower back; p-value were 0.239, 0.767, 0.191 respectively. No significant correlation between serum rivastigmine concentration and the residue amount in the used patch was found.

Conclusion: It was found that the relationship between skin moisture and rivastigmineresidue seemed to be in indirect fashion. However, the further large amount of the sample size needed to be examined.

Prevalence and Factors Influencing Malnutrition in Patients with Parkinson's Disease

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Introduction: Parkinson's disease (PD) is recognized as the second most common neurodegenerative disorder after Alzheimer's. Previous studies have shown that Parkinson's disease patients are at a higher risk of malnutrition. The prevalence has been estimated to 0– 24%. To date, there is no clear explanation for malnutrition in these patients.

Objectives: To determine the prevalence of malnutrition and to analyze factors that influencing malnutrition in patients with Parkinson's disease.

Materials and Methods: We used cross-sectional study design. A total of 260 Parkinson's patients visiting Neurology clinic in Phramongkutklao hospital during August 2019 to January 2020 were enrolled in this study. Patients were asked to measure height and weight and met an investigator to complete the questionnaire and The Nutrition Alert Form (NAF).

Results: Out of 260 patients, 142 (54.62%) were male, 118 (45.38%) were female. Mean age was 74 years and the median disease duration was 5 years. Mean BMI was 23.13kg/m2,14.23% were malnourished based on NAF scores. According to demographic, clinical, psychosocial, and nutritional characteristics between malnutrition and non-malnutrition group, multiple logistic regression analysis revealed that disease duration, Modified H&Y, Depression, and BMI were significant factors influencing malnutrition in patients with Parkinson's disease

Conclusion: Prevalence of malnutrition in patients with Parkinson's disease in this study was 14.23%. Several factors influencing nutritional status including modifiable & non-modifiable factors. Therefore, Parkinson's disease patients should be regularly monitored for malnutrition, especially those with risk factors. Nutritional consultation with dietary regimen should become part of the regular treatment standard for Parkinson's disease patients.

PM 2.5 Air Pollution Composition and Vulnerability Characteristics Patients to Ischemic Stroke Hospitalization in Thailand

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Objective: Particulate matter (PM) 2.5 is associated with increased cerebrovascular events. There is limited data associated with PM 2.5 composition and vulnerability characteristics patients to ischemic stroke hospitalization.

Materials and Methods: Participant data were obtained from the universal coverage health security insurance scheme database across Thailand from 1st Jan 2014 – 31st Dec 2016. Air pollution data were gathered from satellite base (the MERRA-2 model reanalysis, and the Goddard chemistry, aerosol, radiation, and transport model for PM 2.5 species). We performed a Poisson log linear model analysis for the long-term exposure of PM 2.5 composition (black carbon, organic carbon, sulfate, dust, and sea salt) including patient's baseline characteristics with ischemic stroke hospitalization.

Results: We observed 201,024 patients who were diagnosed with ischemic stroke on admission. With every 10 μg/m^3 increase in PM 2.5 exposure in patients with underlying chronic kidney disease or diabetes or atrial fibrillation increase risk for ischemic stroke hospitalization; (RR 1.35 (95%CI 1.27-1.43), 1.26 (95%CI 1.23-1.29), and 1.22 (95%CI 1.16-1.28), respectively). With every 1 μg/m^3 increase in black carbon exposurein diabetic patients increase risk for ischemic stroke hospitalization (RR 1.29 (95%CI 1.26-1.32). With every 1 μg/m^3 increase in dust exposure, patients with atrial fibrillation or chronic kidney disease increase risk for ischemic stroke hospitalization(RR 1.28 (95%CI 1.22-1.34) and 1.26 (95%CI 1.19-1.33), respectively).

Conclusion: Long term PM 2.5 and its composition exposure increase risk for ischemic stroke hospitalization. Diabetic patient increase risk with black carbon. Atrial fibrillation and chronic kidney disease patients increase risk with dust.

Clinical Features and Treatment Outcomes of Severe Strokes in Thailand: Real-World Practice in Hospitals Across Thailand

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Background and Objective: Severe ischemic stroke is a health burden and cause of death in Thailand. Thrombolysis is currently being used to treat acute ischemic stroke and quite effective. This study aims to evaluate clinical outcomes and risk factors associated with intracerebral hemorrhage (ICH) after thrombolysis (rTPA).

Method: This historical cohort study, patient data is obtained from the admission medical record, that sent to the National Health Security Office (NHSO) for reimbursement purposes between fiscal years of 2015-2017. We select acute ischemic stroke patients with severe (NIHSS 15-24) and very severe (NIHSS ≥ 25). Clinical outcome after thrombolysis was analyzed and investigated risk factors for ICH by multivariate method.

Results: 681 from 3,610 patients were included. Severe stroke group found that median Barthel index, median NIHSS at discharge and modified Rankin Scale (mRS) improved in rTPA used patients but had higher sICH (12.2% vs 3.9% p = 0.006). Very severe stroke group found that median NIHSS at discharge was lower than in the rTPA used group (15.0 vs 27.5 P = 0.003) but sICH was not different (15.3% vs 5.7% p = 0.266). The factors associated with sICH in severe stroke group are male gender (OR 1.844,95% CI 1.032-3.297) and diabetes mellitus (OR 2.085,95% CI 1.113-3.908), severe and very severe stroke group (NIHSS ≥ 15) are male gender and age (OR1.022,95% CI 1.000-1.045).

Conclusion: Severe stroke patient who uses rTPA, has a higher sICH but outcomes better. Male gender, diabetes mellitus and age are risk factors for sICH after rTPA.

The Incidence and Associated Risk Factors of Stroke Fever

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Introduction: The human body has a temperature regulation of 36.5 - 37.5 degrees Celsius through the regulation of hypothalamus. A study demonstrated that 14% to 61% of stroke patients have fever which caused higher mortality rate.In the neurology unit , fever is the common co-morbidity in ischemic stroke patient but the data have not collected.

Objective: To study the incidence of fever in stroke patients, factors that related to fever in stroke patients and find the cause of fever in stroke patients.

Materials and Methods: A retrospective cross-sectional study was conducted by reviewing the medical database of ischemic stroke patients in Rajavithi Hospital who was admitted between 1st January 2018 – 31st December 2019.

Result: 265 patients were included to this study, 73 (27.5%) patients had fever during diagnosed with ischemic stroke. Female is the only factor that statistically significant related to stroke fever (p value 0.003). In 73 stroke-fever patients,21 (28.8%) have new pulmonary infiltration in chest radiography and 13 (17.8%) have positive sputum culture.

Conclusion: This study showed stroke fever was more common in female and the most common cause of stroke fever is lung infections.

Quality of Life in Hemifacial Spasm after Treatment with Abo-botulinum Toxin A Injection, A 2 Years Retrospective Study

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Background: Hemifacial spasm (HFS), typical disorder presented with involuntary, unilateral, intermittent, sporadic tonic or clonic contraction of facial expression muscles. The long-term quality of life (QoL) in HFS patients after treatment with Abo-botulinum toxin A (Abo-BTX A) injection has not been studied in Thailand.

Objective: To evaluate long-term QoL in HFS after two years treatment with Abo-BTX A injection.

Material and Method: We performed 24 month, retrospective study, to determine QoL by complete hemifacial spasm-30 (HFS-30), abnormal involuntary movement scale (AIMS), medical outcome short form 36 items (SF-36), and center for epidemiologic studies-depression (CES-D) in HFS patients.

Results: The total of 70 patients, 52 female and 18 male, age between 20 to 80 years, which fulfilled the diagnostic criteria for idiopathic HFS, from October 2017 to September 2019 were enrolled. There were improvement of disease-specific QoL (HFS-30, AIMS-30) after two years treatment ($p < 0.001$). The general QoL (SF-36) also improved after two years treatment ($p < 0.001$). There were no changed of depressive symptoms (CES-D) after two years treatment ($P = 0.8453$).

Conclusion: There were significant improvement in both disease-specific and general QoL after two years treatment with Abo-BTX A, however depressive symptoms was not changed.

Incidences, Characteristics and Severity of Wake- up Ischemic Stroke in Emergency Room, Rajavithi Hospital

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Introduction: The previous studies revealed that 14% of ischemic stroke patients presenting at emergency department were wake-up ischemic stroke, however they did not clarify the subtypes of those wake-up ischemic stroke.

Objective: To study the incidences, characteristics and severity of the patients with wake-up ischemic stroke in emergency room, Rajavithi hospital.

Materials and Methods: A retrospective cross-sectional study was conducted by reviewing the medical record database of those wake-up stroke patients or who had stroke with unknown time of symptom onset, which presented in the emergency room at Rajavithi hospital. The datawas collected between December 1, 2018 and November 30,2019 and were reviewed and analyzed. The patients who were less 15 years old would be excluded.

Results: From all 250 ischemic stroke patients, 70 patients with wake-up stroke were included in this study. Mean age was 62.7±12.40 years. Numbers of male and female were equal. Mean BMI was 23.55±2.05. 65.7% of patients had no underlying disease. 81.4% of them had stroke for the first time. 85.7% had mild stroke (NIHSS 0-14). Small artery occlusion was the most common subtype(51.4%), the second most common was large artery atherosclerosis (27.2%), and the third most common was cardioembolic (21.4%). No patient was in stroke of other determined etiology, or in undetermined etiology.

Conclusion: Small artery occlusion stroke was the most common subtype in wake-up ischemic stroke patients in the emergency department, Rajavithi hospital.

Factors Affecting Epilepsy Surgery Outcomes and Post-Surgical Complications in Patients with Epilepsy in Resource-Limited Settings

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Background: An access to presurgical evaluation and epilepsy surgery remains a considerable challenge worldwide, particularly in resource-limited settings. Given the unavailability of resources for comprehensive epilepsy care and limited number of epilepsy centers in Thailand, epilepsy surgery has been underutilized. To date, there is a paucity of data about factors contributing to the epilepsy treatment gap, epilepsy surgery outcomes and post-surgical complications.

Objectives: The aim of this study is to investigate factors affecting epilepsy surgery outcomes and post-surgical complications.

Materials and Methods: This is a retrospective cohort study. All adult and pediatric patients who underwent epilepsy surgery at Ramathibodi hospital between January 2015 and April 2019 were recruited. Logistic regression analysis was used to identify associations between factors and surgical outcomes. Kaplan-Meier curves were used to estimate the probabilities of unfavorable outcome.

Results: 62 patients were enrolled. During the entire follow-up period, most of our patients were classified into Engel class I. The presence of psychiatric disorders, presurgical seizure more than 4 times/month and number of anti-epileptic drugs (AEDs) at 6-month visit, were associated with no seizure freedom (defined as Engel class II, II and IV altogether). Survival analysis based on age at onset, age at surgery and waiting time are 37, 54 and 25 years of age, respectively.

Conclusion: Under resource-limited setting, the majority of patients who underwent epilepsy surgery had favorable outcome with rare occurrence of surgical complications. Interestingly, a delayed referral time and unavailability of presurgical evaluation have deleteriously impacted on seizure outcomes. The longest waiting time to achieve seizure freedom were 10 years in pediatric and 36 years in adult patients. Therefore, epilepsy surgery has been underutilized and should be encouraged in proper surgical candidates.

Diagnostic Value of Self-Photographs (selfie) in Ocular Myasthenia Gravis

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Objective: To evaluate the value of self-photographs (selfie) as a diagnostic tool in ocular myasthenia gravis (OMG)

Materials and Methods: All available consecutive patients presented with ptosis and/or diplopia were included in this diagnostic study from May 2019 to September 2019. Inclusion criteria for OMG were clinical manifestations of OMG and at least one positive result of standard tests, including AChR-Ab, RNS, and SFEMG. Inclusion criteria for control participants were patients who experienced ptosis and/or diplopia from other conditions. All participants took portrait photographs of themselves using camera phones (selfies). Selfies were recorded twice daily for seven days and measured by the ratio of palpebral fissure height to palpebral fissure width (palpebral fissure index; PFI). The PFI difference between morning and evening selfies represented fluctuation in the degree of ptosis. The maximum PFI difference was used to find the best cut-point for OMG diagnosis.

Results: A total of 31 patients were recruited in the study. Twenty-one of them were compatible with OMG. Ten cases were grouped into controls. The prevalence of OMG was 67.7%.There was no difference in baseline characteristics between OMG patients and controls. The best cut-point of PFI difference was 0.080, which provided the highest likelihood ratio (1.9), with 38.1% sensitivity, 80% specificity, 80% PPV, and 38.1% NPV.

Conclusion: A new diagnostic method, selfie, is costless, convenient, non-invasive, and mostly available. In appropriate clinical contexts, selfies might be useful for the diagnosis of OMG.

Autoimmune Autoantibodies Status in Non-autoimmune Encephalopathic Patients

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Objectives: To investigate the specificity of the autoantibodies related to autoimmune encephalitis and also to identify possible associated factors with the false positive result.

Materials and Methods: This study was a prospective observational study, conducted at the Ramathibodi Hospital between June to December 2019. All patients, who had acute encephalopathy from any causes, were recruited to the study. Their serum and/or cerebrospinal fluid (CSF) were taken to analyze for autoimmune encephalitis assays and anti-thyroid antibodies. The authors did not interfere the primary physicians on any management of the patients. Clinical and laboratory data were systematically reviewed and collected from medical records. Clinical outcome was evaluated at one-month after the onset.

Results: Fifty-one patients were recruited. Only one patient had autoimmune encephalitis related to anti-CV2/CRMP5 antibody. Seventeen out of the remaining 50 patients had positive test for anti-thyroid antibodies in which five of them had Hashimoto's thyroiditis. Eleven remaining patients appeared to have false positive test since their medical conditions were all clearly explained by other causes. Comparison of clinical and laboratory data between patients with false positive test and patients with true negative test did not show any significant difference.

Conclusion: False positive anti-thyroid antibodies appear to be common in patients with acute encephalopathy. The occurrence of serum/CSF antibody in acute encephalopathy may be true association but it may not be the cause of encephalopathy. Therefore, diagnosis of autoimmune encephalopathy should be carefully made and excluded all other possible causes.

Cognitive Impairment in Minor Ischemic Stroke Patients in Ramathibodi Hospital

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Objectives: Firstly, to compare the prevalence of cognitive impairment and the cognitive performance between minor stroke patients and control patients at acute stroke onset and 3 months later. Secondly, to identify the risk factors associated with cognitive impairment in minor stroke patients.

Material and Methods: This study was a prospective cohort study during 1st July 2019 to 31st December 2019 in Ramathibodi Hospital. Seventy four acute-minor-stroke patients (NIHSS ≤ 5 or TIA) and 78 control patients were enrolled. The cognitive assessment was done usingThai Mental State Examination (TMSE) and Montreal Cognitive Assessment-Thai (MoCA-T) at baseline (within 7 days of acute stroke onset) and 3-month follow-up (90 +/- 14 days after). The TMSE scores of ≤ 23 and/or MoCA-T scores of < 25 were defined as cognitive impairment.

Results: The prevalence of cognitive impairment in minor stroke patients was significantly higher than control at 3-month follow-up (77.05% vs 59.70%; p=0.036). The minor stroke group had significantly lower TMSE and MoCA-T scores than the control group at both baseline (mean TMSE 26.30 vs 27.26; p=0.023, mean MoCA-T 19.03 vs 21.06; p=0.01) and follow-up assessments (mean TMSE 26.52 vs 27.64; p=0.028, mean MoCA-T 20.75 vs 22.67; p=0.022). The risk factors associated with cognitive impairment in the minor stroke patients were older age, lower education, hypertension, and the higher remaining NIHSS score at 3-month follow-up.

Conclusion: Minor stroke could be a potential cause of cognitive impairment especially in elderly with low education, hypertension, and remaining neurological deficits.

Evaluation of Retinal Nerve Fiber Layer and Ganglion Cell Layer Thickness in Alzheimer's Disease Using Optical Coherence Tomography

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Objective: To evaluate the feasibility of Optical Coherence Tomography (OCT) in detecting Alzheimer's disease (AD) by measuring the thickness of the retinal nerve fiber layer (RNFL) and ganglion cell layer/inner plexiform layer (GCL-IPL).

Materials and Methods: This was a single-center, cross-sectional study. The study included 29 patients with AD (mean age: 75.61 ± 6.24 years) and 29 healthy age- and sex-matched controls. All subjects underwent cognitive examinations using Montreal Cognitive Assessment tests. Measurements of the RNFL thickness, as well as GCL-IPL thickness, were taken for all subjects using OCT.

Results: The mean RNFL thickness was significantly thinner in the AD group than in the controls group (85.24and 90.68 μm respectively, adjusted P=0.019). The superior quadrant was thinner in the AD group (adjusted P=0.042). The mean GCL-IPL thickness of the AD (68.81) was significantly thinner than that in the controls (76.42) (adjusted P=0.01). There was a negative correlation between age and mean RNFL; and between age and GCL-IPL thickness (r=-0.338, P=0.010 and r=-0.346, P=0.008, respectively).

Conclusion: The means RNFL and GGL-IPL thickness were thinner in the AD than in the controls. The findings suggested that the RNFL and GCL-IPL thickness can be a biological marker for AD.

The Association between Migraine Headache and Obstructive Sleep Apnea

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Objectives: To identify the prevalence of migraine headache in patients with obstructive sleep apnea (OSA) and their association.

Materials and Methods: This was a cross-sectional study which conducted at the Faculty of Medicine Ramathibodi Hospital, Mahidol University during July to December 2019. There were 141 patients with obstructive sleep apnea diagnosed by polysomnogram. All patients were interviewed via telephone using the studied questionnaire of headache evaluation.

Results: Regarding the classification of OSA severity, there were 18 patients (12.77%), 27 patients (19.15%) and 96 patients (68.08%) classified as mild, moderate and severe group respectively. Forty patients (28.37%) were self-reported having headache within this year. According to the ICHD-3 criteria, there were total 13 patients (9.22%) diagnosed as migraine headache. The prevalence of migraine headache in each group were similar (p=0.19) which there were 2 (11.11%), 5 (18.51%) and 6 (6.25%) patients in mild, moderate and severe OSA group respectively.

Conclusion: Results of this study showed no clear relationship between migraine headache and different severities of OSA. Although patients with more severe OSA tended to have more frequent attacks, the association was not significant different. This finding may affect by the limitation of the number of the participants of the study.

Factors Affecting Outcome in Acute Ischemic Stroke Patients with Intravenous Recombinant Tissue Plasminogen Activator (rtPA) Treatment at the Faculty of Medicine Vajira Hospital

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Background: Intravenous thrombolysis is the mainstay treatment for acute ischemic stroke patients who presents within 4.5 hours of onset. Accurate outcome prediction for individual patients is essential for optimizing approach to patient management.

Objective: To identify factors associated unfavorable outcome following intravenous rtPA treatment.

Methods: We retrospectively identified acute ischemic stroke patients who received intravenous recombinant tissue plasminogen activator (IV rtPA) treatment. Multiple logistic regression was performed to identify factors associated with unfavorable outcome (modified Rankin scale at 90 days >2). Receiver operating characteristic (ROC) curve analysis was done to validate previously published prognostication models (DRAGON score and START nomogram) for our population.

Results: 85 patients were included in our analysis (38 males (44.71%); median age: 65 years (IQR 54.25-73); median NIHSS: 11 (IQR 7-17)). Unfavorable outcome was observed in 30 patients (35%). Multivariate logistic regression identified three factors associated with unfavorable outcome: history of diabetes mellitus (OR 9.365; 95% CI: 2.369–37.03; p = 0.001), NIHSS at presentation (OR 1.109; 95% CI: 1.007–1.221; p = 0.036), and early infarct signs on baseline CT scan of the brain (OR 4.834; 95% CI: 1.423–16.413; p = 0.012). Area under the ROC curve (AUC-ROC) for DRAGON score and START nomogram were 0.813 (95% CI: 0.721-0.905; p < 0.001) and 0.8 (95% CI: 0.707-0.894; p < 0.001), respectively.

Conclusion: Diabetes mellitus, baseline NIHSS, and early infarct signs on baseline CT scan of the brain were associated with unfavorable outcome in acute ischemic stroke patients who received IV rtPA.

The Incidence and Associated Risk Factors of Early Poststroke Seizures and Poststroke Epilepsy

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Objectives: To study the incidence of early poststroke seizure and poststroke epilepsy amongThai people and the differences in early poststroke seizures and poststroke epilepsy-associated risk factors.

Material and Methods: This study conducted by studying patients who have poststroke seizures in Vajira Hospital, from 2014 to 2018. The patients were divided into two groups, including early poststroke seizures group and poststroke epilepsygroup with a minimum follow-up of 6 months.

Results: Three thousand six hundred patients with no history of epilepsy presented with the first stroke. 93 patients had developed seizures. Mostly, 54 patients (58.1%) were in a group of hemorrhagic stroke. For ischemic stroke patients, 39 patients (41.9%) had seizures occurred. There were 59 patients with an early poststroke seizure group, of which 44 of them (74.6%) were hemorrhagic stroke patients, and 15 of them (25.4%) were ischemic stroke patients. For poststroke epilepsy group, 34 patients were found in which 24 patients among them (70.6%) were ischemic stroke patients, and 10 of them (29.4%) were hemorrhagic stroke patients. From a comparison between two groups of early poststroke seizures, there was a relation with hemorrhagic stroke and younger age. For the poststroke epilepsy group, there was a relation with ischemic stroke subtype, older age, atrial fibrillation, abnormal kidney function, and high serum calcium.

Conclusion: The incidence of poststroke seizures was found to occur in 5.17 patients / 1,000 people population/year. Ischemic stroke, older age, atrial fibrillation, kidney function, and serum calcium are independent predictors for poststroke epilepsy.

Development of Objective Attention Test for Differentiation Abnormal Sleepiness Person from Normal One

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Objective: To establish novel objective attention test to discriminate between abnormal sleepiness person and normal one.

Materials and Methods: Subjects were recruited during 2-months period of prospective pre-experimental design. Epworth Sleepiness Scale (ESS) Thai version was used to assess sleepiness. We develop novel attention test as consecutive 4 computer games incorporated the concept of realworld stimuli and several attention types. Reaction time (RT), response speed (1/RT), and 3 types of errors were collected. The characteristics of novel attention test were tested. The relationship between ESS scores and attention test outcome measures was tested by correlation. Mean difference of correlated parameters was also compared between ESS groups, and ROC curve was constructed.

Results: 54 subjects completed the study. Our attention test had significantly increased difficulty across serial 4 games, concordance to increased complexity of 4 types of attention in order ($p< 0.001$ for mean RT and mean 1/RT). Also, our test had acceptable ICC of mean RT and mean 1/RT (Cronbach's alpha > 0.70) in all 4 games. Only mean RT and mean 1/RT of Game1, adapted sustained attention principle, correlated with ESS scores ($r_s = 0.42$, $p = 0.002$ for mean RT; $r = -0.40$, $p = 0.003$ for mean 1/RT), with mean RT difference of 56 milliseconds (ms) ($p = 0.012$) and mean 1/RT difference of 0.34 ($p = 0.005$). Regard with Game1, cut-off value was 382 ms for mean RT ($p = 0.005$) and 2.8 for mean 1/RT ($p = 0.004$).

Conclusion: Mean RT and mean 1/RT from Game1 of our novel objective attention test were moderately correlated with ESS scores, and this part could be used to distinguish abnormal sleepiness person from normal one.

Pilot Study: A Validation of Wrist Actigraphy in Thai Cognitive Impairment Patients with Sleep Problem

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Introduction: Sleep is essential to normal brain function for maintained mood, cognition, and hormone rhythms. Sleep disturbances associate with neurodegenerative disorders. The gold standard for measuring sleep is polysomnography, but it needs controlled setting and sleep technician. The wrist actigraphy is a new device for measuring sleep.

Objectives: To explore the efficacy of wrist actigraphy, in relation to gold-standard polysomnography, in Thai cognitive impairment patients and sleep problem.

Materials and Methods: A total of 12 participants aged over 55 years with sleep disturbance with or without cognitive impairment at Siriraj hospital were included. All participants had polysomnography (PSG) for 1 night and wrist actigraphy for 7 days. The interval between PSG and wrist actigraphy data collection was within 1 year. Half of participants had dementia. Demographic data, medical history, history related to cognition, and sleep history were collected from participants.

Results: Actigraphy and PSG had significant and good correlation in onset latency ($P = 0.03$, $r = 0.64$). But the time in bed (TIB) ($P = 0.22$), total sleep time (TST) ($P = 0.38$), sleep efficacy ($P = 0.47$), wake after sleep onset (WASO) ($P = 0.27$), and number of wake bouts ($P = 0.50$) were not correlated. Addition, actigraphy and TIB from sleep diary ($P < 0.001$, r 0.92) and TST ($P = 0.002$, $r = 0.84$) were significantly correlated. But onset latency ($P = 0.19$) and sleep efficacy ($P = 0.10$) were not correlated. These was no relationship between WASO or sleep efficacy from actigraphy with questionnaire, cognitive status, light exposure, and continuous positive airway pressure (CPAP) treatment.

Conclusion: Actigraphy can be used in real life for evaluation of sleep. The use of actigraphy should add some questionnaire to explore sleep movement abnormality to explain poorer sleep efficacy.

Clinical Outcomes and DNA Methylation Profiles of Gemistocytic Astrocytoma in Thai Patients

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Background: Gemistocytic astrocytoma (GA) isa rare but distinct and more aggressive variant of diffuse astrocytoma (DA, WHO grade II). As GA is associated with early malignant transformation, adjuvant treatment following surgery is recommended. However, histological diagnosis of GA remains a challenge even among experienced neuropathologists. DNA methylation-based classification may provide a better approach for diagnosis of GA with higher accuracy.

Objectives: We aimed to differentiate GA from non-GA-DA, by DNA methylation profiling and to compare their respective clinical outcomes.

Methods: This study was originally designed as a case-control study for comparing DNA methylation profiles between GA and non-GA-DA. However, significant number of GA and non-GA-DAsamples failed to undergo successful DNA methylation profiling due to poor DNA quality in old archival tumors. Therefore, meaningful comparison of methylation profiles cannot be performed. We here reported clinical outcomes and DNA methylation profiling of GA and non-GA-DA as case series.

Results: GA and non-GA-DA were clustered within the glioma family, *IDH* mutant, subclass astrocytoma according to Heidelberg methylation classification. Of note, all non-GA-DA were positive for IDH1R132H immunostaining (non-GA-DA_{IDHmut}). One case of GA and three cases of non-GA-DA_{IDHmut} showed *CCND2* amplification, the most common abnormality found in GA in a prior report. *CDKN2A/B* deletion, an emerging marker of poor prognosis for WHO grade II-III glioma, was seen in four out of nine cases (44%) of non-GA- DA_{IDHmut} and one patient with this alteration had short progression-free survival.

Conclusions: GA is associated with poor prognosis when compared to non-GA-DA_{IDHmut}. DNA methylation profiling can precisely classify *IDH*-mutant WHO grade II astrocytoma including the GA subset. Future studies in larger patient populations with adequate tumor DNA quality are required to elucidate the genetic marker of GA.

Prevalence and Characteristics of Cognitive Decline in Thai Patients with Neuromyelitis Optica

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Objective: Previous studies showed the cognitive problem in patients with neuromyelitis optica (NMO). We aimed to study the prevalence and characteristics of cognitive function in Thai patients with NMO at Siriraj Hospital.

Materials and Methods: We recruited 83 participants diagnosed with NMO by the international consensus diagnostic criteria for NMO spectrum disorder 2015 who visited the Demyelinating Disease Clinic of Siriraj Hospital from August 2019 to January 2020. We assessed cognitive function by using the Montreal Cognitive Assessment (MoCA) and Frontal Assessment Battery (FAB) test. Descriptive statistics were used to describe the primary outcome and inferential statistics for the relationship between clinical characteristics and cognitive profiles.

Results: The majority (54%) of patients with NMO had cognitive impairment according to the MoCA score less than the cut-off (<25). The mean MoCA score in this study is 22.96±3.82. Lower education and disease severity evaluated by the Expanded Disability Severity Scale (EDSS) were associated with objective cognitive impairment in NMO (P-value <0.001 and 0.014, respectively). Age, annual relapse rate, duration of disease, and Aquaporin-4 (AQP4) antibody status were not associated with cognitive impairment (all P-value > 0.05). The informant-report of NMO patient's cognitive decline was associated with poorer cognitive performance (P-value = 0.032), not the self-report (P-value = 0.397).

Conclusion: Most of Thai patients with NMO had cognitive impairment, which associated with education, disease severity, and also the perception of their relatives. Further studies on more comprehensive cognitive tests, mood and behavior, and subjective cognitive complaints, are needed for better care in the future.

Morbidity and Mortality in Aquaporin-4 Antibody-Positive and Negative Patients with Neuromyelitis Optica Spectrum Disorder: A Retrospective Chart Review Study

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Background: Neuromyelitis optica spectrum disorder (NMOSD) is an autoimmune, inflammatory disorder of the CNS with a predilection for the optic nerves and spinal cord. The frequent relapses lead to morbidity and mortality.

Objectives: To compare the clinical outcomes in terms of disability and mortality between the patients with AQP4-IgG positive and negative NMOSD

Materials and Methods: A retrospective chart review was performed from the patients diagnosed with AQP4-IgG positive and negative in Siriraj Hospital between 1994 and 2019.

Main measure outcomes: Expanded Disability Status Scale (EDSS), Multiple Sclerosis Score (MSSS), unilateral and bilateral blindness using the logarithm of the minimum angle of resolution (logMAR), requirement of urinary and feeding tube catheterization, as well as, the mortality cases.

Results: Total numbers of all clinical attack and those of optic neuritis (ON) or transverse myelitis (TM) in the group with AQP4-IgG positive NMOSD were higher than those with seronegative NMOSD leading to the significantly worse visual acuity (logMAR VA) and EDSS. Additionally, there was also the higher incidence of bulbar dysfunction and bowel/bladder involvement in aquaporin-4 positive NMOSD group. However, our study did not show statistically different between the two groups in terms of MSSS. We also demonstrated major cause of death among the patients in our hospital.

Conclusion: AQP4-Ab seropositivity and relapsing course had an influence on the morbidity in NMOSD. Most mortality cases had a poor functional status before death, and the cause of death was infections.

Outcome of Early vs Late Immunosuppressive Drug Treatment in Neuromyelitis Optica Spectrum Disorder and Myelin Oligodendrocyte Glycoprotein Associated Disease

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Objectives: To study the treatment outcomes of early versus late immunotherapy administration in neuromyelitis optica spectrum disorder (NMOSD) and myelin oligodendrocyte glycoprotein (MOG)-immunoglobulin (IgG)-associated disease at Siriraj Hospital.

Materials and Methods: Patients were identified by searching the Siriraj Hospital Electronic Health Record (January 1994 to December 2019) following criteria 1) age at presentation ≥ 15 years, 2) diagnosed with one of these following; NMOSD according to the 2015 diagnostic criteria or MOG-IgG-associated disease, and 3) had excluded other demyelinating diseases. Early versus late immunotherapy administration was defined by duration of onset of first attack to initiate immunotherapy less than 6 months, and more than 6 months, respectively.

Results: The median pretreatment annualized relapse rate (ARR) of the early and late immunotherapy administration group were 7.8 (range 4.7-12.0) and 1 (range 0.5-2.7), respectively ($p < 0.001$). The posttreatment ARR of the early immunotherapy was 0 (range 0.2-0.4) and late immunotherapy was 0 (range 0.1-0.4),($p = 0.651$). The reduction of pretreatment and posttreatment ARR between early and late immunotherapy group were 7.9 (4.9 - 12.7), 0.8 (0.2 - 2.4), respectively, $p < 0.001$). No significant difference in visual function (27.9%, 36.8%, $p = 0.314$), mortality rate (0, 4.6%, $p = 0.563$) between early and late treatment group, respectively.

Conclusions: Early starting the immunotherapy within 6 months had significant reduction in relapse rates, total numbers of attack in both seropositive and seronegative NMOSD patients. However, results in patient with MOG IgG associated disease was limited due to small number of patients.

Obstructive Sleep Apnea and Sudden Unexpected Dead in Epilepsy in Unselected Patients with Epilepsy: Does Its Association?

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Objective: We sought to investigate the relationship between the SUDEP-7 inventory, sudden unexpected death in epilepsy (SUDEP) biomarker and apnea-hypopnea index (AHI).

Materials and Methods: We conducted a cross-sectional study of consecutive subjects more than 15-year-old without known sleep disorders or prior PSG were recruited from a single epilepsy clinic in a tertiary care facility. Participants underwent polysomnography. Scoring was performed by a blinded board-certified sleep physician and senior sleep technologist.

Results: Our study population consisted of 97 participants. Median AHI of our populations was 2.4 (range = 0 – 82.4). 16 (16.4%) patients with epilepsy were found OSA (AHI $\geq$ 15), 12 patients have mild to moderate OSA and 4 patients have severe OSA. Median rSUDEP-7 inventory score was 1 (range = 0 - 7). There were no significant differences in total rSUDEP-7 inventory score and AHI or non-REM AHI or REM AHI or supine AHI or non-supine AHI. Also, rSUDEP-7 inventory score $\geq$ 4 did not showed association with AHI or non-REM AHI or REM AHI or supine AHI or non-supine AHI.

Conclusions: Our study did not found association between OSA and SUDEP biomarker in an unselected patient with unknown cause epilepsy.

Pregnancy Associated Bell's Palsy: A Retrospective, Matched Case-control Study

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Introduction: The association between pregnancy associated Bell's palsy (PABP) and gestational hypertension (GHT), preeclampsia (PE), eclampsia (ES), and gestational diabetes mellitus (GDM) remains inconclusive.

Objectives: To study the association between PABP and the pregnancy-related complications mentioned by matched case-control study.

Materials and Methods: This is a retrospective 1:5, case-control study matching specific maternal age and specific order of gravidity of the pregnant women with PABP (PABP (+)) with those without PABP (PABP(-)) from 2006 to 2016 in Songklanagarind Hospital. Descriptive statistics were used to describe the general demographics, medical and gestational data, gestational age at the onset of Bell's palsy (BP), the development of GHT, PE, ES and GDM. The association between PABP and GHT, PE, ES and GDM were analyzed by logistic regression analysis. The newborns of PABP (+) and PABP (-) mother were also matched in corresponding to their mothers. The differences of neonatal parameters were analyzed by descriptive statistics.

Results: There were eight cases of PABP (+) of 12,350 pregnant women found during the study period. Most of the cases were first and second gravidity pregnancy, and experienced BP during the third trimester. PABP (+) mother had greater risk to associate with GDM. (adj. OR 16.73, 95% CI 2.01,139.26 $p < 0.007$). Nevertheless, no significant risk of elevated SBP and DBP in PABP (+) mothers was shown. Neonatal health was acceptably good in both groups.

Conclusion: PABP is a significant risk for GDM but not for GHT, PE and ES.

The Effects of Botulinum Toxin Type A for the Treatment of Trigeminal Neuralgia in Prasat Neurological Institute

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Background: Trigeminal neuralgia (TN) is a neuropathic facial pain condition. Botulinum toxin type A (BTX-A) has been approved by FDA in treating chronic migraine and has been studied as a therapeutic option in various types of neuropathic pain.

Objectives: To evaluate the efficacy and safety of a BTX-A in patients with refractory TN.

Methods: In this open-label pilot clinical trial, twelve patients with refractory idiopathic or classical TN were included. All patients were received 25 units of BTX-A in painful trigger points using subcutaneous and intradermal techniques as an additional treatment, while all patients received their conventional treatment concurrently. The primary outcomes were pain severity assessed by visual analogue scales (VAS) and attack frequency per day (F). Both VAS and F were compared from baseline to eight-week endpoint. The secondary outcomes were patient' quality of life assessed by Quality of Life Scale (QoL scale) and Penn Facial Pain Score-Revised (Penn FBS-R).

Results: A total of 12 patients completed the study. Seven women and five men aged 47-80 years (median 57.5, IQR 20.5) suffering TN from 2 to 15 years (median 5.5, IQR 4.25). In primary outcomes, VAS and F were significant reduced from baseline to endpoint ($p=0.05$, $p=0.02$) respectively. For secondary outcomes, patient's quality of life as measured by QoL scale and Penn FBS-R were also improved. No systemic adverse event was noted. The reported side effect was transient facial asymmetry in one patient which automatically disappeared in 4 weeks.

Conclusion: This pilot study supports other previous studies and demonstrated that BTX-A is a minimally invasive and effective treatment for intractable TN before step up to other more invasive therapies.

Predictive Factors Associated Clinical Outcome and Mortality in Post Mechanical Thrombectomy in Large Vessel Occlusion in Prasat Neurological Institute

Background: Clinical outcome after large vessel occlusive strokes depends on admitting clinical condition, successful recanalization, and collateral circulation. Some of variables may be adjustable for the better outcome. This study tried to find out the modifiable prognostic factors of acute large vessel occlusion when treated with mechanical thrombectomy.

Methods: This is a retrospective single-center analysis of 60 patients with large vessel occlusion treated with mechanical thrombectomy. Data of patient demographics, laboratory investigation, neuroimaging, procedural characteristics, and clinical outcomes were recorded and analyzed. Primary outcome was set for functional independence at 90 days after stroke onset (modified Rankin Scale score of 0–2). Secondary outcome were death during hospitalization, neurological complications and systemic complications.

Results: The patients with mTICI reperfusion grade 3 have significantly good functional outcome when compared to the mTICI0-2b (odds ratio [OR] 8.532; 95% confidence interval [CI] 1.843-39.501). While the successful recanalization (mTICI2b or 3) did not show significantly different between group of good clinical outcome (mRS 0-2 at 90 days after onset) and group of poor clinical outcome (mRS ≥ 3 at 90 days after onset) (93.8% vs. 75.0%; P = 0.69). In addition, patients with hypertension and diabetic mellitus had poorer clinical outcomes in comparison with patients without these risk factors (78.6% vs. 37.5%; P = 0.02 and 39.3% vs. 6.2%; P = 0.04, respectively). And high baseline NIHSS (>25) score showed higher rate of death at discharge (NIHSS 16-25; 80% vs. 53.8% and NIHSS > 25; 20% vs. 0%; P = 0.011).

Conclusions: mTICI3 reperfusion is associated with superior outcome and independent function at 90 days after stroke onset than mTICI2b patients. As reperfusion quality is the most important modifiable predictor of patient outcome, the endovascular treatment approaching to mTICI3 may be considered. Furthermore, the patients with high baseline NIHSS > 25 may be associate with higher rate of death. And patients with risk of intracranial atherosclerosis (hypertension and diabetic mellitus) could bring about poorer clinical outcome.

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Treatment Outcome of Thymectomy in Myasthenia Gravis Patients at Prasat Neurological Institute

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Background: Myasthenia gravis is a most common neuromuscular junction disorders and is caused by autoantibodies responses against acetylcholine receptor in the postsynaptic muscle endplate. Although thymectomy is the current standard treatment but the benefit in long-term outcomes and in non-thymomatous generalized MG patients with negative AChR antibody are still unclear.

Objective: To determine the treatment outcomes of thymectomy in non-thymomatous generalized MG patients with or without AChR antibody and identify features were related to remission.

Methods: Retrospective chart review of diagnosed of non-thymomatous generalized MG patients from January 1st,2014 to December 31th, 2018. Patients were classified into two groups: patients with thymectomy (thymectomy group) and patients with no thymectomy (medication group). All baseline clinical features, investigation and treatment response were comparable.

Results: At 6 and 12 months follow up, most patients in both groups had a good response to treatment. At 24 months follow up, thymectomy group was in complete stable remission higher than medication group (25% vs. 7.5%) and all patients had positive Acetylcholine receptor antibody. The thymectomy group was required prednisone, azathioprine and cholinesterase inhibitor slower than medication group.

Conclusion: Thymectomy is associated with a high probability of achieving remission, reduced cholinesterase inhibitors and immunosuppressive drugs when compared to medication group. Therefore, thymectomy should be considered strongly for non-thymomatous generalized MG patient with positive AChR antibodypatient and may considered in non-thymomatous generalized MG with negative AChR antibodypatient.

Primary and Secondary Hypertrophic Pachymeningitis in Prasat Neurological Institute: Clinical, Laboratory and Neuroradiologic Features

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Background: Hypertrophic pachymeningitis (HP) can be categorized into primary (idiopathic) and secondary HP depend on identifiable underlying cause. Nowadays, it is difficult to distinguish between them.

Objective: The primary aim of this study was identified distinct characteristic between primary and secondary HP by clinical manifestations, investigation and treatment response in Prasat Neurological Institute.

Methods: A retrospective study was conducted between January 2012 until June 2019. We reviewed the clinical records which diagnosis of HP consist of clinical features, laboratory data, MRI finding and treatment. Fisher's exact test and Mann-Whitney U were used for determine the statistically significant differences (p-values < 0.05) between etiology groups of HP.

Results: 84 patients with HP were included with 50 female and 34 male, median age at onset was 51 (38-62) years. Etiologies of HP were classified to idiopathic HP 64.3%, IgG4-related HP 21.4%, ANCA-related HP 2.4%, and the other such as meningioma, neurosarcoidosis, aspergillosis. Common clinical presentation were double vision, focal headache, ptosis and abnormal facial sensation which no different of IgG4-related HP and idiopathic HP. The T1WGd MRI of IgG4-related HP showed irregular pattern of dural thickening and enhancement more than idiopathic HP (50% vs 13%), significant difference (p-value 0.002). The distribution of lesions presented diffuse in IgG4-related HP more than idiopathic HP (27.8% vs 7.4%), significant difference (p-value 0.031).IgG4-related HP showed positive of ANA, increased ESR/CRP and decreased hematocrit more than idiopathic HP. The recurrence rate of idiopathic HP was 26% and IgG4-related HP was 22%.

Conclusion: Idiopathic HP was the most common type and IgG4-related HP was the most common coexisting disease. The clinical features and response to corticosteroid therapy were similar between idiopathic and IgG4-related HP. The MRI showed irregular and diffuse dural enhancement combine with positive ANA test, high serum ESR/CRP, lower hematocrit may be clues to help identified IgG4-related HP.

Comparison Screening Tools for Large Vessel Occlusion in Acute Ischemic Stroke by Using VAN, FAST-ED and NIHSS Tools

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Background: In Thailand, stroke is the first leading cause of death. Moreover, stroke brings major burdens of disability for patients and their families. the prevalence of stroke of Thai populations age over 65 is 2.7%. Current treatment of acute ischemic stroke (AIS) can decrease mortality and disability rate including IV thrombolysis and endovascular treatment. For endovascular treatment, rapid screening tools are needed to clarify the patient who had large vessel occlusion stroke (LVOS) and rapid transport to comprehensive stroke center for proper management. Now, there are no standard screening tools to predict LVOS in patient with AIS. In this study, we used NIHSS $\geq$ 6 from inclusion criteria of AHA guidelines for endovascular treatment 2019 compared with FAST-ED and VAN.

Materials and Methods: Demographic and imaging data (CTA, MRA, conventional angiogram) of acute ischemic stroke patients who presented within 6 hours after onset in Prasat neurological institute (PNI) from May 2018 to October 2019 was collected. LVOS were defined as total occlusions or severe stenosis of ICA, MCA-M1, MCA-M2, and Basilar artery by using CTA, MRA or cerebral angiogram as a gold standard. Sensitivity, specificity, positive (PPV) and negative predictive values (NPV) of FAST-ED, VAN were compared with the NIHSS.

Result: LVOS was detected in 34(54%) of 63 qualifying patients. FAST-ED, VAN and NIHSS were compared in predicting LVOS. A FAST-ED $\geq$ 4 had sensitivity of 0.88, specificity = 0.93, PPV = 0.93, NPV = 0.87 and accuracy = 0.90 versus VAN had sensitivity, specificity, PPV, and NPV = 1.0, 0.89, 0.92, 1, 0.95 respectively whereas NIHSS $\geq$ 6 had 0.97, 0.79, 0.84, 0.95, 0.89 respectively.

Conclusion: FAST-ED scale and VAN assessment may be the reasonably screening tools for LVOS in AIS patients. However, VAN assessment had the best ability to discrimination than FAST-ED.

The Pilot Study of Using MAP18 Programs to Measurement Brain Atrophy in MS Patients; Longitudinal Cohort Study

Background: Multiple sclerosis (MS) is the immune-mediated inflammatory demyelinating disease of the central nervous system. Axonal injury is a prominent pathologic feature leads to white matter loss. In last decade many studies using MRI in patients with MS shown gray matter loss which correlates with neurological disability. The longitudinal study of cortical loss by MRI software may provide the prognosis of patient.

Methods: Demographic and MRI data of MS patients from Prasat Neurological Institute in the past 5 years was collected. Each pair of MRIs in T1MPRAGE protocol was analyzed by MRI base volumetric software MAP18. The primary end point was annualized rate volume loss in each part of brain. The secondary outcome was identifying the relevant factors which related to specific part of brain volume loss.

Results: A total 487 MS patients were recruited from medical record. Twenty-four patients and 38 pairs of MRI scans met criteria. The mean age was 36.4 years. Most of the patients are Asian with relapse-remitting phenotype and 70% of these were on one of disease modifying therapy. Mean MRI follow up duration was 19 months and mean number of pair scans was 1.58. The adjusted annualized brain volume loss was shown significant decreased in three axis including whole brain, whole gray matter and cerebral gray matter. The rate of declining of those parts were -0.68%(95% CI: -1.11 to -0.25, P: <0.01), -1.31% (95% CI: -1.84 to -1.78, P: <0.01) and -1.33% (95% CI: -1.96 to -0.69, P: <0.01) respectively. The secondary outcome was subgroup analysis of gray matter loss in difference conditions. There was no significance gray matter volume loss when considered age (<35, >35 years old), initial clinical phenotype (ex. CIS, RRMS), and regarding of specific type of DMT.

Conclusion: MAP18 may be used in measuring brain volume inMS patients. The data from MAP18 was comparable with previous other morphometric volume base measurements software in whole brain (e.g. SIENA, SIENAX), cortical gray matter (e.g. FreeSurfer). Among of these, cortical gray matter is the most significant loss which may predict the disease progression in subclinical ongoing disease.

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Clinical Characteristic of Seizure or Seizure Mimics with Specified Antibody Autoimmune Encephalitis Patients in Prasat Neurological Institute

Background: Autoimmune epilepsy is now increasingly recognized. It can present in the spectrum of limbic encephalitis and seizures, which can decrease quality of life and increase morbidity. Current data shows no specific seizure or seizure mimic semiology for these diseases and very few studies have analyzed the seizure semiology characteristics of antibody-mediated autoimmune epilepsy in detail.

Objective: To describe the clinical seizure/ seizure mimic semiology characteristics and some investigation results of specific antibody autoimmune epilepsy, which may remind us to test neuronal autoantibodies earlier and initiate immunotherapy as soon as possible.

Methods: Retrospective studies of 44 autoimmune encephalitis presenting with seizure or seizure mimic. Demographic data, seizure/ seizure mimic semiology characteristics, associated neurological symptoms, epilepsy risk factors, neurophysiological results (EEG both inter-ictal and ictal), radiological (MRI) and serological/ CSF (inflammatory markers, neural autoantibody) findings were recorded in each group of patients with specific antibody and describe the difference characteristics between each groups.

Results: Forty-four patients with autoantibody positive autoimmune encephalitis were identified. Specific autoimmune antibodies were detected anti-NMDA-R in 20patients (46%), anti-LGI-1 in 15 patients (34%), anti-CASPR2 in 2 patients (5%), anti-GABAB-R in 5 (11%) patients, anti-GAD65 in 1 patient (2%) and anti-PCA-1 in 1 patient (2%). Among anti-NMDAR encephalitis patients, there were only 2 of 20 patients had true seizure, the others presented with seizure mimics. The most characteristic is oral dyskinesia which can mimic oral automotor seizure. Among anti-LGI-1 encephalitis patients, most of them had memory impairment. Facio-brachial dystonic seizure (FBDS) is the most common seizure semiology of anti LGI-1 encephalitis, which can be preceded by piloerection seizure or aura. GTC seizure at onset was found in patients with anti-GABAB-R and anti-CASPR2 encephalitis. Other seizure semiologic characteristics were difficult to differentiate because of low amount of patients in each groups.

Conclusion: In our study, most common seizure mimic semiology in anti-NMDA-R encephalitis patients were oral dyskinesia which can be confused with automotor seizures. So antiepileptic drug use and management must be considered with caution. Clinical of memory impairment, piloerection seizure, FBDS and hyponatremia can be helpful in specific diagnosis of anti-LGI-1 antibody encephalitis. Whereas other specific antibody-mediated encephalitis have no specific seizure semiology characteristics.

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Factors Associated with Painful Tonic Spasms in Patients with Neuromyelitis Optica Spectrum Disorders: A Cross-Sectional Study

Objective: To obtain the prevalence of painful tonic spasm (PTS), compare the associated factors with the occurrence of PTS, define characteristics of PTS, and correlate the medication and prognostic factors with good recovery of PTS in patients with neuromyelitis optica spectrum disorders (NMOSD) in Thailand.

Methods: The cross-sectional retrospective study was performed in patients with definite NMOSD in Prasat Neurological Institute between January 1st, 2014 and December 31st, 2018. The prevalence and characteristics of PTS were explored. The baseline clinical characteristics and management in NMOSD were recorded. PTS was defined by definition in previous literatures and recovery of PTS was defined by at least 50% estimated reduction in pain score. The association between PTS and associated factors were analyzed. The subgroup analyses of associated factors in patients with PTS and analgesic use were done to compare with the long-term recovery of PTS.

Results: 201 patients with NMOSD were explored. The prevalence of PTS in patients with NMOSD was 37.81%. The factors associated with occurrence of PTS were the presence of acute myelitis (p = 0.002; OR 39.00, 95% CI 3.89-391.23) and tobacco use (p = 0.048; OR 13.38, 95% CI 1.02-175.52). In subgroup analysis of factors associated with recovery of PTS, plasma exchange (p = 0.007; OR 24.70, 95% CI 2.43-251.57) and EDSS range 1.0-4.5 (p = 0.008; OR 6.92, 95% CI 1.67-28.65) were related with recovery of PTS whereas older age at last visit (p = 0.013; OR 1.09, 95% CI 1.02-1.17) and longer segments of spinal cord lesions (p = 0.016; OR 1.21, 95% CI 1.04-1.42) were correlated with non-recovery of PTS.

Conclusions: PTS is one of the high burden complications in patients with NMOSD in Thailand. The presence of acute myelitis and tobacco use are associated with the presence of PTS. Plasma exchange treatment in acute phase of NMOSD may be associated with good recovery of PTS and longer segments of spinal cord lesions are correlated with poor recovery outcome. Control of these factors may prevent the occurrence of PTS or at least facilitate the recovery of PTS in these patients.

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