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# **Asia Pacific Stroke Conference 2018**

**Abstracts of the  
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### O-1. Cerebrovascular Occlusive Disease

#### Exploring the Neuroprotective Potential of Chlorogenic Acid: An In-vivo and In-silico Approach

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**Background and Objectives:** Stroke is life-threatening neurological disorder and a leading cause of adult disability. Several clinical trials have been performed using potential neuroprotective agents, none of them has proven to be useful for providing functional recovery from ischemic stroke. Therefore, present in-vivo and in-silico study were designed to investigate the plasma pharmacokinetics, brain penetration and neuroprotective potential of chlorogenic acid (CGA) in rats.

**Methods:** The molecular docking simulation was performed to evaluate the inhibition potential of chlorogenic acid for MMP-2, MMP-9, NMDA, nNOS, and iNOS. The plasma pharmacokinetics and brain penetration study is also performed. To evaluate neuroprotective activity, brain infarction, % brain water content, blood-brain barrier (BBB) disruption along with the level of nitrate, glutamate, and calcium were observed in the sham, ischemic and treated rats.

**Results:** The CGA was docked with mediators of neuronal dysfunction, i.e., MMP-2, MMP-9, NMDA, nNOS and iNOS active sites along with their inhibitors. Chlorogenic acid has formed a number of H-bonds and established hydrophobic contacts with the active site of MMP-2, MMP-9, NMDA, nNOS and iNOS as compared to their inhibitors. Result of brain penetration study suggest that the exposure of CGA in the brain after intranasal administration was significantly higher (4 times) as compared to the intravenous administration reflecting significant brain uptake of CGA through nasal route. The brain water content, brain infarction, and BBB disruption were significantly reduced in the treated group ( $p < 0.005$ ). As well as the level of nitrate, nitrite, glutamate, and calcium were substantially restored in the treated group ( $p < 0.005$ ).

**Conclusion:** The CGA confers neuroprotection by inhibiting molecular mediators of neuronal disability and can be developed as potent neurotherapeutics to combat ischemic stroke.

**Keywords:** Cerebral Ischemia, Neuroprotection, Chlorogenic acid, Molecular docking, Brain penetration.

### O-2. Acute Stroke Management

#### Ischemic Stroke and tPA: A Plight of Nepal

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**Background and Objectives:** To present the scenario of cerebrovascular disorder, usage of intravenous tPA and other management strategy in acute ischemic stroke in Nepal. Nepal stands as one of the poorest nation on the planet. The poor health care system, nearly no insurance coverage and expensive health care costs, very small number of trained healthcare individual only makes the situation more grimful. Stroke care units are an essential ingredient underpinning safe implementation of stroke thrombolysis. Intravenous tissue plasminogen activator (tPA) has been licensed in Nepal for thrombolysis in selected patients with acute ischaemic stroke only recently. The use of tPA is still low but is increasing across Nepal, and the pioneer being Annapurna Neurological Institute and Allied Sciences (ANIAS).

**Material and Methods:** Institutional audit was carried out from last two years (2015–2017) and the cases with ‘acute stroke/hyperacute stroke’ were collected from database in ANIAS. Clinical information e.g. Age, Sex, NIHSS, Risk factors, time duration of using tPA and presentation of ischemic stroke to ER data were collected retrospectively. Observational (correlational) analysis was carried out. Stroke severity was determined with using different scales like National Institute of Health Stroke Scale (NIHSS), Modified Rankin Scale (MRS).

**Results:** From all stroke patients, more than 6% were acute stroke among which, less than 4% were presenting to ER within therapeutic window time of tPA usage and the good outcome in terms of NIHSS and MRS scale were achieved in almost all of the tPA users.

**Conclusion:** This institutional consensus statement provides a review of the evidence for, and implementation of, tPA in acute ischaemic stroke with specific reference to Nepalese health-care system. In this statement, we have also tried to present and project the current scenario of acute stroke.

**Keywords:** Consensus, Stroke, tPA, therapeutic window, Thrombolysis.

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### O-3. Acute Stroke Management

#### The Correlations of Early Mobilization with the Level of Functional Outcomes in Stroke Patients

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**Background:** Stroke is the highest number in National Brain Centre Hospital, which hospitalized at Stroke Unit and Stroke Ward during an acute phase. Early mobilization is recommended to prevent complications. Nurses have an important role to conduct early mobilization due to lack of physiotherapist at Stroke Ward.

**Objective:** The aim of this study was to determine the correlations of early mobilization with the level of functional outcome in stroke patients.

**Methods:** A quasi-experimental design with one group pre test and post test was used. We have been included 36 patients. The inclusion criteria were patient who diagnosed stroke, age >17 years and NIHSS score was 6–25. The exclusion criteria was Sub Arachnoid Haemorrhage (SAH). We used NIHSS as the baseline and Bartel Index to examine the level of functional outcome. All subjects have been given an early mobilization by nurses and physiotherapist including elevation of head position, passive range of motion, changed of side lying position, and try to sit on bed on the fourth day and being transferred from bed to chair on the fifth day if the patient's condition were stable.

**Results:** There was a significant different between pre- and post-early mobilization ( $p$  value = 0.00). The mean of Bartel Index during admission was 4.81, increased at point 8.83 when discharge, elevated in denominator 11.83 at 30 days after discharge, and it was reached point 13.83 at 90 days after discharge. The mean NIHSS was significantly decreased from 11.3 when at the first day during admission became 9.33 at discharged ( $p$  value = 0.00).

**Conclusions:** It's concluded that the early mobilization could increase the functional state of stroke patients. Furthermore, it is recommended that nursing professional should conduct early mobilization protocols for stroke patients in an acute phase.

**Keywords:** Stroke, Early Mobilization, Functional State.

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### O-4. Epidemiology of Stroke, Risk Factor

#### Sex Differences in Stroke Metrics among Southeast Asian Countries: Results from the Global Burden of Disease Study 2015

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**Background and Objectives:** Sex differences in cardiovascular diseases generally disadvantage women, particularly within developing regions. This study aims to examine sex-related differences in stroke metrics across Southeast Asia in 2015. Furthermore, relative changes between sexes are compared from 1990 to 2015.

**Methods:** Data were sourced from the Global Burden of Disease Study. Incidence and mortality from ischemic and hemorrhagic strokes were explored with the following statistics derived: 1) women-to-men incidence/mortality ratio, and 2) relative percentage change in rate.

**Results:** Women had lower incidence and mortality from stroke compared to men. Notable findings include higher ischemic stroke incidence for women at 30–34 years in high-income countries (women-to-men ratio: 1.3, 95% CI: 0.1, 16.2 in Brunei and 1.3, 95% CI: 0.5, 3.2 in Singapore) and the largest difference between sexes for ischemic stroke mortality in Vietnam across all ages. Within the last 25 years, greater reductions for ischemic stroke metrics were observed among women compared to men. Nevertheless, women below 40 years in some countries showed an increase in ischemic stroke incidence between 0.5% and 11.4% whereas in men, a decline from –4.2% to –44.2%. Indonesia reported the largest difference between sexes for ischemic stroke mortality; a reduction for women whereas an increase in men. For hemorrhagic stroke, findings were similar: higher ischemic stroke incidence among young women in high-income countries and greater reductions for stroke metrics in women than men over 25 years.

**Conclusions:** Distinct sex-specific differences observed across Southeast Asia should be accounted for in future stroke preventive guidelines.

**Keywords:** Stroke; Incidence; Mortality; Sex Characteristics; Asia, Southeastern; Global Health

**Note:** This abstract has been previously presented as a poster presentation in EuroPrevent 2018.

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## O-6. Others

### **Incidence and Characterization of Post-Stroke Seizures in the Elderly: A Cross Sectional Study**

*Christian Oliver C. Co*

Quirino Memorial Medical Center, Philippines

**Background:** Stroke is the most common cause of seizures among the elderly yet there are only limited local data characterizing seizures in this sector of the society. **OBJECTIVES:** To describe the characteristics of post stroke seizures with onset at >60 years of age.

**Methods and Materials:** All medical records of the qualified 53 patients admitted patients at a tertiary government hospital aged 60 years old and above having first seizure between January 2015 and December 2016, were identified and reviewed through the hospital data base.

**Results:** Almost half of the post-stroke seizures during the study period are elderly patients (53 out of 107 or 49.5%). Its Incidence proportion was 6.4% (n = 53 out of 822 elderly stroke cases). About 72% of the patients had ischemic stroke while 28% had hemorrhagic type. Location was mostly cortical (49.1%). Seizures were predominantly focal. History of alcohol use, infection and hyponatremia were seen in 52.8%, 34% 28.3% respectively. Electroencephalogram results showed that 34.4% of the patients had generalized slowing while 31.3% had normal findings. Majority of the seizures were controlled with single epileptic medication while 6 of the 53 (11.33%) cases required multiple medications, 1 presented as status epilepticus.

**Conclusion:** There is significantly greater risk for post-stroke seizure among elderly (relative risk = 2.3, p-value = 0.000). The incidence of post-stroke seizures among the elderly is comparable to those in international studies. Follow up studies regarding the quality of life, treatment and prophylaxis of post –stroke amongst the elderly are recommended

**Keywords:** Stroke, Post Stroke Seizures.

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## O-7. Others

### **Clinical Profile of Post-Stroke Seizures in a Local Tertiary Hospital in Quezon City, Philippines: A Cross-Sectional Study**

*Paul Emmanuel Yambao*

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**Background:** Seizures are among the most common neurologic sequelae of stroke. However, studies on post-stroke seizures in the Philippine setting are still scarce.

**Objectives:** To determine the incidence and clinical features of post-stroke seizures in a local tertiary hospital.

**Methods:** Clinical data of patients with post-stroke seizures admitted between January 2015 to December 2016 were reviewed. Patients with prior history of seizures were excluded.

**Results:** The incidence proportion of post-stroke seizure was found to be 3.9%. Three of every 5 patients were male. Patients' age varied widely from 16 to 90 years. About 58% of the patients had seizures within the first 7 days of stroke. Significantly lower mean age was noted among those who had acute seizure as compared to those who had chronic seizure. Focal type of seizure was more common than generalized. Seizures were mostly either Myoclonic (38.3%) or Generalized Tonic-Clonic (36.5%). Close to half (49.5%) were cases of small to medium-sized infarction. Location of stroke was mainly cortical (55.1%) or subcortical (31.8%). Right-sided stroke comprised 52.94% of the cases. Among those with EEG tests, generalized background slowing was found in 42.4%, focal slowing in 18.2% and epileptiform discharges in 10.6%. Hyponatremia was seen in 27.1% and infection in 32.7% of the patients (in which pneumonia and UTI predominate). History of alcohol and drug use was noted in 57.9% and 2.8% of the patients respectively. Early onset seizures are more common to elderly, males, moderate-sized-infarction with cortical and subcortical involvement and lobar hemorrhagic infarction.

**Conclusion:** The incidence of post-stroke seizure in this study is similar to those documented in other settings. This study provides baseline information and adds to the limited body of knowledge on post-stroke seizures among Filipino patients but further studies are needed to identify predictors of post-stroke seizures in the local population.

**Keywords:** Post Stroke seizure, stroke.

## O-8. Intracerebral Hemorrhages

### Effectiveness of Combined External Ventricular Drainage with Intraventricular Fibrinolysis for Treatment of Intraventricular Haemorrhage with Acute Obstructive Hydrocephalus

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**Background and Objectives:** Intraventricular haemorrhage (IVH) patients with acute obstructive hydrocephalus (AOH) who require external ventricular drainage (EVD) have a high risk of poor outcome. The use of intraventricular fibrinolysis (IVF) by low-dose rt-PA could be used to improve patient's outcome. We evaluated the impact of IVF on the risk of death and functional outcomes in IVH patients with AOH.

**Methods:** This prospective cohort study included IVH patients due to hypertensive intracranial haemorrhage complicated by AOH which required the insertion of an EVD. We evaluated the risk of death and the functional outcome at one and three months, with a specific focus on the impact of combined EVD with IVF by low-dose rt-PA (1 mg every 8 hours, maximum: 9 mg) (EVD+IVF group)

**Results:** Between 2011 and 2014, eighty patients were included. Forty-five patients were treated by EVD alone (EVD group) and thirty-five received IVF (EVD+IVF group). The 30-day and 90-day mortality rates were lower in the EVD+IVF group than those in the EVD group (42.2% vs 11.4%,  $p = 0.003$  and 62.2%

vs 20%,  $p < 0.001$ ; respectively). The 30-day good functional outcome (mRS, 0 to 3) was also higher in the EVD+IVF group (6.7% vs 28.6%;  $p = 0.008$ ). However, the 90-day good functional outcome (mRS, 0 to 3) did not significantly increase in the EVD+IVF group (30.8% in the EVD vs 51.6% in the EVD+IVF group;  $p = 0.112$ ).

**Conclusions:** In our prospective observational study, EVD+IVF decreased the risk of death of severe IVH patients as compared to EVD alone. EVD+IVF also improved the chance of having a good functional outcome at one month, a result no longer observed at three months.

**Keywords:** Intraventricular Haemorrhage, Intracerebral Haemorrhage, External Ventricular Drainage, Acute Obstructive Hydrocephalus, Recombinant Tissue Plasminogen Activator

## O-9. Epidemiology of Stroke, Risk Factors

### The Correlation of Abnormal Ankle Brachial Index and the Severity of Acute Ischemic Stroke in a Tertiary Hospital in Davao City, Philippines: A Cross-Sectional Study

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**Background and Objectives:** Peripheral arterial disease (PAD) has been shown to have a higher likelihood of developing cardiovascular events as well as cerebrovascular accidents particularly acute ischemic stroke. However, there are limited data on the association between ankle brachial index (ABI) values and the severity of ischemic stroke. This study determines the correlation of abnormal ABI values and the severity of acute ischemic stroke in a tertiary hospital located in Davao City, Philippines.

**Methods:** This was a cross-sectional study with 112 patients diagnosed with acute ischemic stroke. The severity of stroke was determined using National Institutes of Health Stroke Scale (NIHSS) and the corresponding ABI value was obtained.

**Results:** Majority had peripheral arterial disease with ABI ratio of  $\leq 0.9$  (51.8%), followed by normal ABI ratio between 0.91–1.4 (47.3%) and only (0.9%) had non-compressible peripheral artery (ABI ratio  $> 1.4$ ). Using t-test, the NIHSS was significantly higher among patients with ABI ratio of  $\leq 0.9$  having a mean score of  $12.43 \pm 5.29$  compared to patients with normal ABI ratio having a mean score of  $5.13 \pm 4.09$  ( $p \leq 0.001$ ). Furthermore, using Spearman's rho statistics, ABI ratio was negatively correlated with NIHSS score ( $p < 0.001$ ).

**Conclusion:** Our results confirmed that there is a correlation between low ABI value and the severity of acute ischemic stroke

**Keywords:** Peripheral arterial disease, NIHSS, acute ischemic stroke, stroke severity.

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## O-10. Stroke Rehabilitation

### The Occurrence of Turning Difficulty in Post-Stroke Hemiplegic Patients

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**Introduction:** Chronic stroke often experience persistent impairments in strength, balance, and coordination of gait, which affects their ability for safely changing direction during walking. However, the percentage of turning difficulty among stroke patients was unclear. Therefore, this study was to investigate the occurrence of turning difficulty after stroke regarding turn time, step, type and balance.

**Method:** Thirty stroke patients (SP) and 30 healthy controls (HC) performed 180-degree turns recorded by a video camera and analyzed based on 4 indicators: the turning time, steps, type, and balance.

**Result:** Chi-square test showed significant differences between SP and HC in turn steps [ $\chi^2(2) = 32.14$ ,  $p < 0.001$ ], time [ $\chi^2(2) = 32.31$ ,  $p < 0.001$ ], type [ $\chi^2(2) = 43.06$ ,  $p < 0.001$ ] and balance [ $\chi^2(2) = 25.76$ ,  $p < 0.001$ ]. All HC accomplished turns less than 2.5 seconds while 53% of SP needed 3 seconds or greater. All HC used less than 5 steps but 57% of SP required more than 5 steps. As for types, 73% of HC acted as a pivot type, on the contrary none of SP adopted it and most of them acted as a step type. Nearly every HC (97%) turns without losing balance, however, the majority of SP (70%) lost balance and may or may not require assistance. There were 40% of SP defined as turning difficulty.

**Conclusion:** Nearly half of stroke patients experienced turning difficulty as they used of 5 or more steps, spent duration of 3 seconds or longer, with absence of pivot strategy and presence of staggering during 1800 standing-turns compared with healthy individuals.

**Keywords:** Occurrence, Hemiparesis, Stroke, Turning difficulty.

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## O-11. Intracerebral Hemorrhage

### Antiplatelet Treatment after TIA and Ischaemic Stroke in Patients with Cerebral Microbleeds in Two Large Cohorts

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**Background:** In TIA/ischaemic stroke patients, microbleed-burden predicts intracerebral haemorrhage (ICH), and ischaemic stroke, but implications for antiplatelet-treatment are uncertain.

**Methods:** In two independent prospective cohorts with TIA/ischaemic stroke (Oxford Vascular Study/mainly Caucasian; University of Hong Kong/mainly Chinese), antiplatelet-treatment was started routinely irrespective of microbleed-burden. Risks, time-course and outcome of ICH, extracranial bleeds, and recurrent ischaemic events, were determined and stratified by microbleed-burden (0 vs. 1, 2–4 and  $\geq 5$ ), adjusting for age, sex and vascular risk factors.

**Results:** Microbleeds were more frequent in the Chinese cohort (450/1003 vs. 158/1080;  $p < 0.0001$ ), but risk associations were similar during 7433 patient-years of follow-up. Among 1811 patients on antiplatelet drugs, risk of major extracranial bleeds was unrelated to microbleed-burden (ptrend = 0.87), but the 5-year risk of ICH was steeply related (ptrend  $< 0.0001$ ), with 73% of ICH in 7.7% patients with  $\geq 5$  microbleeds. However, risk of ischaemic stroke also increased with microbleed-burden (ptrend = 0.013), such that risk of ischaemic stroke and coronary events exceeded ICH and major extracranial bleeds during the first-year, even amongst patients with  $\geq 5$  microbleeds (11.7% vs. 3.7%). However, this ratio changed over time (time-course pinteraction = 0.034), with risk of haemorrhage matching that of ischaemic events after one-year (11.0% vs. 10.5%). Moreover, whereas the association between microbleed-burden and risk of ischaemic stroke was due mainly to non-disabling events (ptrend = 0.007), the association with ICH was accounted for (ptrend  $< 0.0001$ ) by disabling/fatal events ( $\geq 5$  microbleeds: 82% disabling/fatal ICH vs. 40% ischaemic stroke;  $p = 0.035$ ).

**Conclusions:** In Caucasian and Chinese patients with  $\geq 5$  microbleeds, withholding antiplatelet drugs during the first-year after TIA/ischaemic stroke may be inappropriate. However, the risk of ICH may outweigh any benefit thereafter.

**Keywords:** Cerebral microbleeds, ischaemic stroke, intracerebral haemorrhage.

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**O-12. Epidemiology of Stroke, Risk Factor Sex Differences in Risk Factor Profile, Stroke Subtype, and Outcome in Acute Ischemic Stroke**

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**Background:** There is increasing evidence to suggest that sex differences exist in the risk factor profile, treatment and outcome of stroke.

**Aim:** We analyzed the sex difference of ischemic stroke in India.

**Methods:** We included 742 patients within one week of onset of first ever ischemic stroke during 2014–2017. The demographic, clinical details, and risk factors were documented. The stroke severity was assessed using the National Institutes of Health stroke scale (NIHSS) at admission. The stroke subtype classification was done using TOAST (Trial of Org 10172 in Acute Ischemic Stroke) criteria. The three-month functional outcome was assessed using modified Rankin scale (mRS), and excellent outcome was defined as an mRS  $\leq 2$ .

**Results:** Of 742 patients, 250 (33.7%) were females. The mean age, clinical presentation, and rate of thrombolysis did not differ between men and women. Women suffered more severe strokes compared to men (mean NIHSS 9.5 vs 8.4,  $P = 0.03$ ). The etiological stroke classification showed large artery atherosclerosis was more common in men (21.3% vs 14.8%,  $P = 0.03$ ) and cardioembolic strokes were more common in women (27.2% vs 19.7%,  $P = 0.02$ ). Men had a better 3-month functional outcome compared to women (68.6% vs 61.2%,  $P = 0.04$ ).

**Conclusion:** Our data provides insights about the sex differences of stroke in India. Identification of these differences has implications in planning treatment and prevention strategies.

**Keywords:** Sex, outcome, stroke subtype, stroke severity, ischemic stroke.

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**O-13. Vascular Cognitive Impairment / Vascular Dementia**

**The Neuroaid II (MLC901) in Vascular Cognitive Impairment Study (NEURITES): Baseline Results**

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**Background and Aims:** A substantial number of patients are cognitively impaired after a non-disabling stroke, Vascular cognitive impairment no dementia (VCIND) of moderate severity has a higher risk of incident dementia as well as dependency and death. MLC901 has its origins from Traditional Chinese Medication (TCM) and has been shown to be effective in cellular and animal models of stroke, as well as having neuroprotective and neuroregenerative properties in global ischemia models with prevention of necrosis and apoptosis of hippocampal CA1 neurons after global ischemia, and improved functional recovery in spatial memory. NEURITES tests the hypothesis that NeuroAiD II is safe and effective in the treatment of post-stroke cognitive impairment.

**Methods:** NEURITES is a 24-week, multi-center, double-blind, randomized, placebo-controlled phase II study of NeuroAiD II in patients with VCIND. The primary outcome is executive function as measured by Verbal Fluency and Color Trails Test 1 & 2. Secondary outcomes include cognitive function, behavior, depression, and activities of daily living. Safety will be assessed using adverse events, laboratory tests and vital signs. Clinicaltrials.gov-NCT01847924.

**Results:** NEURITES has recruited a total of 103 patients by November 2017 from sites in Singapore, Philippines and Vietnam. Baseline data on demographics and clinical characteristics will be reported.

**Conclusions:** NEURITES is investigating the efficacy of a TCM on VCIND. It is performed in compliance with international guidelines and using Western clinical standards. The results will be available in Q4 2018.

**Keywords:** Neuroaid II, MLC901, Vascular cognitive impairment no dementia, Clinical trial, Neuroregeneration.

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## O-14. Multidisciplinary Stroke Care

### Post Stroke Dysphagia, Pneumonia and Impact on Clinical Outcomes in Older Stroke Inpatients

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**Introduction:** Post-stroke dysphagia (PSD), defined as difficulty swallowing after a stroke, is a common complication in the early phase of acute stroke, affecting up to 78% of stroke survivors. A major risk factor for pneumonia in the older person is the presence of serious co-morbidities. The objective of this study was therefore to determine the incidence of pneumonia in patients with PSD and the impact on inpatient clinical outcomes.

**Methodology:** This was a retrospective study of all acute stroke patients aged  $\geq 65$  years admitted to the geriatric medicine ward in University Malaya Medical Centre in 2016.

**Results:** There were 116 patients (average age 81.7 (SD  $\pm 6.46$ )) years of whom 70 (60.3%) had dysphagia. Sixty-two patients (53.4%) required an NG tube early in their admission. Dysphagic patients were more likely to develop pneumonia (adjusted odds ratio, aOR (95% CI) 3.68 (1.47–9.18),  $p = 0.005$ ), stay longer in hospital (adjusted mean difference, aMD (95% CI) 2.93 (1.30–4.55),  $p = 0.010$ ) and die as inpatients (aOR (95% CI) 9.09 (1.85–44.73),  $p = 0.007$ ) compared to non-dysphagic patients. Length of stay of dysphagic patients with pneumonia were longer than those without ( $27.7 \pm 24.9$  vs  $14 \pm 7.7$  days,  $p = 0.007$ , aMD (95% CI) 3.94 (3.97–19.69). Dysphagic patients who died were significantly older ( $85.8 \pm 5.8$  vs  $80.3 \pm 6.6$ ,  $p = 0.003$ ). Pneumonia was the cause of death for 7/18 (38.8%) dysphagic patients who died as inpatients. Swallow improved for 33/70 (47.1%) dysphagic patients prior to discharge.

**Conclusion:** PSD is strongly associated with a higher risk of pneumonia, increased length of stay and inpatient mortality. A comprehensive care plan by a multi-disciplinary team is necessary to reduce the incidence of pneumonia and morbidity in the acute phase.

**Keywords:** Post stroke dysphagia, dysphagia, pneumonia.

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## O-15. Acute Neuroimaging

### Clinical Utility of 320-Detector Row Computed Tomography in the Evaluation of Moyamoya Disease

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**Purpose:** The present study aimed to determine the ability of 320-detector row computed tomography angiography (CTA) to evaluate moyamoya disease.

**Materials and Methods:** We retrospectively analyzed the records of 25 patients (male,  $n = 15$ ; mean age, 48 years; range, 23–71 years) with clinically diagnosed moyamoya disease (20

with infarction or transient ischemic attack) who were assessed by CTA using 320-detector row CT and magnetic resonance angiography (MRA) between April 2013 and March 2018. Based on the severity of steno-occlusive changes in the internal carotid, anterior cerebral, middle cerebral, and posterior cerebral arteries, CTA and MRA scores ranging from 0 (normal) to 10 (worst) were calculated for 50 facets in each cerebral hemisphere. Two specialists independently evaluated relationships between CTA and MRA scores and visualized basal moyamoya vessels.

**Results:** The mean CTA and MRA scores significantly correlated ( $3.82 \pm 1.53$  vs.  $4.76 \pm 1.80$  ( $P < 0.05$ )), although the mean CTA score was significantly lower. Inter-observer agreement for CTA scores was excellent ( $\kappa = 0.83 \pm 0.12$ ,  $P < 0.05$ ). The rate at which basal moyamoya vessels were visualized was significantly higher for CTA than for MRA ( $P < 0.05$ ), especially when patients had acute hemorrhagic stroke.

**Conclusion:** Steno-occlusive changes were evaluated more accurately, and basal moyamoya vessels were visualized with greater sensitivity by CTA using 320-detector row CT than by MRA.

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## O-16. Cerebrovascular Occlusive Disease

### Predictors of Periprocedural Events and Discharge Outcome in Patients Undergoing Carotid Revascularization – An Indian Experience

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**Background and Objectives:** Asian studies have shown a high prevalence of intracranial atherosclerosis in ischemic stroke patients, ranging from 20–50% of large artery atherosclerosis. Whether these have an adverse impact on Carotid revascularization outcomes have seldom been reported in literature. We studied patients undergoing carotid revascularization to see clinical and imaging predictors of periprocedural complications and discharge outcome.

**Materials and Methods:** Study was conducted at Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, India. Subjects were recruited from a prospectively maintained carotid revascularization database, from January 2011 till December 2016 (5 years). Clinical and risk factor profile were collected from the database. Imaging data was reviewed from PACS. Periprocedural complications and discharge outcome were correlated with clinical and imaging parameters.

**Results:** We had 176 patients undergoing Carotid endarterectomy (CEA) recruited for the study (144 males, mean age 64.6 years). Except for 2, all were having symptomatic Extracranial-ICA stenosis. 56 had TIAs and 9 presented with retinal symptoms only. Our cohort had a high prevalence of vascular risk factors. 152 (86.3%) had symptomatic  $\geq 70\%$  carotid stenosis. Contralateral ICA involvement was seen in 49.4% of the patients. 17.2% had ipsilateral tandem lesions. Periprocedural complications overall had a significant association with preoperative CAD alone ( $p$  value 0.026). We also found that perioperative stroke risk was unaffected

with ipsilateral tandem lesions. Discharge outcome was poorer in diabetics and those with contralateral EC-ICA disease. We did not collect details on dietary habits of our cohort.

**Conclusions:** Prevalence of tandem lesions and contralateral disease is more common in Indian patients undergoing carotid revascularization. Overall complication rates, especially stroke risk, was unaffected by tandem lesions. Diabetics and those with a contralateral disease had an adverse discharge outcome.

**Keywords:** Carotid revascularization, tandem lesions, perioperative complications

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### O-17. Acute Stroke Management

#### 5-year Community-Based Hospital Experience of Intravenous Thrombolysis in Acute Ischaemic Stroke in Malaysia

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**Background and Objective:** Stroke in the developing countries has grown to epidemic proportions and carries a high burden of mortality and morbidity. It is the third leading cause of death in Malaysia according to the Global Burden of Disease Study in 2016. We report our experience of intravenous thrombolysis therapy in acute ischaemic stroke (AIS) in Sarawak General Hospital, Malaysia.

**Patients and Methods:** Data of patients with AIS who received intravenous thrombolytic therapy with recombinant tissue plasminogen activator, alteplase (rt-PA) 0.9 mg/kg were collected retrospectively from June 2013 to February 2018. Routine CT brain before and 24 hours after thrombolysis was done for all patients. Neurological examinations were assessed using National Institute of Health stroke scale (NIHSS) and the functional outcome was measured by modified Rankin scale (mRS) at 3 months. Onset-to-needle time, door-to-needle time and intracerebral haemorrhages (ICH) were evaluated.

**Results:** Among 223 patients enrolled, 87 (46.5%) had mRS of 0 to 1 at 3 months. The mean pretreatment NIHSS was 14.6 (mean = 14.6 ± 7.6), the mean onset-to-needle time was 192 minutes, and the mean door-to-needle time was 90 minutes. ICH detected in 33 cases (14.5%) with 28 (12.5%) were asymptomatic and 5 (2.2%) were symptomatic. 46 (21.2%) patients died within 3 months.

**Conclusion:** Our data shows IV alteplase is safe and efficacious in Malaysian population. The overall mortality is high due to severe stroke at presentation and lack of post-stroke community care.

**Keywords:** Acute ischaemic stroke, thrombolysis, rt-PA.

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### O-18. Intracerebral Hemorrhage

#### Correlation Between High Blood Pressure and Bleeding Volume with Degree of Consciousness and Mortality in Intracerebral Hemorrhage Patients in the Neurologic Section of RSUD Dr. Soetomo in 2014

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**Background:** Blood pressure, bleeding volume, and degree of consciousness are important parameters in assessing hemorrhagic stroke. Hypertension caused by acute response to intracerebral hemorrhage, bleeding volume that causes an increase in intracerebral pressure and decrease in degree of consciousness are all responsible in the increasing trend of mortality rate.

**Objective:** The aim of this study was to determine correlation between blood pressure, bleeding volume, and degree of consciousness with patient mortality of hemorrhagic stroke.

**Methods:** Study design is correlational analytic cross sectional with retrospective study approach. The variables used are blood pressure, bleeding volume, and degree of consciousness as independent variable and mortality rate as dependent variable. Population is all hemorrhagic stroke patients in RSUD Dr. Soetomo Surabaya from January–December 2014 which comprises 477 patients, and 369 of them fulfill every inclusion criterion. Data are taken from medical record and tested using chi square and Logistic Multinomial Regression test.

**Results:** Result shows a significant correlation between bleeding volume, degree of consciousness and mortality rate ( $p = 0.000$  and  $p = 0.000$ ). Nevertheless, there is no significant correlation between blood pressure and mortality rate ( $p = 0.175$ ). Result also shows that degree of consciousness is more significant to mortality rate than bleeding volume, with mortality is likely to be associated with GCS 8–13 and bleeding volume <30 cc patients had a 4.453 times greater chance of dying than patients with bleeding volume <30 and GCS >13 ( $p = 0.000$ , RR = 4.453).

**Conclusion:** Degree of consciousness and bleeding volume have significant correlation to mortality rate than blood pressure.

**Keywords:** Bleeding Volume, Blood Pressure, Degree of Consciousness.

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## O-19. Epidemiology of Stroke, Risk Factor

### Smoking as a Predictor of Poverty Level and Burden Risk Factor For Young Stroke in Indonesia

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Taipei Medical University

**Background and Objective:** Young stroke is defined as a stroke which developing in adults <45 years old. It comprises only 10–15% of stroke patients. However, it will leave an economic burden since patients will be disabled in their productive age. Indonesia is still yet to ratify of a country in the world that still yet to ratified the Framework Convention on Tobacco Control initiated by WHO. Tobacco consumption is a known risk factor for hypertension, dyslipidaemia, and carries an economic burden. This study will estimate the tobacco consumption as a predictor of burden economic status and risk factor for early stroke among smokers in Indonesia.

**Methods:** The Indonesia 2011 Global Adult Tobacco Survey provides information from 8305 respondents aged 15 years and above. Wealth index was calculated using principal component analysis of adjusted household's ownership on 9 assets. Chi2 and ANOVA measured the mean difference between categorical variable and smoking and non-smoking respectively. Binomial logistic regression measured the likelihood of a smoker's wealth status by their covariates.

**Results:** Poor smokers spent 20% of their assets each year on tobacco. Smoking was also a strong predictor of poverty level. It increased the probability of poverty by 46% (CI 95%:1.32–1.63, <0.001). After adjustment for gender, age of smokers, region of residence, education and knowledge level, there was a 27% higher likelihood of smokers staying in a deprived condition.

**Conclusion:** There is an economic burden for smokers where they might have a greater difficulty improving their wealth status, while they also have a higher risk of having early stroke. This issue needs to be manage seriously especially in a country that has a high prevalence of young and productive age smokers like Indonesia.

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## O-20. Others

### Stroke and Cardiovascular Disease Knowledge Among Adult Smokers and Non-Smokers in Taiwan, from 2014 to 2017

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Taipei Medical University, Taiwan

**Background:** There is a well-established causal link between tobacco smoking and stroke. Smoking is the leading risk factors for stroke, along with hypertension. Smoking increases the risk of stroke from two to four-fold, in both men and women, depending on dose response. Both active smoking and second-hand smoking cause similar effects for stroke. However, there is limited information on public knowledge of smoking as a risk of stroke.

**Aims:** To investigate the knowledge on smoking as a risk factor of stroke and its change 2014–2017 in national level of Taiwan.

**Methods:** We used cross-sectional population-based data from the Taiwan Adult Tobacco Survey (TATS) from 2014 to 2017. Weighted univariate and multivariate analyses were performed using Stata 12.1.

**Results:** Total participants were 101,691 (49.3% male and 50.7% female) and among them 15.8% were smokers (28.5% in male and 3.4% in female). Awareness of smoking as a risk factor of stroke and other CVD was 8.3%–9.3% among non-smokers and 2.5%–3.6% among smokers ( $p < 0.001$ ). Percentage of awareness among participants decreased from 2015 to 2017; however, the decrease was not statistically significant. Regression analysis shows that gender, and smoking status were significant predictors of awareness of smoking as a risk factor for stroke.

**Conclusions:** Awareness of smoking as one of the main risk factors of stroke is low, especially among smokers and those with less education. Effective public educating programs on harms of smoking would increase risk awareness and could potentially reduce the incidence of stroke.

**Keywords:** Knowledge of stroke, smoking, risk factors.

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## O-21. Others

### Safety of Extracranial Stent or Intracranial Angioplasty Procedures by Neurointerventionist in Indonesia

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**Introduction:** Stenting and angioplasty procedures have been developed and widely used nowadays since the number of cerebrovascular disease keep increased. The goal of stent placement or balloon deploy is to prevent recurrent stroke. Both procedures are expected to be more effective in secondary stroke prevention of stroke management rather than medical therapy alone. However, these procedures has som complication at risk, either reversible or permanent even death.

**Aims:** to determine the rate of morbidity and mortality due to stenting or angioplasty procedures.

**Methods:** A multicenter prospective study in Indonesua conducted from Januari 2010 to December 2017. Data was collected including demographic characteristics, number of stent or balloon mounted, complication and mortality. All of the procedures performed by neurologist with speciali training for neuro intervention. Complications were divided into reversible (more than 24 hours but less than 7 days) and permanent (more than 7 days).

**Result:** Subject consist of 268 people, 151 male and 117 female with mean of age 59.5 years old. The numbers of stent or balloon mounted varies from 1 to 3. Five (1.9%) had permanen complica-

tions and 10 (3.7%) had reversible complications. Two (0.7%) had mortality reported.

**Conclusion:** Stenting and angioplasty in cerebrovascular system performed by neurointervention in Indonesia is relatively safe. Each kind of morbidity less than 5% and mortality rate less than 1%.

**Keywords:** complication, neurointervention, stent and angioplasty, stroke.

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## O-22. Stroke Rehabilitation

### Motor Outcome Differences Between Three Neurorestoration Techniques (Bobath vs Motor Relearning Program vs Mirror Therapy) in Post Stroke Patient

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**Background and Objective:** Post acute phase stroke therapeutic effort primarily depend on neurorestoration technique, such as Bobath technique, Motor Relearning Program (MRP) and Mirror Therapy (MT). Up until now, there are not much research that can prove that one of the technique more superior than others in coping with the impairment and disability. Aim of the study is to compare the functional outcomes between these techniques.

**Methods:** This was an observational-cohort prospective design study with post-stroke patients which fulfilled inclusion criteria from January 11<sup>th</sup> 2017 to November 11<sup>th</sup> 2017. We assessed motoric functional outcome according to the National Institute of Health Stroke Scale (NIHSS), Barthel Index (BI), Motor Assessment Scale (MAS) and modified Ashworth Scale (mAS). The subjects was divided into 3 groups of neurorestoration and neurorehabilitation technique, which was Bobath technique, MRP and MT and we reassessed NIHSS, BI, MAS and mAS after 1 month of neurorestoration. Statistical analysis were performed using paired student T-test and ANOVA.

**Results:** Thirty patients were included (28 subject [93.3%] of post-ischemic stroke and 2 subject [0.67%] of post-haemorrhagic stroke). There are statistically significant differences before and after neurorestoration on NIHSS ( $p = 0.01$ ), BI ( $p = 0.005$ ), MAS ( $p < 0.001$ ) and mAS ( $p = 0.001$ ). We found MAS differences ( $\Delta$ MAS) as a statistically significant outcome variable and using post hoc Bonferroni correction we found Bobath ( $2.60 \pm 2.12$ ) compared to MT ( $1.30 \pm 1.42$ ) that give statistically significant MAS differences ( $p = 0.007$ ).

**Conclusions:** There were differences of motoric functional outcome (NIHSS, BI, MAS and mAS) before and after neurorestoration which were statistically significant. MAS differences was the motoric outcome scale that was the most statistically significant seen from comparing Bobath compared to MT technique.

**Keywords:** Stroke, Bobath, Motor Relearning Program, Mirror Therapy.

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## O-23. Outcome and Quality of Care

### To Study Various Factors Causing Delay in Presentation of Stroke Patients in the Rural Tertiary Care Hospital Located in Sub-Himalayan State of North India

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**Background:** The study was designed to evaluate various factors which led to delay in presentation of stroke patients. This study will help in taking remedial measures to reduce the delay of presentation so as to receive timely thrombolytic therapy.

**Methods:** It was an observational cross-sectional hospital based study. The study was conducted for a period of 12 months (June 2015-June 2016). All patients of stroke were taken into study. They were subjected to focused history taking and examination.

**Results:** 120 patients were taken into study. 67 (55.8%) of patients presented >4.5 hrs after the onset of stroke and 53 (44.2%) patients arrived within 4.5 hrs of onset of stroke. Patients who arrived early, only 29 (54.7%) visited local doctor and 21 (41.5%) came hospital directly. P value: 0.000 (highly significant) Distance from home to nearest road was  $190 \pm 357.11$  m in early arrival group and  $405.76 \pm 486.079$  m in delayed arrival group which is significantly more ( $p$  value:0.006). Similarly, distance from nearest road to hospital was  $33.25 \pm 23.145$  km in early arrived group and  $72.36 \pm 56.120$  km in delayed arrival group ( $p$ value:0.000). 19 (28.4%) patients with delayed arrival considered the symptoms as non serious as compared to 6 (11.3%) patients with early arrival. ( $p$  value 0.044) which is significant. 19.4% in delayed presented patients group thought that symptoms would resolve spontaneously as compared to 5.7% patients in early arrival ( $p$  value: 0.028) which is statistically significant. 50 (74.6%) patients/ attendant who arrived late, said they were anxious on noticing symptoms while 48 (90.6%) patient/attendants who arrived early, got anxious on symptoms (P value:0.025) which is significantly higher.

**Conclusion:** The factors which were found responsible for delayed presentation to hospital were: distance from home to nearest road, distance from nearest road to hospital, visit to local doctor, time of first medical contact, time taken by local doctor to refer, low threat perception of patients/ attendants, less concern about symptoms, perception of symptoms as non serious.

**Keywords:** Stroke, delay, subhimalayan.

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## O-24. Nursing Care in Stroke Patients

### Renal Safety After Repetitive Use of Radio-Contrast CT Imaging in Acute Ischemic Stroke

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**Background and Objectives:** Computed tomography (CT) of the brain remains the main imaging modality in acute ischemic stroke (AIS). A large proportion of patients undergo contrast based studies (CT angiogram, CT perfusion) for the evaluation of vascular patency and perfusion. Some patients even undergo repeated evaluation of cerebral hemodynamics during first view days. We evaluated the renal safety of the repeated use of radio-contrast in our study cohort.

**Methods:** In this prospective study of thrombolized AIS patients, renal functions [blood urea, serum creatinine and estimated glomerular filtration rate (eGFR)] were assessed at presentation as well as at day 90. Demographic data, National Institute of Health Stroke Scale (NIHSS) and modified Rankin scale were recorded for all patients. The study was approved by the institutional ethic committee.

**Results:** A total of 54 patients were recruited, mean age 66 ( $\pm 12$ ) years, predominantly male (59%). Hypertension was the commonest risk factor in 40 (75%) followed by dyslipidemia in 26 (48%). Mean (SD) baseline renal parameters were Urea ( $5.44 \pm 1.67$  mmol/L), creatinine ( $75 \pm 20$   $\mu$ mol/L) and eGFR ( $84 \pm 18$  ml/min). All patients underwent 2 CT angiograms and 3 CT perfusion studies within 1 week of acute stroke, according to a standardized research protocol. Various renal functions performed at day 90 did not show any significant change.

**Conclusion:** Multiple use of intravenously administered radio-contrast for various CT based neuro-imaging in AIS is safe for the kidneys.

**Keywords:** Acute Ischemic Stroke, Computerised Tomography, Radiation exposure, Radiocontrast, Renal functions

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## O-25. Prevention of Stroke

### Chula Stroke Self-Help Group: A Tool for Empowering Stroke Patients

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**Background and Objectives:** After acute stroke treatment in the hospital, long term post-stroke care is essential in order to prevent recurrent stroke and enhance quality of life. Stroke self-help groups engage patients, family members, and caregivers with the health care team including stroke physicians, psychiatrists, nurses,

nutritionists, and social workers to help empower stroke survivors. The aim of this study is to evaluate the satisfaction among participants in the Chula Stroke Self-Help Group.

**Methods:** The Chula Stroke Self-Help Group has been established since 2016. The group meeting is held monthly at the outpatient department of King Chulalongkorn Memorial Hospital. The topic for each session is carefully selected by the nursing staff such as “Stroke is treatable”, “Stroke is preventable”, “Life after stroke”, and “Stroke Rehabilitation.” Each 90 minute session is led by stroke nurse, social worker, and invited speaker with 10–15 participants who were stroke patients, family members, or caregivers. The session begins with a brief introduction followed by extensive discussion among participants to share their own experiences. After the session, the participants are asked to rate their satisfaction towards the activity.

**Results:** Thirty sessions were held between January 2016–June 2018 with total of 351 participants. Among these, 220 (62.7%) participants were female. Most of the participants were stroke patients (49.8%), followed by family members of stroke patients (44.7%) and caregivers (5.4%). Most of the participants had a high level of satisfaction regarding self-empowerment (96.8%), knowledge (93.7%), and applicability to their situation (91.6%).

**Conclusion:** Stroke self-help group at King Chulalongkorn Memorial Hospital can be considered as a tool for empowering stroke patients, family members, and caregivers. Participants had high satisfaction toward the activity held by the self-help group.

**Keywords:** Self help group, empowering, stroke patients.

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## O-26. Acute Neuroimaging

### Safety of Thrombectomy Procedure Using Balloon Angioplasty in Patients with Ischaemic Stroke Less Than 24 Hours

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**Introduction:** Management of stroke will get optimal results by Including time factor. Often, patients who have met the criteria as candidates for thrombectomy procedures should be suspended due to lack of equipment or cost issues. We reported 8 procedures of thrombectomy using intracranial balloon angioplasty, due to inadequate availability of the device. Drug eluting balloon always used in every procedures. The period from January 2018 to June 2018. The onset of stroke in all cases occurred within 24 hours. And before the procedure has been done informed consent to patients and/or their families.

**Aims:** to determine the rate of morbidity and mortality due to thrombectomy procedure using balloon angioplasty.

**Methods:** A prospective study in Jakarta Indonesia conducted from January 2018 to June 2018. Data was collected including demographic characteristics, number of balloon mounted, complication and mortality. All of the procedures performed by neurologist with specially training for neuro intervention. Complications were divided into reversible (more than 24 hours but less than 7 days) and permanent (more than 7 days).

**Result:** Subject consist of 8 people, 7 male and 1 female. All the occlusion occurred in M1 Middle Cerebral Arteries. Five in Left MCA and three in right MCA. The number of balloon mounted varies from 1 to 2. There is no permanent complication, and one (12.5%) reversible complication. There is no mortality reported.

**Conclusion:** Thrombectomy performed in patients with 24-hour onset of ischaemic stroke by intracranial balloon angioplasty may be considered in the unavailability of adequate equipment. Although to get better results, research is needed with larger sample quantities and longer period research.

**Keywords:** Drug eluting balloon, neurointervention, thrombectomy, balloon angioplasty.

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## O-27. Acute Stroke Management

### AAFITN Acute Stroke Management Consensus

*Shigeru Miyachi, Jeyaledchumy Mahadevan, Winston Chong*

Executive committee of AAFITN

**Background and Objective:** The health resources available in the AAFITN member countries varies enormously. Some nations have health systems that rival the best in the world, whilst others do not have enough resources to provide sophisticated treatment such as comprehensive acute stroke treatment. It is against this background that a “Stroke Challenge” forum was held at the recent 13<sup>th</sup> AAFITN Congress in Malaysia. The objective was to determine what resources are available in each member country and how acute stroke is being managed currently and what are the future plans.

**Materials and Methods:** A questionnaire was sent to each member nation. It had 6 headings with detailed questions under each heading. The headings are Site Conditions, Stroke Facilities, Angiographic Suite, Procedural Volumes, Operational guidelines/ Medical Personnel and Anaesthetic Teams. The member countries presented their answers at the forum which were used to develop the AAFITN Stroke consensus.

**Results:** As expected the results varied widely. Some countries had very well developed primary (IV TPA only) centres with good transfer systems to comprehensive stroke centres to countries that were just contemplating starting IV TPA. Some countries did not have any stroke interventionists or suitable facilities. Some countries were developing secondary centres where interventionists performed Clot Retrieval only.

**Conclusions:** There is a wide variation in health for the management of acute stroke. Based on these results AAFITN is developing a Stroke Consensus document that will enable each member country to develop the best acute stroke system based on their available resources and to improve their system in the future.

**Keyword:** acute stroke, thrombectomy, stroke consensus.

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## O-28. Vascular Cognitive Impairment/ Vascular Dementia

### Basic Characteristics of Older Patients in the Outpatient Memory Clinic Service in University Malaya Medical Centre: A Cross Sectional Survey

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**Introduction:** Dementia is a severe mental health disorder which is increasing with the aging society and it is a major cause of increased Years Lived with Disability (YLD).

**Objective:** To identify characteristics of patients attending the outpatient Memory Clinic in University Malaya Medical Centre.

**Methods:** A cross-sectional survey was carried out using a specially designed questionnaire. Basic information of patients, comorbidities, diagnosis and medication lists were recorded. The survey was carried out from 29th January 2018 to 14th May 2018.

**Results:** Two hundred and fourteen patients, 61.7% female, aged ( $78.2 \pm 8.01$ ) years, were evaluated. 84.1% attended with family members, 7.9% were from nursing home. Their diagnoses were Mixed dementia 32.7%, Alzheimer’s dementia 22.0%, Vascular dementia 19.2% and Mild Cognitive Impairment 18.2%. Existing comorbidities included Hypertension 71%, Diabetes Mellitus 35%, Dyslipidaemia 39.3%, previous Stroke 15.4%, Depression 8.9%, Ischemic Heart Disease 10.7% and Atrial Fibrillation 7%. 26.6% of patients had at least 3 comorbidities. The medications prescribed were Acetylcholinesterase Inhibitors in 34.8%, and NMDA inhibitors in 18.1%. 15% of patients had no formal education and 35% had primary school education.

**Conclusion:** Our study has provided valuable information about our outpatient memory clinic clients. This information will now be used to inform service development. Our service will now take into account caregiver needs as well as the presence of comorbidities in our memory clinic population.

**Keywords:** Memory Clinic, Dementia.

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## O-29. Epidemiology of Stroke, Risk Factor

### Decision Maker’s Knowledge: A Significant Factor of the Stroke Patient’s Hospital Arrival

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**Background:** Stroke is a medical emergency. The time frame for effective treatment of stroke is about three hours. Thus, it is important to know that urgent intervention can limit the cerebral damage. Surely it would be difficult to do if the patient did not arrive at hospital just in time.

**Purpose:** There is an urgent call to identify factors related to the arrival time of stroke patients

**Methods:** This study used a quantitative correlation with cross sectional study and was conducted at a Rumah Sakit Pusat Otak Nasional (RSPON), Indonesia National Brain Center in Jakarta. The total respondent consisted of 30 family members who are responsible for patient care.

**Results:** There is a significant correlation between the knowledge of decision makers about the early signs of stroke and the arrival time of patients in RSPON ( $p = 0.016$ ), conversely, there was no correlation between age ( $p = 0.423$ ), gender ( $p = 0.399$ ), education level ( $p = 1.000$ ), ethnicity ( $p = 0.936$ ), as well as traffic congestion ( $p = 1.000$ ) with hospital arrival time of stroke patients.

**Recommendation:** The understanding about recognizing early signs of stroke is the most important variable needed to be solved through health education in community or public facilities on how to identify and recognize the stroke symptoms so that the stroke patients can get treatment immediately.

**Keywords:** Acute stroke, Delay hospital arrival, demographic factors.

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### O-30. Basic Science

#### Chemical Preconditioning With an Nrf2 Activator Reduces Brain Injury After Experimental Ischemia

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**Introduction:** Ischemic stroke is a debilitating disease that affects millions of people worldwide yet lacks effective neuroprotective treatments. Nrf2 is master transcription factor that controls the expression of a battery of anti-oxidative and de-toxifying enzymes. Recent studies showed that CDDO-TFEA is a potent and BBB permeable Nrf2 activator. The purpose of this study is to test our hypothesis that preconditioning the brain with CDDO-TFEA increases ischemic tolerance of the brain to transient focal cerebral ischemia.

**Materials and Methods:** Adult C57BL/6J mice were treated with vehicle or CDDO-TFEA solution ( $n = 8$ ) by gastric gavage for 3 days. Focal ischemia was induced by middle cerebral artery occlusion (MCAO) for 60 min followed by reperfusion. Neurological dysfunction and infarct volumes were measured. In vitro, primary cortical neurons were cultured from E17 rat embryos. The cultures were treated with CDDO-TFEA and oxygen-glucose deprivation (OGD) that induces ischemic condition. Nrf2 knockdown was induced by Lenti-particles carrying Nrf2-shRNA.

**Results:** Preconditioning of mice with CDDO-TFEA significantly reduced neurological dysfunctions and infarct volumes after MCAO. This protection was associated with activation of Nrf2 and upregulation of heme oxygenase 1, a canonical downstream target of Nrf2 with neuroprotective effect, in the brain. CDDO-TFEA pretreatment also decreased neuronal death induced by OGD. This protection depends on Nrf2, because Nrf2 knockdown abolished the protective effects of CDDO-TFEA, indicating a key role of Nrf2 in CDDO-TFEA mediated protection.

**Discussion/Conclusion:** Chemical preconditioning of the brain with Nrf2 activators induces ischemic tolerance to subse-

quent stroke. Therefore, Nrf2 could be a promising target to reduce ischemic brain injury.

**Keywords:** cerebral ischemia, neuroprotection, Nrf2, preconditioning, stroke

**Statement:** Animal experiments in this study have been approved by the IACUC of the University of Pittsburgh and conform to internationally accepted standards. There is no conflict of interest. This study is supported by the grants of the American Heart Association (10SDG2560122 to F.Z.) and the National Institutes of Health (NS092810 to F.Z.). T.Y performed the in vitro experiments, Y.S and Q.L performed the in vivo experiments, and F.Z designed the study and wrote the abstract.

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### O-31. Epidemiology of Stroke, Risk Factor

#### Stroke Incidence, Subtypes, and Trends in Taiwan in the Early 21st Century

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**Background and Objective:** Chinese populations have been reported to have a higher stroke incidence and a higher proportion of intracerebral hemorrhage compared with white populations. However, there are few large population-based studies of stroke incidence, subtypes, and trends in Taiwan in the 21st century.

**Methods:** We investigated the incidence of stroke, pathological types, and case fatality each year from 2004 to 2011, using the Taiwan National Health Insurance Research Database. Incidence was reported as age-adjusted rate, standardized to the "WHO" world populations. Also, we performed time-trends analyses for incidence and case fatality of all strokes, for each pathological type, and for both sexes.

**Results:** The age-adjusted incidence of all strokes per 100,000 person-years had declined from 251 (95% CI 249–253) in 2004 to 210 (95% CI 209–212) in 2011 ( $p < 0.001$ ), which was higher in men than women each year. Among pathological types of stroke, the incidence of intracerebral hemorrhage had a remarkable decrease in both sexes from 2004 to 2011 ( $p < 0.001$ ), while the incidence of ischemic stroke had significantly decreased only in women, but not in men or all (all:  $p = 0.055$ , men:  $p = 0.399$ , women:  $p = 0.004$ ). As for one-month case fatality, it had reduced significantly in all strokes ( $p < 0.001$ ).

**Conclusion:** The incidence of all strokes has declined in Taiwan in the early 21st century, but only significantly in intracerebral hemorrhage, not in ischemic stroke. These findings suggest that there is need to make more effective strategies for prevention of ischemic stroke, particularly in men.

**Key words:** stroke, incidence, subtype, trend, Taiwan.

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### O-32. Epidemiology of Stroke, Risk Factor

#### Dietary Glucose and Functional Outcome in Patients with Acute Cerebral Infarction

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**Purpose:** Elevated postprandial blood glucose is a critical risk factor for stroke. The dietary glycemic load (GL) and glycemic index (GI) are frequently used as markers of the postprandial blood glucose response to estimate the overall glycemic effect of diets. We hypothesized that high dietary GL, GI, or total carbohydrate intake is associated with a poor functional outcome in patients with acute ischemic stroke.

**Methods:** We prospectively included 263 first-ever ischemic stroke patients who completed a semiquantitative food-frequency questionnaire. The dietary GL, GI, and total carbohydrate intake were investigated by examining the average frequency of intake during the previous year based on reference amounts for various food items. Poor functional outcome was defined as a score on the modified Rankin Scale (mRS) of  $\geq 3$  at 3 months after stroke.

**Results:** The patients were aged  $65.4 \pm 11.7$  years (mean  $\pm$  standard deviation), and 58.2% of them were male. A multivariate analysis adjusted for age, sex, marital status, prestroke mRS score, diabetes mellitus, hyperlipidemia, body mass index, triglycerides, low-density lipoprotein, hemoglobin A1c, stroke classification, and National Institutes of Health Stroke Scale score, early neurological deterioration, and high-grade white-matter hyperintensities revealed that the dietary GL and total carbohydrate intake were associated with a poor functional outcome, with odds ratios for the top quartile relative to the bottom quartile of 28.93 (95% confidence interval = 2.82–296.04) and 36.84 (95% confidence interval = 2.99–453.42), respectively ( $p$  for trend = 0.002 and 0.002, respectively). In contrast, high dietary GI was not associated with a poor functional outcome ( $p$  for trend = 0.481).

**Conclusions:** Increased dietary GL and carbohydrate intake were associated with a poor short-term functional outcome after an acute ischemic stroke.

**Keywords:** Glycemic load; glycemic index; carbohydrate intake; stroke; outcome.

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### O-33. Epidemiology of Stroke, Risk Factor

#### Cystatin C and The Risk of Cardioembolic Stroke in Patients Without Chronic Kidney Disease

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**Background and Objectives:** Atrial fibrillation (AF) is well-established risk factor for cardioembolic stroke. Epidemiological evidence indicates there is increased risk of AF with chronic kidney disease (CKD) and renal dysfunction. Cystatin C (Cys-C) is now considered as a specific marker for detection of renal impairment. However, there are no data about the association of Cys-C with AF and cardioembolic stroke in the subjects without

evident CKD. We investigated whether serum Cys-C level is associated with development of cardioembolic stroke due to atrial fibrillation.

**Methods:** Consecutive data were collected retrospectively at the Seoul National University Hospital (SNUH). Patients with ischemic stroke with subtypes of large artery atherosclerosis, small vessel occlusion and cardioembolism who admitted at the SNUH between November 2014 and November 2017 were screened. We excluded the patient who have a history of secondary hypertension, CKD (estimated glomerular filtration rate  $< 60$  mL/min/1.73 m<sup>2</sup>), valvular heart disease, congenital heart disease, dilated or hypertrophy cardiomyopathy and thyroid disease.

**Results:** Among the total 627 patients, 61.8% were male, with a mean age of 67.9 years. Compared to the other stroke mechanisms, a stepwise logistic regression analysis showed that AF was independently associated with size of left atrium (OR, 1.196, 95% CI: 1.160–1.266), initial stroke severity (NIH Stroke Scale) (OR, 1.126, 95% CI: 1.083–1.189), and Cys-C (OR, 2.472, 95% CI: 1.255–15.129), but not with eGFR (OR 0.993, 95% CI: 0.977–1.009).

**Conclusion:** Cys-C is a independent predictor for cardioembolic stroke due to AF in patients without evident CKD.

**Keywords:** Cystatin C, Cardioembolic stroke, Atrial fibrillation.

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### O-34. Epidemiology of Stroke, Risk Factor

#### Risk Factors Affecting Functional Outcome of Acute Ischemic Stroke Without Hyperacute Treatment in Young Age

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**Objective:** There is a lack of research for risk factors that affect the prognosis of ischemic stroke in young age. We investigated the risk factors associated in the functional status at discharge in acute ischemic stroke patients who do not undergo hyperacute treatment such as intravenous thrombolysis or mechanical thrombectomy in young age.

**Methods:** This is a case-control study of a total of 590 patients aged less than 50 years, who were enrolled in the Korean Stroke Registry (KSR) from 2002 to 2018. Patients who had undergone intravenous thrombolysis or mechanical thrombectomy were excluded. Patients were divided into two groups based on modified Rankin Scale (mRS) at discharge. mRS 0-1 was set as good functional outcome group, and mRS 2 or more was set as poor functional outcome group.

**Results:** Of the 590 patients, 398 (67.5%) were male and 192 (32.5%) were female. The mean age was 41.67 years and ranged from 16 to 50 years. Unclear onset (95% confidence interval [CI], 1.13–3.52;  $p = 0.018$ ), high fasting blood sugar level on admission (95% CI, 1.01–1.02;  $p < 0.001$ ), initial NIHSS (95% CI, 1.25–1.45;  $p < 0.001$ ), and mRS before ischemic event (95% CI, 1.05–1.52;  $p = 0.016$ ) were associated with poor prognosis at discharge.

**Conclusions:** Unclear onset, elevated FBS on admission, high initial NIHSS, and previous mRS are the risk factors for poor func-

tional outcome at discharge in acute ischemic stroke patients who do not underwent hyperacute treatment in young age.

**Keywords:** stroke in young age, functional outcome, acute ischemic stroke.

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#### O-35. Basic Science

### Prostaglandin E1 Pretreatment Endows Mouse Cortical Neurons Resistance to Hemin-Induced Toxicity via Nrf2/HO-1 Pathway

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**Background and Objectives:** We previous indicated that PGE1 has a beneficial effect on patients who suffered from intracerebral hemorrhage (ICH) in clinic, however, the specific mechanisms are still not clear.

**Methods:** We established a neuronal apoptosis model with primary cortical neurons stimulated by hemin, which was the main degradation product of blood, to simulate the clinical ICH pathology. Hemin is the product of degrading hemoglobin (Hb), which has the obvious toxic effect on account of the induction of reactive oxygen species (ROS). We speculated that the hemin-induced toxicity would be resisted by pretreatment of PGE1 on cortical neurons. To verify this speculation, the cortical neurons were exposed to hemin before pretreated with PGE1, and intracellular ROS accumulation and cell apoptosis were evaluated.

**Results:** The results demonstrated that pretreatment of PGE1 prevented cultured cortical neurons from hemin induced apoptosis, restored mitochondrial membrane potential, and inhibited intracellular ROS production. Moreover, the potential mechanism was explored by detecting the expressions of Heme oxygenase-1 (HO-1) and nuclear transcription factor erythroid 2 related factor (Nrf2). As a result, HO-1 upregulation was observed in primary cortical neurons which was pretreated with PGE1 and it made contribution to the reduced ROS accumulation and apoptosis rate. We further knocked down Nrf2 by siRNA intervention, and found that the up-regulation of HO-1 was inhibited and the PGE1 pretreated neurons were more susceptibility by the hemin-induced toxicity.

**Conclusion:** We demonstrated that PGE1 pretreated neurons acquired resistance to hemin induced toxicity via Nrf2/HO-1 pathway.

**Keywords:** PGE1, Oxidative stress, Intracerebral hemorrhage, Heme oxygenase 1, Nuclear transcription factor-erythroid 2 related factor.

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#### O-36. Basic Science

### Up-Regulation of Cab45s Involves in Neuronal Apoptosis Following Intracerebral Hemorrhage in Adult Rats

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**Background and Objectives:** Recent studies have shown that Cab45s, belonging to the CREC family, can fight against apoptosis in the cancer cell lines and in rat PC12 pheochromocytoma cells. Here, we suppose that Cab45s may be concerned with neuronal apoptosis at the early stage of intracerebral hemorrhage (ICH) in pathophysiology.

**Methods:** The analysis was operated in rats and PC12 cells, which were simulations of clinic ICH disease.

**Results:** From the results of western blot and immunohistochemistry, enhanced expression of Cab45s was observed in areas contiguous to hematoma following ICH. Consist with promoted Cab45s' expression, it was found that the expressions of Glucose-regulated protein 78 (GRP78), pro-apoptotic Bcl-2-associated X protein (Bax), and active caspase-3 were elevated. Co-localizing with active-caspase-3 in neurons, Cab45s performed its potential role in neuronal apoptosis. In vitro, coimmunoprecipitation analysis indicated the interaction between Cab45s and GRP78. Besides, the data showed that the expression of GRP78, Bax, and caspase-3 could be attenuated by Cab45s depletion with double-stranded RNA interference in PC12 cells. These results revealed that Cab45s might exert its anti-apoptotic function against neuronal apoptosis.

**Conclusions:** The study provided evidences for regulating Cab45s as a potentially reliable treatment for the secondary damage following ICH.

**Keywords:** ICH, Cab45s, Neuronal apoptosis, GRP78, Rat.

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#### O-37. Basic Science

### Increased Expression of Triad1 is Associated with Neuronal Apoptosis After Intracerebral Hemorrhage in Adult Rats

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**Background and Objectives:** Triad1 (2 RING fingers and DRIL [double RING finger linked] 1), also called ARIH2, is one of ubiquitinating enzymes which involved in protein Ub-related degradation. It had demonstrated that Triad1 negatively regulate myeloid cell growth and induces cell apoptosis. However, its functions in intracerebral hemorrhage (ICH) disease have not conducted.

**Methods:** The role of Triad1 in rat model of ICH was explored. Western blot and immunohistochemistry were used to examine the Triad1 levels and subcellular localization adjacent to hematoma after ICH. SiRNA specific to Triad1 was employed to knock down the level of Triad1 to uncover its causal association with neuronal apoptosis.

**Results:** We observed an increasing expression of Triad1 in area adjacent to hematoma after ICH. Immunofluorescence showed that Triad1 was only colocalized with neurons, while not microglia or astrocyte, indicative of its correlation with neuronal activities following ICH. As neuronal apoptosis is the most crucial event in ICH disease, the expression of active caspase-3 and p53 were also enhanced in area adjacent to hematoma, which also consistent with Triad1 in expression tendency. In turn, Triad1 depletion in primary cortical neurons decreased the apoptosis of neurons after using Triad1 shRNA.

**Conclusions:** We concluded that inhibition of Triad1 expression might protect the brain from secondary damage following ICH.

**Keywords:** Intracerebral hemorrhage; Triad1; Neuronal apoptosis; p53; Rat.

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### O-38. Prevention of Stroke

#### **Screening for Stroke Risk Factors Using Stroke Riskometer™ Application and Portable Atrial Fibrillation Detection Device: An Experience from King Chulalongkorn Memorial Hospital**

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**Background and Objectives:** Despite the advancement of acute stroke management, stroke prevention remains one of the best approach regarding stroke burden reduction. Most of risk factors contributed to stroke are modifiable. Therefore, risk factors screening for stroke is consider to be one of the effective strategy for stroke prevention.

**Methods:** Risk factors screening kiosk was launched at King Chulalongkorn Memorial Hospital to commemorate HM the queen's birthday on August 12th, 2017. Demographic data and cardiovascular as well as stroke risk factors were collected. Screening electrocardiogram was performed using portable atrial fibrillation detection device and confirmed by 12-lead electrocardiogram. Stroke Riskometer™ application in the tablet device was used to calculate the 5 and 10-year stroke risks in all individuals presented at the kiosk.

**Results:** There were 207 subjects included in the program. Forty-six (22%) of the subjects were male. The mean age was 62.5 years. The most common risk factors were hypertension (27.5%) followed by diabetes mellitus (6.3%) and alcohol consumption >1 standard drink/day (6.3%). There were 3 subjects with atrial fibrillation. All of them were older than 70 years old. The 5 and 10-year risk of stroke ranged from 0.85–29.09% and 1.16–66.03%, respectively. There were 15.9% of patients who had 10-year stroke risk more than 10% and 7.2% of patients had the risk more than 20%.

**Conclusion:** Stroke Riskometer™ mobile application and portable atrial fibrillation detection device have shown to be both convenient and practical tools for stroke risk screening among individuals.

**Keywords:** Stroke, Risk Factors, Screening, Atrial fibrillation, Prevention.

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### O39. Epidemiology of Stroke, Risk Factor

#### **Association Between Ratio of Serum Eicosapentaenoic Acid to Arachidonic Acid and Functional Outcome After Acute Ischemic Stroke**

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**Background and Purpose:** Low ratio of eicosapentaenoic acid to arachidonic acid (EPA/AA) is known as a risk factor for cardiovascular disease. Japan EPA Lipid Intervention Study showed that EPA intake reduced stroke recurrence in patients with dyslipidemia. We aimed to evaluate the influence of EPA/AA ratio at admission on functional outcome after acute ischemic stroke.

**Method:** Consecutive patients treated for acute ischemic stroke within 7 days of onset were included in this study. We obtained EPA/AA ratio at admission and investigated the relationship with demographic data, stroke subtypes and functional outcome at discharge. Good outcome was defined as a modified Rankin Scale score of 0-1.

**Result:** One hundred and forty-four patients were enrolled (mean age 73.6 years old, M/F 81/63). Median value of EPA/AA ratio was 0.35 (IQR; 0.24–0.53). EPA/AA ratio increased with age and was not different among stroke subtypes. In the analysis of the first-ever ischemic stroke (N = 76), 87% of the patients with higher EPA/AA ratio (>0.6, N = 31) showed good outcome. In contrast, good outcome was observed in only 40% of the patients with lower EPA/AA ratio (<0.6, N = 45).

**Conclusion:** High EPA/AA ratio may predict a favorable functional outcome among patients with acute ischemic stroke.

**Keywords:** eicosapentaenoic acid, risk factor, acute ischemic stroke.

#### P-5. Multidisciplinary Stroke Care

##### Frequency of Neurologic and Systemic Thromboembolic Events Following Non-Traumatic Intracerebral Hemorrhage and Subarachnoid Hemorrhage

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**Background:** Thromboembolic events are one of the cardinal causes of morbidity and mortality following intracerebral hemorrhage (ICH) and subarachnoid hemorrhage (SAH). This study intended to evaluate the incidence of neurologic and systemic thromboembolic events in patients with non-traumatic ICH and SAH during the first 6 months after hemorrhage.

**Methods:** In this randomized-cohort study, we enrolled 203 patients with acute non-traumatic ICH & SAH who admitted in neurology ward of Zanjan Vali-e-Asr hospital during years 2016–17. Their risk factors (hypertension, diabetes mellitus, atrial fibrillation, smoking), initial neurologic indices (Glasgow coma scale, ICH score, Hunt & Hess grading), bleeding size were recorded, and then followed in intervals 1 week, 1 month, 3 months and 6 months for occurrence of deep vein thrombosis (DVT), pulmonary embolism (PE), ischemic heart disease (IHD) and ischemic stroke (IS).

**Results:** ICH group comprised 165 patients and 38 subjects had SAH. The overall incidence of thromboembolic events in an unselected ICH & SAH population was 27.6%. Incidence rates of DVT, PE, IHD and IS at 6 months following ICH and SAH were 10.9%, 5%, 10% and 7.4%, respectively. Mean time to event was  $145.5 \pm 5.5$  days (95% CI.  $P = 0.02$ ).

**Conclusion:** Age, smoking, hypertension, diabetes mellitus and atrial fibrillation were significant independent risk factors for thromboembolic events. Adjustment for baseline risk factors revealed significant correlation between age, higher ICH score, hemorrhage size >30 cc and higher Hunt & Hess grade and developing of DVT.

**Keywords:** Intracerebral hemorrhage, subarachnoid, thrombosis, embolism, ischemia.

#### P-6. Pediatric Stroke

##### Paediatric Moyamoya Disease: Case Series

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**Introduction:** Moyamoya disease or syndrome is an uncommon chronic cerebral vasculopathy, characterized by progressive stenosis of the terminal portion of the internal carotid artery (ICA) and its main branches, in association with the development of compensatory collateral vessels at the base of the brain.

**Case Studies:** We report three cases of moyamoya disease who presented with recurrent acute ischemic stroke (AIS) in a single tertiary center over the last 3 years (Jan 2014–Feb 2017). Age of presentation are between 11 month and 4 year of age. Angiography findings of these patients were in keeping with moyamoya disease. Case 1 presented with 2 episodes of AIS. MRA brain showed stenosis over bilateral distal carotid arteries, bilateral M1 segment of MCAs, and A1 segment of the left ACA. This patient did not underwent surgical intervention. Case 2 presented with 2 episodes of AIS. MRA showed tight and progressive stenosis at left distal ICA, right A1 segment of ACA and left MCA. Subsequent cerebral angiography showed strial and thalamic collaterals, in addition to the stenosis. The child underwent encephalo-duro-arteriosynangiosis (EDAS) at the age of 3.5 years old with favourable outcome. Case 3 presented with 2 episodes of ischemic stroke. MRA after second ischemic stroke showed occlusion of supraclinoid segments of both ICAs. Subsequent cerebral angiography revealed multiple small collaterals from lenticulostriate and thalamic perforating arteries. We planned to perform indirect bypass. All patients are currently only have slight hemiparesis, and are on Aspirin.

**Discussion:** These cases highlight that moyamoya disease should be considered when paediatric patients presented with recurrent AIS. MRA findings of distal stenosis of ICA and proximal stenosis of its branches should prompt a conventional cerebral angiography whenever possible, as early recognition and intervention of moyamoya disease is important to prevent further strokes in these patients.

**Keywords:** Pediatric Stroke, Moyamoya, Ischemic Stroke.

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## P-7. Basic Science

### Reduction of Intracerebral Hemorrhage by Rivaroxaban After tPA Thrombolysis is Associated with Down-Regulation of PAR-1 and PAR-2

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**Background and Objectives:** Several clinical trials have reported rivaroxaban, a direct FXa inhibitor, is superior to warfarin in terms of reducing intracerebral hemorrhage (ICH); however, the mechanism of ICH reduction by rivaroxaban is unclear. This study aimed to assess the risk of ICH after tissue-type plasminogen activator (tPA) treatment in rivaroxaban compared with warfarin pretreated male Wistar rat brain after ischemia in relation to activation profiles of protease-activated receptor-1, -2, -3, and -4 (PAR-1, -2, -3, and -4).

**Methods:** After pretreatment with warfarin, low dose rivaroxaban, high dose rivaroxaban, or vehicle for 14 days, transient middle cerebral artery occlusion was induced for 90 min, followed by reperfusion with tPA (10 mg/kg/10 mL). Infarct volume, hemorrhagic volume, immunoglobulin G leakage, and blood parameters were examined. Twenty-four hours after reperfusion, immuno-histochemistry for PARs was performed in brain sections.

**Results:** ICH volume was increased in the warfarin-pretreated group compared with the rivaroxaban-treated group. PAR-1, -2, -3, and -4 were widely expressed in the normal brain, and their levels were increased in the ischemic brain, especially in the peri-ischemic lesion. Warfarin pretreatment enhanced the expression of PAR-1 and PAR-2 in the peri-ischemic lesion, whereas rivaroxaban pretreatment did not.

**Conclusions:** The present study shows a lower risk of brain hemorrhage in rivaroxaban-pretreated compared to warfarin-pretreated rats following tPA administration to the ischemic brain. It is suggested that the relative down-regulation of PAR-1 and PAR-2 by rivaroxaban compared with warfarin pretreatment might be partly involved in the mechanism of reduced hemorrhagic complications in patients receiving rivaroxaban in clinical trials.

**Keywords:** cerebral ischemia, stroke, FXa inhibitor, protease-activated receptors (PARs), intracerebral hemorrhage.

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## P-8. Cerebrovascular Occlusive Disease

### Clinical Manifestation of Patients with CVST

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**Background:** CVST is an entity by intracranial vein, including cerebral sinuses, cortical vein and proximal part of the jugular vein. A delay in diagnosing and treating can result in brain infarct with hemorrhagic transformation, even death.

**Objective:** The purpose of this study was to learn the clinical manifestation of patients with CVST that have been confirmed by DSA.

**Methods:** A retrospective observational descriptive study. The subjects of this study are patients diagnosed as CVST in Neurology department Hasan Sadikin Hospital from June 2015 to November 2017, the data used in this study came from the hospital medical record.

**Results:** There were 33 subjects with Twenty four of 64 participants were excluded from the protocol analysis due to loss of contact and four patients have died during three months after discharge. Thirty six patients (21 male, 15 female, mean ages 62.78) were analyzed. The result of the functional state was significantly different between pre and post early mobilization at discharge time, one month after discharge and three months after discharge (p value: 0.00, alpha 0.5).

**Conclusion:** It's concluded that the early mobilization could increase the functional state of stroke patients. Furthermore, it's recommended that nursing professional and physiotherapist should conduct early mobilization protocols for stroke patients in the acute phase.

**Keywords:** CVST, DSA, prothrombotic condition.

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## P-9. Epidemiology of Stroke, Risk Factor

### Correlation between Nutritional Status with Type of Stroke in Hasan Sadikin Hospital and Salamun Hospital Bandung

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**Background:** Stroke is a disease with a high mortality rate and named as the third deathly disease in the world. One of the factors associated with stroke is nutritional status. Nutritional status in the acute stage of stroke has not been properly evaluated in different stroke subtype.

**Objective:** The objective of this study was to investigate the nutritional status of different subtype of stroke patients

**Methods:** This research was an analytic observational study with cross sectional method. Subjects were hospitalized stroke patient, who met the inclusion and exclusion criteria at RS. Hasan Sadikin and RSAU. DR. Salamun Bandung on October to December 2015. Sampling was done randomly. The screening tools for stroke is brain CT scan, informed consent, measure body mass index (BMI), weight scale using (SECA) and height scale using measuring tape.

**Result:** There were 121 subjects research that consist 87 subjects with ischemic stroke (CI) and 34 subjects with intracerebral hemorrhage (ICH). There has been conflicting evidence, subject with underweight and normal nutritional status mostly had (ICH), meanwhile overweight and obesity nutritional status mostly had (CI). Hemorrhage in the underweight group was approximately 20.6% (ICH) and 4.6% (CI), normal nutritional status group had approximately 55.9% (ICH) and 9.2% (CI), overweight group had

approximately 0% (ICH) and 29.9% (CI), obesity group had approximately 23.5% (ICH) and 56.3% (CI). The statistical analysis found that there were a significant association between nutritional status and stroke subtype in acute stroke ( $p = 0.000$ ). had moderate correlation between nutritional status and the type of stroke ( $R = 0.412$ ).

**Conclusions:** In this study, there were relationship between nutritional status and subtype stroke in acute stroke

**Keyword:** Nutritional status, Ischemic stroke, Intracerebral hemorrhage, BMI.

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## P-10. Prevention of Stroke

### **A Modified NCD (Non Communicable Diseases) Stroke Posbindu Using Stroke Riskometer™ Application: The Newest and Promising Strategy for Primary Stroke Prevention in Indonesia**

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**Background and Objectives:** Stroke has been the leading cause of death in Indonesia since 2010. In 2011, The Government of Indonesia has launched Non Communicable Diseases (NCD) Posbindu, which increased community detection NCD risk factor. The Stroke Riskometer™App uses the rapidly growing smartphone platform to provide individualized stroke risk assessments. A modified NCD Stroke Posbindu with Stroke Riskometer™ will be used to inform of the global population risk of stroke. The objective of this study is to describe the results of Modified NCD Stroke Posbindu with Stroke Riskometer™ 5-year risk of stroke occurrence.

**Methods:** The study is a descriptive observational study to describe the results Modified NCD Stroke Posbindu with Stroke Riskometer™. The study was conducted to celebrate World Stroke Day on 29th October 2017. We examined 81 people with the Stroke Riskometer™. The Stroke Riskometer™ calculates the 5-year risk of stroke for any individual aged  $\geq 20$  years, based on their responses to a short questionnaire.

**Results:** From 81 subjects (83.95% women, mean age 38 years old), 15 (18.52%) subjects had hypertension, 17 (20.98%) subjects had dyslipidemia, 2 (2.47%) had DM, and 14 (17.28%) had obesity. This study found 96.30% subjects had low ( $< 5\%$ ) and 3.70% subjects had moderate (5% to 14%) 5-year risk of stroke occurrence using the Stroke Riskometer™. To measure 5-year risk of stroke, we can answer a series of questions based on validated algorithm, which allow them to quickly and accurately calculate their risk of stroke using the Stroke Riskometer™. We can download the Stroke Riskometer™ application from Playstore.

**Conclusion:** A modified NCD Stroke Posbindu with Stroke Riskometer Application is the newest and promising strategy for primary stroke prevention in Indonesia. Further researches regarding the larger subjects are still needed in the future.

**Keywords:** Modified NCD Stroke Posbindu, Stroke Riskometer™App, Primary stroke prevention.

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## P-11. Epidemiology of Stroke, Risk Factors

### **The Correlation between Side of the Stroke Lesion Location and Stroke Risk Factors**

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**Objectives:** Stroke has been the most silent killer disease in the world. Age, sex, hypertension (HT), diabetes mellitus (DM), and dyslipidemia has been known as stroke risk factors. Previous studies found that the site of lesion was associated with poor outcome. Left hemisphere was the most common lesion site. The atherosclerotic process may differ between left and right hemisphere and may affected by the stroke risk factors. The aim of this study is to determine the characteristics of the site of the lesion and their correlation with stroke risk factors.

**Methods:** This was a retrospective study with the cross-sectional method. The subject was the stroke patients that proved by CT-Scan. Data was retrieved from medical records. Incomplete data, recurrent stroke, and hemiparesis patient who had normal CT-Scan were excluded. Spearman correlation test and multivariate linear regression test was used.

**Results:** Of 81 subjects in the period March 2017–April 2018, the average of the subjects was 60.64 years. The most stroke type were non-haemorrhagic stroke (77.8%), the location of the lesion was mostly at Periventricular Lateralis (PVL) (35%) and in the right hemisphere (24.4%). The correlation between the side of lesion location and stroke risk factors were not significant (type of stroke  $r = 0.125$ ,  $p = 0.379$ , age  $r = 0.127$ ,  $p = 0.362$ , sex  $r = -0.105$ ,  $p = 0.449$ , HT  $r = 0.032$ ,  $p = 0.819$ , DM  $r = 0.120$ ,  $p = 0.386$ , and dyslipidemia  $r = 0.180$ ,  $p = 0.193$ ).

**Conclusion:** PVL and the right hemisphere appear more frequent in this study. The side of lesion location was not correlated with stroke risk factors.

**Keywords:** Lesion; Stroke; Risk Factors.

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## P-12. Case Report

### **Hashimoto Encephalopathy Mimicking Acute Ischemic Stroke: Perfusion MR Imaging**

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**Background:** Hashimoto encephalopathy is used to describe a syndrome of cerebral symptoms in patients with serologic evidence of autoimmune thyroid disease. This disease entity could be diagnosed after the exclusion of other etiology, the diagnosis often delayed. There has been no report of MR perfusion delay in Hashimoto encephalopathy.

**Case Presentation:** A 61-year-old woman presented with sudden onset left hemianopia. She had taken anti-hypertensive medication, other medical history was not remarkable. In initial ophthalmologic examination, left hemianopsia was documented. She arrived at our emergency department about 1 hour after neurologic symptom onset, intravenous tissue plasminogen activator was administered. Brain MRI which performed 7 hours symptom onset showed no definite lesion of acute ischemic stroke, but perfusion delay was seen in right parieto-occipital lobe. No significant occlusion or stenosis was found in intra- and extra-cranial vessels on brain MR angiography. She discharged with remaining visual symptom. Ten days after discharge, she presented with right-sided hypesthesia and confusion. Brain MRI showed no diffusion restriction lesion. CSF exam was not remarkable. EEG revealed diffuse cerebral dysfunction in left hemispheres. Although thyroid function test was normal, both anti-thyroglobulin antibody and anti-thyroid peroxidase antibody were elevated. Hashimoto encephalopathy was diagnosed and, steroid was started. Her neurologic symptoms were gradually improved after steroid use.

**Conclusions:** Although non-specific abnormalities of brain MRI in Hashimoto encephalopathy were reported, perfusion delay on MRI compatible with the neurologic symptom in Hashimoto encephalopathy was not reported, yet. We report a case of Hashimoto encephalopathy mimicking acute ischemic stroke.

**Keywords:** Hashimoto encephalopathy, acute ischemic stroke.

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### P-13. Epidemiology of Stroke, Risk Factors

#### Body Mass Index and Stroke Severity in Patients with Non-Valvular Atrial Fibrillation

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**Background:** Obesity is known as the negative risk factor on survival after acute stroke (the obesity-stroke paradox). But, the study on the association between the obesity and stroke severity after acute ischemic stroke is sparse, especially the patients with non-valvular atrial fibrillation (NVAf). The objective of this study was to investigate the association between obesity and stroke severity in patient with non-valvular atrial fibrillation.

**Methods:** In this multi-center, retrospective observational study, total 1876 acute ischemic stroke patients with NVAf were included. Patients were categorized into underweight (body mass index [BMI] <18.5, n = 121), normal (18.5 ≤ BMI <25, n = 1220), overweight (25 ≤ BMI <30, n = 481) and obese (30 ≤ BMI, n = 56). CHASDS2-VASc score was also collected. National Institutes of Health Stroke Scale (NIHSS) score at admission and discharge, modified Rankin Scale (mRS) score at 3 months were evaluated. For analysis, mRS was dichotomized to favorable outcome (mRS 0 to 2) or unfavorable outcome (mRS 3 to 6).

**Results:** In baseline characteristic analysis, initial and discharge NIHSS scores and 3 month mRS score were differed among 4 groups of patients. In subgroup analysis, overweight patients had low NIHSS score at admission (6.80 ± 6.99 vs 8.00 ± 7.55, p < 0.001) and discharge (5.11 ± 8.01 vs 8.27 ± 8.54, p =

0.002) compared with normal weight patients. Also, overweight patients had more favorable outcome (60.0% vs 54.4%, p = 0.039) compared with normal weight patients. After log-linear regression for adjusting confounders, underweight patients had 36.2% higher NIHSS score than normal weight patients had (10.2–68.4, p = 0.004), while overweight patients had 12.5% lower NIHSS score compared with normal weight patients (22.9–0.8, p = 0.037). Multiple logistic regression analysis showed that when compared with normal weight patients, overweight was less likely to have unfavorable outcome with marginal statistical significance (OR 0.80, 95% CI 0.6–1.0, p = 0.07).

**Conclusion:** We found the association of BMI and stroke severity in the acute ischemic stroke patients with NVAf. Overweight patients had mild initial ischemic symptom and more favorable outcome compared with normal weight patients. Our results documented obesity paradox in the patients with NVAf. Further investigations are needed.

**Keyword:** Acute ischemic stroke, non-valvular atrial fibrillation, stroke severity.

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### P-15. Epidemiology of Stroke, Risk Factors

#### Prevalence, Clinical Features and Outcomes of Progressive Lacunar Stroke: A Retrospective Cohort Study at King Chulalongkorn Memorial Hospital (KCMH), Thailand

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**Background and Objective:** Some patients with lacunar stroke have progressive neurological deficit. However, the mechanism of progressive lacunar stroke is poorly understood. We aimed to explore the prevalence, clinical features and outcomes of progressive lacunar stroke.

**Methods:** Consecutive patients with acute lacunar stroke, who were admitted in KCMH during July 1, 2015 and February 28, 2018, were recruited. In this study, clinical lacunar stroke was defined as acute motor deficit lasting more than 24 hours and clinical syndrome compatible with pure motor hemiparesis, ataxic hemiparesis or sensorimotor stroke. The patients with cardioembolism or imaging shown cortical involvement was excluded. Lacunar stroke was considered to be progressive if there was an increase in NIHSS during admission by more than 2 points.

**Results:** Of 258 patients, 57 (22.1%) had progressive lacunar stroke. Patients presenting with ataxic hemiparesis were less likely to have progressive stroke than those presenting with pure motor hemiparesis or sensorimotor stroke (OR 0.4; 95% CI 0.17–0.94, p = 0.03). The median onset time of progression was Day 2. Length of stay was longer (median length of stay, 8 ± 4 versus 4 ± 2 days; p < 0.001) in the progressive group. In addition, functional status at discharge and 3 months follow-up was worse (median modified rankins score (mRS) at discharge, 3 versus 1; p < 0.001) (median mRS at 3 months follow-up 4 versus 1; p < 0.001) in progressive group than those without progression.

**Conclusion:** The progressive lacunar stroke is not uncommon condition and associated with poor functional outcome.

**Keywords:** Lacunar stroke, progressive stroke, prevalence.

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#### **P-16. Case Report**

### **Reversible Cerebral Vasoconstriction Syndrome in Patients with Polycythemia Vera**

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**Background & Objectives:** Reversible cerebral vasoconstriction syndrome (RCVS) is characterized by recurrent thunderclap headaches with reversible cerebral vasoconstriction. RCVS is possibly caused by a transient dysregulation of cerebral vascular tone, leading to multi-focal arterial constriction and dilation. RCVS is associated with nonaneurysmal subarachnoid hemorrhage, pregnancy and exposure to certain drugs. The primary clinical manifestation is recurrent sudden-onset and severe ('thunderclap') headaches over 1–3 weeks.

**Case:** A 54-year-old woman presented with recurrent thunderclap headaches, aggravated by coughing. There was no nausea, vomiting, or photophobia. She was diagnosed polycythemia vera 3 years ago and treated with aspirin and hydroxyurea. She was alert and oriented. Her neurologic examination was normal. Brain CT angiography showed multiple cerebral artery irregularities with alternations of segmental multifocal constrictions and dilatations. Blood tests with normal or negative findings included complete hematology counts, erythrocyte sedimentation rate, liver enzymes, blood chemistry, antinuclear antibody panel, anti-cardiolipin antibodies, and blood coagulation studies. Cerebral angiography confirmed segmental multifocal constrictions and dilatations in the same vascular territories. She was treated with oral nimodipine and her symptoms were improved within 3 weeks. She had no headache during 6 months follow-up.

**Conclusions:** We report a patient with RCVS and polycythemia vera. RCVS has been reported to occur in various clinical settings. Though the pathophysiology is not clearly understood, a disturbance in the control of cerebrovascular tone seems to be the final common pathway.

**Keywords:** Headache, polycythemia vera, reversible cerebral vasoconstriction syndrome.

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#### **P-17. Case Report**

### **Increased Signal Intensities in Splenium of Corpus Callosum: Stroke vs Encephalopathy**

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**Background & Objectives:** Metronidazole has been used in the treatment of anaerobic, protozoal infections, or brain abscess. It is comparatively safe but can produce neurological disorders especially when exceeding 2 g/day or following weeks of treatment.

**Method:** An 88-year-old woman with atrial fibrillation visited the emergency room complaining of mild dysarthria and dizziness. She had been received 5 days of daily 1500 mg of intravenous metronidazole for chronic appendicitis and discharged two days before symptoms onset. She continued to take the same dosage of oral metronidazole after discharge. Her neurologic examination was normal except mild dysarthria.

**Results:** Brain MRI showed high signal intensities on diffusion-weighted image (DWI) intensities and low signal on apparent diffusion coefficient (ADC) map in the splenium of corpus callosum, suggesting cytotoxic edema. Though metronidazole induced encephalopathy was suspected, metronidazole was administered continuously since the total period of treatment was only seven days. She was also treated antiplatelets for the possibility of acute cerebral infarction. After eleven days of metronidazole treatment, trunkal ataxia and moderate dysarthria was developed. Follow-up brain MRI demonstrated high signal intensities in the bilateral dentate nuclei and the splenium of corpus callosum on DWI. Metronidazole was stopped and after twelve days of cessation, her symptoms were slowly improved.

**Conclusion:** Though the total treatment time was short as days, the suspicion of metronidazole as a cause of acute toxic encephalopathy was essential in patients with metronidazole treatment.

**Keywords:** Encephalopathy, metronidazole, stroke.

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#### **P-18. Prevention of Stroke**

### **Primary Prevention with Aspirin in 1,125 Medical Check-Up Participants**

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**Background and Objectives:** The aim of the present study was to assess the 10-year cardiovascular disease (CVD) risk and to apply the current recommendations on aspirin use for primary prevention in Korean participants undergoing a medical check-up.

**Methods:** Adults aged 50 to 69 years were eligible for the study if they did not have a history of atherosclerotic cardiovascular disease (ASCVD) or stroke. The 10-year CVD risk was calculated using the ASCVD risk estimator (<http://tools.acc.org/ASCVD-Risk-Estimator>).

**Results:** A total of 1,125 participants were enrolled in this study. The mean age was 57 years, and 32% of the participants were women. Based on the 2016 USPSTF recommendations, aspirin was indicated in 266 (23.6%) participants but only 44 (3.9%) participants were taking aspirin regularly. Among these participants, aspirin was prescribed appropriately in 36% of the participants, suggesting that only 6% of the participants were taking aspirin appropriately and 3.3% of the participants were taking aspirin inappropriately. Logistic regression analysis showed that treatment for hypertension was significantly associated with taking aspirin (OR, 7.49; 95% CI, 3.62–15.49).

**Conclusion:** Our study suggested that there may be an opportunity for decreasing the rate of CVD as well as the risk for major bleeds through tailored education on aspirin use.

**Keywords:** Aspirin, cardiovascular disease, guideline, primary prevention, stroke

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### P-19. Uncommon Stroke Disorder

#### Amnesia Presenting Acute Multifocal Cerebral Infarctions in CADASIL

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**Background and Objectives:** Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL) is an adult-onset, autosomal dominantly inherited small-vessel disease of the brain caused by NOTCH3 mutations. It is characterized by migraine with aura, mood disorder, recurrent subcortical infarctions, and dementia. We report a patient presenting sudden amnesia due to acute multifocal cerebral infarctions as the first manifestation of CADASIL.

**Case Report:** A 52-year-old man admitted due to acute amnesia. He was lost and found five days later, far away from home. Initial MMSE was 16 and mild left-sided ataxia was observed. Brain magnetic resonance imaging revealed diffuse leukoencephalopathy and multiple acute cerebral infarctions on bilateral cerebral white matter and left middle cerebellar peduncle. Brain magnetic resonance angiography, echocardiography and 24-hour electrocardiography were unremarkable, except patent foramen ovale. The NOTCH3 genetic testing showed a heterozygous missense mutation, c.505C>T (p. Arg169Cys).

**Conclusion:** This case shows that the acute simultaneous multiple small deep infarctions can occur in CADASIL. It should be differentiated with other embolic cerebral infarctions, which usually involve both cortical and subcortical area.

**Keywords:** Amnesia, CADASIL, cerebral infarction.

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### P-20. Aneurysm, Sub Arachnoid Hemorrhage & Vascular Malformations

#### Loss of Consciousness at Onset of Subarachnoid Hemorrhage as an Important Marker of Short Term Outcome

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**Background and Objective:** Loss of consciousness (LOC) is one of the most common presenting symptoms of Subarachnoid hemorrhage (SAH). Studies assessing the impact of LOC on prognosis of SAH has been limited. Scientific assessment of effect of LOC on outcome of SAH, this study is first ever in Bangladesh as far as knowledge goes and it will be helpful to assess the prognosis of patients.

**Method:** Observational hospital-based study in Department of Neurology of Dhaka Medical College Hospital. Patients with diagnosis of SAH admitted in the in-patient wards of Neurology, Neurosurgery and Internal Medicine were sampled. Study population was 75 by Purposive sampling. Patients were divided in two groups with either presence (B) or absence of loss of consciousness (A). Group B was further subdivided into 3 subgroups depending on admission WFNS (World Federation Of Neurosurgical Societies) scale grades (BI= WFNS II & III, BII=WFNS IV and BIII=WFNS V). Follow-up was in the stroke clinic, outpatient department of Neurology or by telephone interviews of patients, caregivers or family members. Outcome was measured by modified Rankin scale (mRS). Short term outcome: mRS at the end of three months or within this period.

**Result:** Six (8%) patients died during hospital stay (only from B), and 6 died after 3 months. Sixteen (21.33%) patients were lost during follow-up. In group A, 28.6% patients had poor outcome at discharge, whereas 36% of patients in group B had poor outcome. Within group B most of the patients having poor outcome were in subgroup BIII (75%). Statistically significant difference of poor outcome was observed between group A and group B ( $p = 0.023$ ). The frequency of poor outcome at 3 months was 16.7% in group A and 75.0% in group BIII. The frequency of death was 8.3% in group A, but 25% in group BIII. There was statistically significant ( $p = 0.007$ ) difference of poor outcome between the groups. Multivariable logistic regression analysis was carried out to determine the magnitude of admission characteristics (age, sex, HTN, DM, WFNS grade) of patients on 3-month outcome after SAH. Patients having LOC with only WFNS grade (IV or V) had statistically significant influence on poor outcome ( $p = 0.04$ ).

**Conclusion:** Loss of consciousness at onset of SAH may serve as an important marker for poor outcome.

**Keywords:** Loss of consciousness, Subarachnoid hemorrhage, WFNS score, mRS.

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## P-21. Prevention of Stroke

### Patterns of Stroke Recurrence in Ischemic Stroke Patients Taking Non-Vitamin K Antagonist Oral Anticoagulation

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**Background and Purpose:** Patterns of stroke recurrence in ischemic stroke patients taking non-vitamin K antagonist oral anticoagulants (NOACs) remain uncertain. We investigated the association between the presence of major vessel occlusion (MVO) and the intensity of anticoagulation by taking NOACs in recurred ischemic stroke patients with atrial fibrillation.

**Materials and Methods:** From July 2013 through December 2016, 120 patients with recurred ischemic stroke with atrial fibrillation taking NOACs were retrospectively analyzed. Patient with non-standard dose of NOACs was divided into two groups; Missed dose group that was discontinuation of NOACs more than 48 hours and under dose group which was off-label dose of NOACs.

**Results:** Patient with standard dose group, under dose group, and missed dose group was 60 (50.0%), 39 (32.5%), and 21 (17.5%), respectively in recurred ischemic stroke patients. Patients with major vessel occlusion was 12 (20.0%) in standard dose group, 15 (38.5%) in under dose group, and 13 (61.9%) in missed dose group. In 40 patients with MVO, missed dose group (61.9%) was significantly higher ratio than standard dose (20.0%) and under dose (28.5%) group ( $P = 0.002$ ). An increase in intensity of NOACs was inversely associated with MVO in the unadjusted model.

**Conclusions:** Regular monitoring for intensity of NOACs does not provide benefits and cannot be recommended at present. In ischemic stroke patients with atrial fibrillation taking NOACs, low intensity of anticoagulation by missed dose and under dose of NOACs was significantly associated with the occurrence of major vessel occlusive stroke.

**Keywords:** Non-vitamin K antagonist oral anticoagulants, major vessel occlusion.

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## P-22. Stroke Rehabilitation

### Effects of Turning Direction on 1800 Turning-On-The-Spot In Individuals With Stroke

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**Background and Objectives:** Turning has been reported as one of the activities that most frequently leads to falling for stroke patients. Turning performance may vary depending on the direction of the turn due to asymmetrical posture and movements, and most falls occur when they turn to their paretic side. Therefore, the

objective of this paper was to investigate the differences in turning performance between toward affected and unaffected side in post-stroke hemiplegic patients.

**Methods:** Thirty stroke patients performed 1800 turning-on-the-spot in both directions. The turn steps, time, type and balance were recorded. The direction they chose to turn first was observed. They were also asked the easier turning direction after assessment. Turn steps and time between directions were examined by the Wilcoxon signed-rank test while turn quality and type by Chi-square test.

**Results:** There were no differences between directions of turning in terms of turn steps, time, quality, and type in stroke patients. Half of patients chose to turn first toward affected side. One-third of patients felt easier to turn toward the affected side, One-third felt unaffected side, and the rest of one-third felt no difference.

**Conclusion:** The 1800 turning performance was the same whether it was made to the affected or to the unaffected side. Stroke patients did not express any preference in turning directions. This could be associated with motor impairments affecting both sides after stroke and affected leg lacking effective function during the turn whether it worked as the inner or outer leg.

**Keywords:** Direction, Stroke, Turn.

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## P-23. Case Report

### Acute Pontine Infarction in a Patient with Persistent Left Superior Vena Cava

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**Background:** Persistent left superior vena cava (PLSVC) is a common venous anomaly of the thorax and usually drains into the right atrium. Less often it drains into the left atrium and has previously been related to ischemic stroke.

**Case:** We report a case of PLSCV that manifested as ischemic stroke in a 77-year-old woman which was detected on transesophageal echocardiography (TEE) and transcranial Doppler ultrasonography (TCD) with saline agitated test and computed tomography

**Conclusion:** It is important to adhere to the correct protocol for infusion of saline with microbubbles through the left brachial vein and contrast bubbles, which is essential in accurately diagnosing rare cases such as PLSVC presented in this report.

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## P-24. Neurosonology

### Extracranial Parameters of Significant Intracranial Arterial Steno-Occlusive Disease

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**Background:** Significant intracranial stenosis can be suspected from extracranial Duplex scans. We sought to identify Duplex parameters that indicate the presence of severe intracranial disease.

**Methods:** Patients with extracranial Duplex study and MRA of the circle of Willis between June 2014 and June 2016 were studied. Only those with severe unilateral intracranial disease (>75% using caliper and visual measurements) in the Internal Carotid [ICICA], proximal or distal Middle Cerebral [MCA] and Vertebral Arteries [ICVA], with no severe extracranial disease were included. Extracranial parameters were collected in the Common Carotid (CCA), ICA and mid VA including peak systolic velocities (PSV), end diastolic velocities (EDV), mean velocities (MV), pulsatility index (PI) and external luminal diameters.

**Results:** A total of 180 had severe unilateral intracranial stenosis (62% males; mean age 63 years; 78% Chinese) with severe disease in 45 ICICAs, 50 proximal MCAs, 31 distal MCAs and 34 ICVAs. Twenty eight hypoplastic VA (terminated into Posterior Inferior Cerebellar Artery) were analyzed too. PSV, EDV and MV of ipsilateral CCA and ICA were significantly lower than contralateral side when severe ICICA disease was present. ICA MV was >50% lower than contralateral side ( $17 \pm 9$  cm/s vs  $39 \pm 10$  cm/s,  $p < 0.001$ ), with significantly higher PI ( $1.8 \pm 0.8$  vs  $1.0 \pm 0.2$ ,  $p < 0.001$ ) and smaller ICA diameter ( $3.7 \pm 1.1$  mm vs  $4.7 \pm 0.8$  mm,  $p < 0.001$ ). With severe proximal MCA, ICA MV were 20% lower compared to the contralateral side ( $28 \pm 8.7$  cm/s vs  $35 \pm 8.4$  cm/s,  $p < 0.001$ ), but ICA PI and caliber were not significantly different. Extracranial indices were not significantly different for severe distal MCA disease. Both hypoplastic VA and severe ICVA disease had significantly lower PSV, EDV, MV and diameters, compared to contralateral side. PIs in hypoplastic VAs ( $1.5 \pm 0.3$  vs  $1.2 \pm 0.3$ ) and severe ICVA disease ( $2.8 \pm 0.4$  vs  $1.3 \pm 0.3$ ) were significantly higher than contralateral side. In addition, PIs in ICVA disease were significantly higher compared to hypoplastic VAs.

**Conclusions:** Duplex scan is useful to detect severe intracranial ICA, proximal MCA and ICVA disease. In addition, severe ICVA and hypoplastic VA can be differentiated by their PI.

**Keywords:** Intracranial disease, extracranial Duplex scan, Carotid Arteries.

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## P-25. Outcome and Quality of Care

### The Severity of Ischemic Stroke as a Risk Factor for Late-Onset Seizure

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**Background:** Cerebrovascular disease is the most frequent etiology of acute symptomatic seizure and secondary epilepsy among adult population and elderly. Late-onset seizure (LS) prevalence is 3–67% of post stroke individuals. One study which involved young adult post ischemic stroke patients has reported that 55% out of LS group would subsequently develop recurrent seizure. Several researches reported different conclusions concerning stroke severity relating to LS, and used various methods.

**Objective:** Therefore, we aim to investigate whether stroke severity is a risk factor for LS among ischemic stroke patients.

**Method:** This is a single center retrospective study, conducted in Dr Sardjito Hospital from 2007 to 2017. Variables measured in this study were stroke severity (NIHSS) on admission, Barthel index, age, sex, hypertension, diabetes mellitus, cardiac disease, smoking habit, and lesion site (cortical involvement).

**Result:** This study enrolled 68 subjects, consisting 29 patients in LS group and 39 patients in control group, 64.7% were male, while 35.3% were female. Age median of all subjects was 57 year old. Bivariate analysis suggested NIHSS, Barthel index, age, and cortical involvement significantly influence LS occurrence in post ischemic stroke subjects, with p values 0.021; 0.013; <0.001; <0.001 respectively. Multivariate analysis found that older age and cortical involvement were the independent risk factors for LS in ischemic stroke patients.

**Conclusion:** stroke severity on admission (NIHSS) was not found to be related significantly to LS among post ischemic stroke population.

**Keywords:** Ischemic stroke, late-onset seizure, seizure, stroke severity, NIHSS.

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## P-26. Case Report

### Case Report: Spontaneous Spinal Epidural Hematoma

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**Introduction:** Spontaneous spinal epidural hematoma (SSEH), an acute spinal cord compression, is a rare disorder, 1 per 1.000.000 populations annually. About 40% cases are idiopathic but it can be related to coagulopathy, anticoagulant and vascular malformation. Surgical intervention is a main treatment for SSEH. However, in some cases, conservative treatment can be considered. Our objective is to report a case of acute paraplegia caused by SSEH that treated conservatively.

**Case Report:** Woman, 36 years old presented to our hospital with a history of acute paraplegia, radicular pain and numbness from her back to bilateral lower limbs, also urinary and alvi retention. On neurology examination, we found paraplegia (muscle strength 1 on proximal and 2 on distal), hypesthesia below thoracal X level, bowel and bladder dysfunction. She had Idiopathic Thrombocytopenic Purpura (ITP) treatment since 5 years old. The platelet count was 17.000/mm<sup>3</sup>. Magnetic Resonance Imaging (MRI) T1-T2 weighted noncontrast revealed spindle shape, isointense on T1-weighted and hyperintense on T2 weighted in epidural region at thoracal X level. Due to low platelet count, the patient was treated conservatively with methylprednisolone 500 mg every 8 hours intravenously and tapering off within 15 days. There was clinical improvement but not full recovery. At two months after treatment, her muscle strengths were 4+ at bilateral lower limbs.

**Discussion:** SSEH is rare but serious illness. It requires prompt diagnosis and treatment. Conservative management can be feasible and gives clinical improvement in some patients.

**Keywords:** Epidural, hematoma, spinal, spontaneous.

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## P-27. Case Report

### Moyamoya Disease Presented with Intraventricular Hemorrhage in Young Adult Patient

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**Introduction:** Moyamoya disease (MMD) is a rare case that causes stroke in young ages. The incidence of MMD is very rare, typically occurs in females under the age of 20.1 MMD presents with various cerebrovascular events including TIAs, ischemic stroke, intracranial hemorrhage, headache, or seizures. The ischemic type predominates in young ages, whereas the hemorrhagic type predominates in adults.2 Progression of MMD has been estimated symptomatic progression over a 5-year period; the outcome is poor without treatment. This is the first case reported at our center.

**Case Report:** A case of 21-years old, Asian, female, presented with a severe headache with VAS: 9, nuchal rigidity, right facial UMN nerve palsy, with normal blood examination, The NCCT Brain was revealed an intraventricular hemorrhage at posterior horn of left lateral ventricle. Cerebral angiography was performed and revealed a total occlusion the left M1 segment, leptomeningeal collateral from left ACA to left MCA, dilatation of left P1 segment, leptomeningeal collateral left PCA temporal branch to cortical of MCA, choroidal blush at left side. She was diagnosed with MMD (Suzuki classification stage II) and managed with conservative treatment. mRS at discharged was 0. Patient underwent MRI and MRA TOF after 9 months which revealed normal findings in MRI and a narrowing of caliber in proximal segment of left A1.

**Discussions:** MMD is a rare case could diagnosed with cerebral angiography. Management of conservative treatments was a choice in early onset in this case. However, strict monitoring of the clinical and radiological examination is necessary.

**Keywords:** Moyamoya disease, young stroke, intraventricular hemorrhage.

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## P-28. Epidemiology of Stroke, Risk Factor

### Geographical Variation of Characteristics of Stroke Patients in North Sulawesi

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**Background:** Recently, stroke continues to be the second leading cause of death worldwide and is a major cause of disability and death in Indonesia. Geographic variations aren't fully explained by differences in patient need or preferences. Either too much care is being delivered in some areas or patients are missing out the care they need in other areas.

**Objective:** To analyze geographical variants of characteristics of stroke patients in coastal and non-coastal area treated at R. D. Kandou Hospital, North Sulawesi.

**Methods:** This study was a retrospective study by analyzing secondary data from stroke patients in R. D.Kandou Hospital, Manado. The data was obtained from 2015 to 2017.

**Results:** A total of eligible 940 stroke patients admitted to emergency department were included. There were 125 (59%) male and 87 (41%) female in coastal, 413 (56.7%) male and 315 (43.3%) female in non-coastal. Mean of age  $58.1 \pm 12.627$  in coastal and  $57.27 \pm 12.733$  in non-coastal. Stroke hemorrhage 46.2% and ischemic 53.8% in coastal. In non-coastal stroke hemorrhage was 52.5% and ischemic 47.5%. Based on transportation mode, 50% with private vehicle and 50% with ambulance in coastal; 51.2% with private vehicle and 48.8% with private vehicle in noncoastal. Poor knowledge about stroke was 30.2% and good knowledge was 69.8% in coastal. In non-coastal, 25.4% was poor knowledge and 74.6% was good knowledge. For all analysis,  $p$ -value  $>0.05$ .

**Conclusion:** Based on geographic variation, there were no different of characteristics of stroke patient in North Sulawesi province.

**Keywords:** Stroke, Geographical Variation, Coastal, Non-coastal, North Sulawesi.

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## P-29. Epidemiology of Stroke, Risk Factor

### Job Strain Related Stress as a Risk Factor of Stroke: A Review

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**Background and Objective:** There are more studies explore the job related stress can affect the health outcome of workers. Some meta-analysis explored the job strain can be risk factor of stroke but the but the journals included not only stroke but also other disease related. Updating any evidence which more focused on the job and risk factors of stroke are really needed for the clearly

evidence for this issue. Aim of this study is to describe and update the empirical literatures regarding job strain related stress as the risk factor of stroke both in woman and man workers.

**Methods:** This review literature including studies published between 2009 until 2018 which searched by an electronic database such as "EMBASE, PUBMED, Web of Science" and search engine "Google scholar".

**Result:** A literature search was performed ten studies from different countries. There are many factors induced the job stress which correlated the risk factors of stroke. Eight studies reported high job strain had association with risk factor of stroke which is psychological pressure, excessive work, sitting and inconsistency of work. In contrast, there are two studies had negative association between job strain and risk factor of stroke.

**Conclusion:** Most findings showed the association between job strain and risk factor of stroke. However, the future research may be needed to support the current results. Considering the adverse psychological impact of job, the health workers can be more attention on occupational health.

**Keywords:** Job strain, stress, risk factor, stroke.

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## P-30. Acute Neuroimaging

### Ultrasonic Evaluation of Arterial Stenosis in Acute Stroke Patients

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**Background:** The intracranial artery stenosis is common findings among stroke patients in Asian countries. We investigated risk factors concerning intracranial artery stenosis, carotid artery disease, and peripheral artery disease which reflects atherosclerosis.

**Methods:** stroke patients who visited these hospitals from January 2017 to December 2017, who were investigated with TCD studies, carotid artery ultrasonography and ABI (ankle brachial index) studies were included. This study was a retrospective review of the medical records.

**Results:** A quarter of the studied patients categorized as incomplete TCD study group because of poor insonation windows and all are excluded. The total number of 340 patients were included for analysis. Three groups of intracranial arterial stenosis are defined according to TCD criteria: no vessel stenosis is in about 40% of the patients, involving 1~2 vessels in 35%, involving more than 3 vessels in 25%. The common and internal carotid arteries are examined using duplex ultrasonography, and the largest diameter of plaques are recorded. Carotid arterial plaques are defined into 3 groups: diameter smaller than 2 mm is 35%, diameter between 2~4 mm is 55% and diameter larger than 4 mm is 10%. As the number of intracranial artery stenosis increases, the prevalence of carotid arterial plaque with moderate degree or severe also has increased accordingly.

**Conclusions:** Among acute stroke patients, more than a half of them have intracranial arterial stenosis to some extent. These patients are also more likely to have atherosclerosis as revealed by a higher incidence of plaques of moderate to large sizes in carotid arteries.

**Keywords:** Intracranial artery, carotid stenosis, transcranial doppler, stroke.

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### P-31. Case Report

#### Management of Cerebral Venous Sinus Thrombosis in Pregnancy: A Case Report

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**Introduction:** Cerebral venous sinus thrombosis (CVST) is a rare condition, causing stroke with the incidence of 0.5–1% of all stroke. One third cases may be intracerebral hemorrhagic and potential to death. Pregnancy is one of the important etiological factor. During late pregnancy and puerperium, CVST can be an important cause of stroke.<sup>1</sup> CVST in pregnancy basically have minimal morbidity and mortality, thus the treatment must be aggressive.<sup>2,3</sup>

**Case Presentation:** Female, 26 years old, Indonesian, with G2PIA0, 30–31 weeks of gestation, presented with seizure and unconsciousness, had been admitted to Obstetrics and Gynecology Department. The patient was diagnosed with eclampsia and HELLP Syndrome and managed by their protocols. The further management was done an emergency cesarean section. Hemiparesis on the right side was emerged thereafter. The patient then consulted to Neurology Department. The brain non-contrast CT (NCCT) scan was revealed an intracranial hemorrhagic (sICH score = 5) and suspected of CVST. The further management was heparinization with strictly control of aPTT. The further evaluation of NCCT scan showed a resolution of intracranial hemorrhagic followed by improvement on neurological deficit and clinical symptoms of HELLP Syndrome. Cerebral angiography was revealed a cortical vein thrombosis. Oral anticoagulant was administered, and modified rankin scale after being discharged from the hospital was 0.

**Discussion:** CVST is a rare condition but often occur in pregnancy with delayed on diagnosis or even misdiagnosed, thus the maternal mortality rate is quite high. Early and appropriate identification of this case can provide better clinical outcomes.

**Keywords:** Management, cerebral venous sinus thrombosis, secondary intracranial hemorrhagic, pregnancy.

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### P-32. Epidemiology of Stroke, Risk Factor

#### Characteristic of Factors Associated with Admission Time of Stroke Patients in Hospital

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**Background and Objective:** Stroke is a major cause of disability and death in Indonesia. Based on Riskesdas 2013 data, the incidence of stroke in North Sulawesi was ranked second after hypertension. Early management of stroke contributes to have better outcome. Our hospital data showed limited number of stroke patients who were admitted in early onset. We investigated factors related to admission time of stroke patients in RSUP Prof. dr. R. D Kandou Manado during 2015–2017

**Method:** This was a retrospective study using secondary data from stroke patients who met the eligibility. The statistical analysis was performed with Chi-square test with SPSS.

**Result:** There were 1060 patients that were interviewed; only 0.5% came in less than and equal 4 hours. There were 62% male. The mean age was 57.47 years. Of all patients, 47.1% patients had stroke ischemic and 52.8% patients had stroke hemorrhage. Those who delayed admission to the hospital beyond 4 hours were 98.3% patients did not recognize the urgency of immediate help for their symptoms and 99.8% patients traveled more than 10 km to reach our hospital.

**Conclusion:** Approximately one-quarter of stroke patients correctly interpret their symptoms as representing a stroke. This knowledge was associated with delayed admission to the emergency department. Widespread public education of stroke-prone individuals may increase the proportion of patients eligible for new acute stroke treatments.

**Keywords:** Admission time, stroke, knowledge.

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**P-33. Vascular Cognitive Impairment / Vascular Dementia**

**Post Stroke Cognitive Impairment Characteristic in Kandou Hospital: A Pilot Study**

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**Background and Objectives:** Cognitive impairment is a common outcome in patients with stroke, but the incidence and long-term significance of the diverse neuropsychological deficits are still not established. The prevalence of post-stroke cognitive impairment is heterogeneous depends on country, race, and the diagnostic criteria. The incidence of stroke is enormous in Indonesia, particularly Manado. However there is still a lack of data about the characteristics post-stroke cognitive impairment such as the amount and the most frequently impaired domain. The aim of this study was to investigate the frequency of specific domain of cognitive impairments in patients with stroke in Kandou Hospital, Manado, Indonesia.

**Methods:** This is a descriptive study with consecutive sampling between January – December 2017 from new post-stroke patients seen in the memory clinic in Kandou Hospital. Subjects were evaluated with neuropsychological assessment of attention, language, memory, visuospatial function, executive function, and abstraction. Impairment within each cognitive domain were determined according to normative data from healthy population.

**Results:** There were 57 subjects with median age 58 (24–85) years old, where 70.2% was male with various cognitive impairment after stroke. Majority of subjects had high school as their education level (49.1%) and private sector as their occupation (33.3%). On average only one domain was compromised (50.9%). Language was the most common disturbed domain (47.4%) followed by memory (40.4%), executive function (40.4%), attention (40.4%), visuospatial (14.4%), and abstraction (1.8%).

**Conclusion:** In this study we found that patients with post-stroke cognitive impairment in Kandou Hospital were mostly male, level education was high school, and one cognitive domain was disturbed.

**Keywords:** Post-stroke, cognitive impairment, incidence.

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**P-34. Acute Stroke Management**

**Kuala Lumpur Regional Integrated Stroke Intervention System – Intra-Arterial Thrombectomy Registry (KRISIS – ITR) Audit 2009–2015**

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**Introduction:** Thrombectomy is superior to intravenous recombinant tissue plasminogen activator (IVT) in the presence of large vessel occlusion (LVO). However, this potent therapeutic intervention is not widely available in many centres including ours. We present an audit of thrombectomy service in our centre.

**Methods:** Acute ischemic stroke patients who underwent thrombectomy within 8 hours from 2009–2015. LVO was detected via pre thrombolysis computed tomography angiography. We analyzed National Institute of Health Stroke Scale (NIHSS) to determine stroke severity, mean Door-to-puncture time (DTP), modified Rankin Scale (mRS) at 3 months (score of 0–2 was defined as a good clinical outcome), rate of intracerebral hemorrhage and death.

**Results:** There were 10 patients with mean  $\pm$  standard deviation (SD) age was  $69 \pm 14$  years. 100% of the patients had M1/M2 occlusion. 30% had atrial fibrillation and similarly 30% diagnosed with ischemic heart disease. The patients presented with severe stroke with mean NIHSS of  $17 \pm 6$  (range 6–25). The mean DTP was  $367 \pm 142$  minutes. 40% of the patient underwent thrombectomy within 6 hours of onset. 60% of the patients successfully treated with good functional outcome. There were three death (two directly related to stroke complication and one was due to recurrent myocardial infarction) while only one patient suffered hemorrhagic transformation.

**Conclusion:** Thrombectomy is an effective and safe treatment for acute ischemic stroke within 8 hours of onset. However, further work need to be exercised to identify factors contributing to treatment delay.

**Keywords:** Stroke, Thrombectomy, Large vessel occlusion, Thrombectomy registry, Endovascular clot retrieval.

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### P-35. Acute Stroke Management

#### **Successful Mechanical Thrombectomy of Low ASPECTS Wake-Up Stroke Assisted by Computed Tomography Perfusion in PPUKM at 7.5 Hours of Onset: Initial Single Stroke Center Experience in Developing Countries**

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**Introduction:** In the current guideline, the standard of care for intravenous recombinant tissue plasminogen activator (rt-TPA) therapy is up to 4.5 hours from onset of symptoms. In cases where intravenous thrombolysis is not suitable, endovascular intervention must be considered. In our patient who presented with wake up stroke, we utilised computed tomography (CT) perfusion brain to assist us estimating the penumbra area prior to mechanical thrombectomy.

**Method:** We report our initial centre experience of a successful mechanical thrombectomy on a low ASPECTS Wake-up Stroke case which assisted by CT perfusion at 7.5 Hours of Onset.

**Result:** 38 year-old man presented with sudden onset aphasia and right sided body weakness upon woke up and the time last seen well (TLSW) was 7.5 hours prior arrival. His National Institute of Health Stroke Scale (NIHSS) was 15, non-contrasted CT brain showed Alberta Stroke Program Early CT Score (ASPECTS) of 4. However, the CT perfusion brain revealed 50% penumbra with clots at M1 and M2 branches of the middle cerebral artery. Mechanical thrombectomy was performed successfully. He was discharged after one week with residual weakness with muscle power of the upper limbs of 3/5 and lower limbs of 4/5. His modified Rankin Scale at 1 month follow up was one with minimal expressive dysphasia.

**Conclusion:** This case demonstrates CT brain perfusion may assist in decision for mechanical thrombectomy especially in the presence of a significant area of penumbra and results in good neurological recovery.

**Keywords:** CT perfusion, thrombolysis, mechanical thrombectomy, penumbra, acute ischaemic stroke

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### P-36. Uncommon Stroke Disorders

#### **Embolic or Recurrent Strokes Can Be the Harbingers of Trousseau Syndrome**

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**Background and Objectives:** Trousseau's syndrome (TS) is defined as any thromboembolic event occurring in patients with an underlying or undiagnosed malignancy. The condition is highly associated with mucin-producing adenocarcinoma.

**Methods:** We described two cases of TS who presented with thromboembolic strokes despite adequate anticoagulation.

**Results:** Case 1: A 69-year-old male with a history of hypertension, dyslipidaemia and smoking presented with acute onset of nausea and ataxia. An MRI brain confirmed multiple infarcts in bilateral cerebral and cerebellar hemispheres. Apixaban was commenced for paroxysmal atrial fibrillation. Two weeks later, he developed confusion and hemianopia. A repeat MRI showed multiple new areas of cerebral ischaemia. His oral anticoagulant was withheld and he received heparin infusion for 72 hours. His oral anticoagulant regime was changed from apixaban to dabigatran. He deteriorated again two week later with a third MRI brain showing progression of extensive infarcts in bilateral hemispheres. During the admission a pulmonary neoplasm with metastasis was suspected on CT imaging and cytology. A transoesophageal echocardiogram and blood tests for thrombophilia were unrevealing.

Case 2: A 51-year-old male with metastatic pancreatic adenocarcinoma presented with confusion and ataxia. He was on therapeutic enoxaparin for a pre-existing pulmonary embolus. A MRI brain showed numerous infarcts in both hemispheres. He received therapeutic heparin infusion for 72 hours and was changed back to enoxaparin afterwards. He was referred to palliative care.

**Conclusion:** In patients presenting with multiembolic and/or recurrent stroke despite adequate anticoagulation, cancer-associated hypercoagulability should be considered.

**Keyword:** Ischaemic stroke, Trousseau's syndrome, malignancy.

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### P-37. Acute Stroke Management

#### **Clinical Evaluation of Cerebral Microbleeds (MBs) after Intravenous rt-PA Therapy**

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**Background and Rationale:** Clinical evaluation of cerebral microbleeds (MBs) after intravenous rt-PA therapy is not fully reported. We examined relationship between MBs and the prognosis after intravenous rt-PA therapy.

**Methods:** We studied 152 consecutive ischemic stroke patients treated by rt-PA intravenous therapy between October 2005 to June 2017 in our hospital. 100 patients with T2\* images on MRI were participated in this study. We divided these patients into 7 groups according to the number of MBs (i.e., 0, more than 1, 1, 2-4, 5-9, more than 10, and more than 5). We analyzed (complications, percentage of good prognosis (modified Rankin Scale (mRS): 0-2 after 3 months), symptomatic intracerebral hemorrhage, and use of antiplatelet and anticoagulant.

**Results:** 34 patients (34%) had MBs. The percentages of hypertension and ischemic heart disease were significantly higher with MBs than without MBs. Prognosis was getting worse by the number of MBs. The percentages of use of antiplatelet and anticoagulant were higher in patients with MBs.

**Conclusion:** Prognosis was tended to be poor in patients with MBs.

**Keywords:** rt-PA, microbleeds, prognosis.

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### P-38. Epidemiology of Stroke, Risk Factor

#### Characteristics of Elderly Stroke Patients in Kandou General Hospital, Manado

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**Background and Objective:** Stroke is one of the leading causes of death and disability, more likely to occur in those who are older. Patient outcomes after stroke are highly age-related. Stroke is a leading cause of hospital admission and prolonged length of stay for elderly patients. The aim of this study was to describe the characteristics of elderly ( $\geq 60$  years) stroke patients in Kandou General Hospital Manado from 2015 to 2017.

**Methods:** This study is a retrospective study with consecutive sampling from secondary data of patients admitted to Kandou General Hospital for stroke. The data analysis was performed using Chi-square.

**Results:** A total number of 952 stroke patients who were admitted to Department of Neurology – Kandou General Hospital, were included. There were 41.8% male patients who were elderly and 58.2% were non-elderly, whereas 47.4% of female patients were elderly and 52.6% were non-elderly. There were 42.5% of hemorrhagic stroke in elderly and 57.5% in non-elderly, whereas 46.4% of ischemic stroke in elderly and 53.6% in non-elderly. Mean of admission time after stroke onset was  $43.31 \pm 32.48$  hours in elderly and  $41.97 \pm 31.13$  hours in non-elderly, with  $\leq 4$  hours being 50% in elderly and 50% in non-elderly, while  $>4$  hours was 44.3% in elderly and 55.7% in non-elderly. Transportation use of private vehicles was 47.5% in elderly and 52.5% in non-elderly, whereas use of ambulance was 41.1% in elderly and 58.9% in non-elderly. The patients who were familiar with stroke was 45.1% in elderly and 54.9% in non-elderly, whereas less familiar was 42.1% in elderly and 57.9% in non-elderly. Overall analysis was significant with  $p$ -value  $>0.05$ .

**Conclusion:** There were no significant differences between elderly and non-elderly patient in this study.

**Keywords:** Characteristic, elderly stroke, Kandou Hospital.

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### P-39. Epidemiology of Stroke, Risk Factor

#### Characteristics of Stroke Patients Based on Gender in R.D. Kandou Hospital Manado in North Sulawesi

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**Background and Objective:** The age-specific incidence and mortality of stroke is higher among men, but stroke has a greater clinical effect on women (Niewada et al., 2005; Reeves et al., 2008). Gender related differences in quality of acute stroke are an important concern regarding differences on certain stroke unit.

The aim of this study is to describe gender associations with age, admission time, mode of transport and knowledge of stroke in R. D. Kandou Hospital Manado period 2015–2017.

**Method:** This study is a retrospective study by analyzing secondary data from stroke patients in R. D. Kandou Hospital Manado who lived in North Sulawesi who meet the inclusion criteria.

**Results:** Among 940 stroke patients, there were 538 males and 402 females. Male stroke patients were aged  $58.1 \pm 12.6$  year while female stroke patients were aged  $57.3 \pm 12.7$  year. The admission time for males was  $43.8 \pm 33.5$  hours while admission time for females was  $41.8 \pm 30.5$  hours. The transport in private car and ambulance for males was 271 (50.4%) and 267 (49.6%) respectively, while the transport in private car and ambulance for females was 208 (51.7%) and 194 (48.3%) respectively. Stroke patients with good knowledge and poor knowledge among males 401 (74.5%) and 137 (25.5%) respectively. Stroke patients familiar and less familiar with stroke among females was 290 (72.1%) and 112 (27.9%). For all analysis,  $p$ -value was significant at  $>0.05$ .

**Conclusion:** Based on gender, there were no difference in characteristics of stroke patients in North Sulawesi province.

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### P-40. Epidemiology of Stroke, Risk Factor

#### A Descriptive Study of Characteristic and Pre-Hospital Delay Among Stroke Event at Waled Hospital Cirebon

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**Background and Objectives:** Stroke event should be considered as an emergency. According to cochrane stroke group, thrombolysis has benefit in acute ischaemic stroke treatment, our hospital haven't do that. Purpose of this study is to know pre-hospital delay

characteristic so we can reduce mortality and enhance effectiveness of treatment in the early stages.

**Method:** This was retrospective study with data collected from December 2017 til May 2018. On patient who were hospitalized at Waled Hospital Cirebon. Data included information on gender, age, type of stroke, risk factor, and stroke onset.

**Result:** Eighty seven patients were included, 83% were male and 41% were >61 years old. Hypertension is major factor along side with smoking. CT Imaging confirm ischaemic stroke more often (91%), 5% patient came less than 1 hour, 35% came 2 to 3 hour, 28% came 4 to 6 hour after stroke onset, and 32% more than 6 hour. From the 95% case of >1 hour stroke onset, unawareness of symptoms was the major factor (54%) with transportation (38%) and cost (8%).

**Conclusion:** Health promotion should be held frequently in primary care, so unawareness of symptoms can be avoided as pre hospital delay. The time taken to ischaemic stroke that will allow thrombolysis will be a significant advance in treatment in our region.

**Keyword:** Characteristic, pre-hospital delay, factors, stroke event.

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#### P-41. Case Report

### Massive Pulmonary Embolism Following Stroke Thrombolysis

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**Background:** Pulmonary embolism (PE) is an uncommon but serious complication after an acute ischemic stroke (AIS). Here we report a case of massive PE after systemic thrombolysis for AIS and the subsequent management.

**Case Presentation:** A 47-year-old woman with poorly controlled diabetes mellitus presented with acute right hemiparesis and dysarthria within 3.5-hour time window. National Institutes of Health Stroke Scale (NIHSS) score was 7/42. CT scan showed acute left thalamic infarct. After the exclusion of all contraindications, 63 mg of alteplase was administered. Twenty-four hours after systemic thrombolysis, repeat CT scan showed no change and antiplatelet therapy with acetylsalicylic acid was started. On day-5 post-stroke, patient developed acute respiratory distress with tachypnea and hypoxaemia on ABG. Electrocardiogram revealed sinus tachycardia, right bundle branch block with S1Q3T3 pattern. Troponin I and D-dimer results were unremarkable. Trans-thoracic echocardiogram showed normal left ventricular function and chambers size. A pulmonary CT angiogram was performed which revealed a saddle thrombus in the bifurcation of the pulmo-

nary trunk extending into both pulmonary arteries consistent with massive bilateral PE. Doppler ultrasonography was negative for DVT. Subcutaneous enoxaparin injection (60 mg twice daily) was started. Her clinical condition improved over the following days. MRI scan was obtained on day-14 post-stroke, which showed acute infarct in the left posterior cerebral artery territory. Novel oral anticoagulant rivaroxaban (15 mg for first 21 days followed by 20 mg daily) was started for secondary prevention. At 6-month follow-up, she had a modified Rankin Scale score of 3 with no evidence of bleeding or PE recurrence. The clinical paradox of venous thromboembolism after systemic thrombolysis observed in this case may possibly be explained by procoagulant activation in stroke patient treated with rt-PA [1–3], although possibility of DVT preceding the stroke onset with lysis of deep veins thrombus with systemic thrombolysis could not be ruled out.

**Conclusion:** Our case describes the rare occurrence of PE following systemic stroke thrombolysis with successful therapeutic management.

**Keywords:** pulmonary embolism, ischaemic stroke, systemic thrombolysis

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#### P-42. Case Report

### Post Stroke Mania and Hemichorea

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**Background:** Post-stroke mania and hemichorea due to corticostriato-thalamocortical circuit dysfunction are extremely rare. The co-existence of mania and chorea as the chief presenting features of acute stroke has never been reported in the literature. Here we report a case of acute mania and left hemichorea following right putamen infarct.

**Case Presentation:** A 66-year-old man with underlying hypertension presented with 10-day history of sudden onset invol-

untary movements of the left limbs. His relative also reported abrupt changes in his mood and behaviour that occurred on the same day. There was no personal or family history of psychiatric illness. Examination revealed frequent, irregular, large amplitude choreiform movements in the left arm and leg, which present at rest and increased during voluntary actions. Psychological evaluation showed he was in manic state characterised by elated mood, inflated self-esteem, increased activity, loud and pressured speech, flight of thoughts and distractibility that fulfilled the DSM-V criteria for mania. Routine laboratory tests including fasting glucose, HbA1C and thyroid function test were normal. MRI scan obtained 12 days after onset demonstrated T2W/FLAIR hyperintense lesion located in the right putamen with no fluid restriction on corresponding DWI indicating subacute infarct. He was started with oral antiplatelet and statin for the stroke. Following treatment with oral haloperidol with subsequent addition of oral sodium valproate as a mood stabiliser, his chorea and mania symptoms were markedly improved. He was discharged one week later with further improvement of symptoms at 4-week follow up.

**Conclusion:** Our case describes acute mania and hemichorea as rare clinical manifestations after ischaemic stroke.

**Keywords:** Ischaemic stroke, mania, hemichorea.

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#### P-43. Uncommon Stroke Disorders

### CADASIL in Malaysia: Genotype-Phenotype Variations in a Multiethnic Nation

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**Background and Objective:** Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL) is a hereditary disease of small cerebral arteries, characterized by young TIAs or ischaemic stroke, migraine with aura, neuropsychiatric symptoms, as well as dementia. This case series aims to highlight the multiple types of genetic mutations and their varying phenotypes in Malaysia.

**Methods:** The study subjects include patients with genetically confirmed CADASIL at University of Malaya Medical Centre. We included their family members who fulfill certain features and also Malaysian patients from 2 previous published reports for the analysis.

**Results:** 10 patients were included in this series. Some unique features in this series include the absence of migraine and also older mean age of onset (60.5) in our Chinese subjects. The brain MRI for all the subjects demonstrated lesions in the periventricular, white matter regions and the internal capsule. All subjects showed external capsule involvement except one. 2 subjects showed no involvement of the anterior temporal pole. Genetic testing in this series revealed mutations c.328C>T (R110C), c.1630C>T (R544C) and also c.160C>T (R54C).

**Discussions and Conclusions:** CADASIL, with its numerous mutations can present with vast phenotypic variations. Certain mutation such as R544C however does show significant phenotypic correlation such as older age of onset and sparing of the anterior temporal pole in MRI. With more cases of reported CADASIL in

the elderly age group, this diagnosis should be given more consideration in the elderly group, especially with the presence of suspicious MRI features.

**Keywords:** CADASIL, elderly stroke, genotype, phenotype, R544C.

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#### P-44. Basic Science

### Elevated Monocyte Levels in Peripheral Circulation Associated with Pneumonia in Acute Ischemic Stroke Patients at Dr. Moh. Hoesin General Hospital

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**Background and Objectives:** One of the complications of acute ischemic stroke that contributes to high mortality and morbidity is infection with reported incidence varying from 5% to 65%. Pneumonia (7–22%) is the most common post-stroke infection and also the main cause of death in stroke patients. The major component in ischemic stroke pathobiology is inflammation. The number of inflammatory cells—one of them is monocyte—increases at the site of injury. Previous studies have shown that increased monocyte counts are related with stroke-associated infection (SAI). The severity of stroke is also known to increase the risk of pneumonia. This study aimed to determine the relationship between the number of monocytes in the peripheral blood and the severity of stroke with the incidence of pneumonia in patients with acute ischemic stroke.

**Methods:** This study was an analytic study with cohort design. Blood samples were taken when patients were admitted to the hospital. The number of monocytes was obtained from the multiplication of the percentage of monocytes with the total number of leukocytes. The severity of stroke was determined by the NIHSS score and divided into mild-to-moderate stroke and severe stroke. Stroke patients who met the inclusion-exclusion criteria were then observed for pneumonia during the hospitalization.

**Results:** From 22 subjects of the study, the incidence of pneumonia was 22.7%. The severity of stroke was not related to the incidence of pneumonia (Fisher exact test:  $p = 0.311$ ; OR = 5.71). Nevertheless, the incidence of pneumonia was higher in severe stroke group (18.2%) than in mild-to-moderate stroke group (4.5%). Median of monocyte value was  $827.50/\text{mm}^3$  with a minimum value of  $384/\text{mm}^3$  and a maximum value of  $1688/\text{mm}^3$ . Cut-off point of monocyte was at  $1028/\text{mm}^3$  with 80% sensitivity, 88.2% specificity and AUC 90.6% (95% CI: 0%–100%). The number of monocytes  $>1028/\text{mm}^3$  was associated with the incidence of pneumonia (Fisher exact test:  $p = 0.009$ ; OR = 30.0, 95% CI: 2.1–421.1).

**Conclusion:** Greater number of monocytes in peripheral blood increases the risk of pneumonia in patients with acute ischemic stroke.

**Keywords:** Acute ischemic stroke, monocyte, pneumonia.

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#### P-45. Outcome & Quality of Care

##### **Relationship Between Hemoglobin Levels at Admission with Outcomes in Acute Ischemic Stroke Patients Hospitalized at Rsup Dr. Mohammad Hoesin Palembang**

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**Background and Objectives:** Hemoglobin has an important role in oxygenation of brain tissue. Anemia cause hipoksia, in other hand high hemoglobin level increase blood viscosity. The hemoglobin level at hospital admission is still a matter of debate as one of the factors that can affect the outcome of patients with acute ischemic stroke.

**Aim:** The aim of this study is to describe the characteristics of subjects with acute ischemic stroke and to identify the effect of hemoglobin value on outcome of acute ischemic stroke.

**Method:** Data was retrospectively obtained from the medical record from 1 January 2017–31 December 2017. Risk factors for stroke, baseline hemoglobin value at entry, stroke severity based on NIHSS, and mortality were analyse with bivariate analysis using chi square and Spearman correlation.

**Results:** A total of 205 subjects were included. The hemoglobin values independently had no effect on the initial severity value (NIHSS) ( $p = 0.726$ ) and mortality ( $p = 0.473$ ). The hemoglobin values independently had a weak association with length of stay ( $p = 0.021$ ). From the result of multivariate analysis, hemoglobin, NIHSS, and length of hospitalization time had an effect on mortality. Hemoglobin ( $p = 0.06$ ; OR = 3.825; 95% CI 1.482–9.870), NIHSS values ( $p \leq 0.001$ ; OR = 1.438; 95% CI 1.297–1.594), and length of stay ( $p \leq 0.001$ ; OR = 0.876; 95% CI 0.816–0.940).

**Conclusion:** The hemoglobin level did not independently influence NIHSS and mortality during treatment in the hospital.

**Keywords:** Hemoglobin, ischemic stroke, outcome, mortality

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#### P-46. Aneurysm, Sub Arachnoid Hemorrhage & Vascular Malformations

##### **Single Macro Fistula of PICA Successfully Treated with Detachable Balloon Embolization**

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**Background and Objective:** The incidence of cranial arteriovenous fistulas (CaVFs) in children is around 0.84% [1, 2]. Endovascular treatment for CaVFs mostly treated with glue (91%), and 6% combination of coil and glue, and only 3% treated with coil alone<sup>3</sup>. We describe a case of a single macro fistula with high flow that underwent balloon embolization.

**Methods/Results:** A teenager, 16 y.o, developed continuous vertigo, pulsatile headache in the left occipital region, truncal

and limb ataxia, horizontal nystagmus, inability to walk since 3 months before. Imaging was suspicious for a vascular malformation compressing the left cerebellum and brainstem causing a non communicating hydrocephalus. Cerebral DSA showed single macro fistula of the left PICA with vein ectasia. Blood flow to the basilar artery was not adequate. The patient underwent successful occlusion of the fistula using Balloon Goldbal 4 inflated just proximal of the fistula, distal to the PICA.

**Conclusion:** Single macro fistula with high flow can be treated with detachable balloon embolization

**Keywords:** Macro fistula, detachable balloon.

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#### P-47. Epidemiology of Stroke, Risk Factor

##### **The Difference of Stroke Risk Factors between Military and Civilians at Dr. Soedjono Indonesian Military Hospital**

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**Background and Objective:** Stroke is one of the biggest causes of death and dissability in the world. The prevalence and risk factors of stroke among civilians on the national level have been investigated and reported, while the prevalence and risk factors of stroke among Indonesian Military remain unclear. This study aimed to identify the difference of stroke risk factors between military and civilians.

**Methods:** This study was conducted by analyzing secondary data from patient medical record in dr. Soedjono Indonesian Military Hospital between January and December 2017. We evaluated the risk factors of stroke: hypertension, diabetes mellitus, dyslipidemia, overweight / obesity, smoking and coronary heart disease (CHD).

**Result:** There were 8.85% military and 91.15% civilians stroke patients. The dominant risk factors in military were hypertension, smoking and diabetes mellitus, while, in civilians they were hypertension, overweight / obesity and diabetes mellitus. There were statistical differences in the frequency of overweight / obesity, smoking, CHD and the age of the stroke onset ( $p < 0.05$ ), but, no statistical difference in other stroke risk factors between military and civilians ( $p = 0.7$ ).

**Conclusion:** There were differences in dominant stroke risk factors between military and civilians. The healthy and disciplinary life style modification in military may influence the prevalence of dominant risk factors of stroke.

**Keywords:** Stroke Risk Factors, Military, Civilians.

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## P-48. Neurosonology

### Correlation Between Blood Glucose and Low-Density Lipoprotein Level with Pulsatility Index of Intracranial Arteries Evaluated by Transcranial Color-Coded Duplex Ultrasonography

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**Background:** Pulsatility index (PI) measures the vascular resistance distal to the examined artery. PI of intracranial arteries may predict the future cerebrovascular event. High blood-glucose and low-density lipoprotein (LDL) level are the known risk factor for atherosclerosis. However, there were few studies which describe the correlation of the two.

**Objective:** To analyze the correlation between plasma blood-glucose and low-density lipoprotein (LDL) level and PI of intracranial arteries (right and left anterior cerebral arteries, right and left middle cerebral arteries, right and left posterior cerebral arteries, right and left vertebral arteries, and basilar artery) examined by transcranial color-coded duplex ultrasonography (TCCD)

**Method:** This study is a Cross Sectional Study Design in dr Kariadi Hospital within Januari until May 2018. The patient who underwent a TCCD examination were tested for blood-glucose and LDL level. Normality of the data were tested using Saphiro wilk, then the correlation tested using Spearman's rank correlation test.

**Result:** There were no significant correlation between both blood-glucose nor LDL level with any PI of intracranial arteries (all  $p > 0.05$ ).

**Conclusion:** blood glucose and LDL level is unlikely associated with PI of intracranial arteries.

**Keywords:** Blood-glucose, low density lipoprotein, pulsatility index, intracranial arteries, vascular resistance, ischemic stroke.

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## P-49. Others

### Characteristics of Language Function in Hospitalized Stroke Patients at Dr. Mohammad Hoesin Hospital, Palembang

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**Introduction:** Language problem, particularly aphasia is common in stroke patients in Indonesia. However, it is often overshadowed by clinical diagnosis. No current data exists on its prevalence and characteristics in hospitalized stroke patients in Indonesia.

**Aims:** To determine prevalence and characteristics of language problem in hospitalized stroke patients at dr. Moehammad Hoesin Hospital Palembang.

**Methods:** This was a cross-sectional, descriptive, survey study conducted at the beginning of July 2016 until sample size was fulfilled. Eligible subjects were surveyed using questionnaire on language problems and MMSE. Data was input into table and analyzed using SPSS ver.24.0.

**Results:** Prevalence of language problem in hospitalized stroke patients was 18.8%. There were one subject with transcortical aphasia, 2 subjects with sensoric transcortical aphasia, two subjects with Broca's aphasia, and seven subjects with global aphasia. Aphasia occurred more frequent in patients with left hemisphere dominance, right hemisphere dominance. Most subjects with aphasia had ischemic stroke and left hemisphere dominance. Aphasia in right hemisphere dominance may occur in both right and left side weakness.

**Discussion:** Aphasia is frequent in ischemic stroke patients with left hemisphere dominance. In stroke patients with right hemisphere dominance, aphasia can be accompanied by left or right side weakness.

**Keywords:** Aphasia, stroke patients.

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## P-51. Outcome & Quality of Care

### Role of Neutrophil Lymphocyte Ratio on Clinical Outcome of Acute Ischemic Stroke Patients

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**Background and Objectives:** Neutrophil lymphocyte ratio (NLR) indicates the presence of inflammation. It can be used, because in acute ischemic stroke there are inflammation processes. This study aims to determine NLR as the prognosis of acute ischemic stroke patients

**Methods:** This study was an observational-cohort study in acute ischemic stroke patients performed in dr. Sardjito Hospital Yogyakarta. The NLR is checked at admission and the clinical outcomes of acute ischemic stroke were assessed by NIHSS score at admission and discharge. Statistical analysis to find out the NLR cut off point by determining Area Under Curve (AUC). The association of NLR and deteriorate of acute ischemic stroke using chi-square test and for confounding factor using logistic regression analysis.

**Results:** There were 62 subjects with mean age 65 (36–82) years. Both men and women are 31 subject. Clinical outcomes deteriorated 18 (29.03%) of patients. The AUC value obtained is 72.3% p-value 0.006 with cut off point of NLR was 5.13, sensitivity 72.2% and specificity 61.4%. Stroke patients admitted to hospital with NLR >5.13 scores have deteriorate 13 (43.33%) patients while NLR <5.13 level deteriorate 9 (25%) patients (p value 0.016; RR 4.13 IK 95% 1.25–13.67). In

multivariate analysis of logistic regression, DM is a variable that influence clinical outcome of patient besides NLR. Acute ischemic stroke patients with DM have 8 times deteriorate whereas NLR >5.13.

**Conclusion:** Neutrophil lymphocyte ratio can be a prognostic factor in clinical outcome of acute ischemic stroke patients.

**Keywords:** Neutrophil lymphocyte ratio, clinical outcome, acute ischemic stroke.

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#### P-52. Case Report

### Reversible Cerebral Vasoconstriction Syndrome Presenting as Orgasmic Headache

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**Background:** Orgasmic headache is a severe headache that occurs at orgasm. Reversible cerebral vasoconstriction syndrome (RCVS) is a clinical and radiological syndrome characterized by recurrent thunderclap headache and multifocal vasoconstriction. RCVS often subsides completely within 1–3 months, but sometimes may induce persistent neurological deficits.

**Case Report:** A 25-year-old man presented with recurrent thunderclap headache during sexual activity for 10 days. He did not have previous history of headache including migraine, and there were no vascular risk factors such as hypertension and diabetes. On neurologic examination, there was no focal neurological deficit. Simple brain CT performed 10 days after symptom onset showed no abnormality. However, CT angiography and conventional digital subtraction angiography showed multifocal narrowing (a typical string and beads appearance) at mid basilar artery and left posterior cerebral artery and did not reveal dissection. He was treated with oral nimodipine (30 mg every 8 hours), and headache was much relieved and resolved within 7 days. After one month, multifocal narrowing of cerebral arteries has disappeared in follow-up CT angiography.

**Discussion:** Orgasmic headache could be a presentation of RCVS. Early recognition is critical in order to treat RCVS and prevent devastating complication.

**Keywords:** Orgasmic headache, reversible cerebral vasoconstriction syndrome, thunderclap headache.

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#### P-53. Basic Science

### Beneficial Effects of Cinnamaldehyde in Experimental Rat Model of Stroke

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**Objectives:** Cinnamaldehyde (CA) is a diterpene with a wide range of anti-inflammatory, cognitive enhancer and neuroprotective effects thus may be advantageous in the treatment of neurological disease. In this study, we investigated the effect of CA on ischemic injury in a middle cerebral artery occlusion (MCAO) model as compared to sham-operated animals.

**Methods:** 48 male Wistar rats were pretreated with a CA (20 and 40 mg/kg p.o.) for 7 days. Rats were then subjected to 2-hour transient middle cerebral artery occlusion (MCAO) by the intraluminal method. Rats were sacrificed for the evaluation of the antioxidant enzymes (superoxide dismutase (SOD), catalase (CAT)), glutathione levels, thiobarbituric acid reactive substances (TBARS), neurolipofuscin, reactive oxygen species (ROS) levels and cytochrome c. Histopathological change, cell apoptosis and infarct area were respectively determined by hematoxylin–eosin staining, terminal deoxynucleotidyl transfer-mediated dUTP nick end labeling (TUNEL) analysis and 2,3,5-triphenyltetrazolium chloride staining.

**Results:** Present results shown that improved neurological outcome and reduced ischemia-induced cerebral infarction 48 h after MCAO. A significant behavioural impairment was observed in rats after MCAO. CA treatment reduced the TBARS and ROS levels, neurolipofuscin accumulations, cytochrome c expression. A significant increase in reduced glutathione levels and CAT, SOD activity was also observed both in MCAO rats treated with CA in comparison to sham-operated animals.

**Conclusion:** It may conclude that neuroprotective efficacy of CA protects against ischemic brain injury by increasing the antioxidant enzymes and reduced intracellular ROS.

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#### P-54. Others

### Modulation and Role of Brain Neurotransmitters in Pilocarpine-Induced Seizures in The Rat

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**Background:** Epilepsy, a group of serious disorders of the central nervous system characterized by a predisposition to recurrent unprovoked seizures due to abnormal excessive synchronous neural activity. Animal models of pilocarpine-induced seizures have been employed to demonstrate that ongoing epileptic activity in the brain can affect both excitatory and inhibitory synapses and thus neuronal plasticity. Neurotransmitters play a vital role in the functioning of brain. Our study aimed to investigate the changes in brain neurotransmitters in Wistar rat models of pilocarpine-induced seizures.

**Methods:** Total 75 animals of pilocarpine-induced seizures models for epilepsy were studied. Behavioral, electroencephalographic and morphological changes induced by systemic administration of pilocarpine hydrochloride were studied in 3–90-day-old rats. Pilocarpine, 100, 200 and 380 mg/kg, presented a characteristic array of behavioral patterns in developing rats. Determination of brain norepinephrine, Gamma-aminobutyric acid (GABA), dopamine and serotonin was carried out using high performance liquid chromatography (HPLC) system, Agilent technologies 1100 series.

**Results:** The mean values of brain norepinephrine, dopamine and serotonin levels in pilocarpine-induced seizures rat brain were significantly increased compared to control group, which consequently, may reduce seizure susceptibility and epilepsy comorbidities. There was a significant decrease in Gamma-

aminobutyric acid (GABA) values in treatment group compared to control.

**Conclusion:** Neurotransmitters play a vital role in brain functioning and also have important function in epilepsy status.

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### **P-55. Epidemiology of Stroke, Risk Factor Incidence of Stroke in Patients with Alzheimer's Disease**

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**Background and Objective:** The relationship between dementia and stroke has been significant attention because planning future needs for health services and improved primary and secondary prevention of stroke are important. We evaluated the relationship between AD and the subsequent development of stroke within 11 year follow-up.

**Methods:** This retrospective, nationwide, longitudinal study used National Health Insurance Service – Senior cohort (NHIS-Senior) 2002–2013, which was released by the KNHIS in 2016, comprising 550,000 random subjects who were selected from over than 60 years old. The study included a cohort of 3,524 patients who were first diagnoses as AD between 2003 and 2005. To match each dementia patient, 19,013 control subjects were selected from the data-base.

**Results:** We enrolled 4,790 patients for analysis in this cohort and the prevalence of AD was higher in female (19.29%) than in male (17.71%). A higher prevalence of AD was observed in the 70–84 year age group and in the higher income status group. A total of 6,102 strokes occurred within the observation interval. AD was associated with risk of all strokes and Cox regression analysis showed that the HR of all stroke was 2.87 times greater for patients with AD (95% CI 2.707–3.042) than for control group after adjusting for other risk factors.

**Conclusion:** Our findings suggest that Alzheimer's disease may be independent risk factor for all strokes, hemorrhagic stroke and ischemic stroke. So we need to control and pay attention to cerebrovascular events also in patients with AD.

**Keywords:** Stroke, Alzheimer, dementia, cohort, nationwide.

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### **P-56. Case Report**

#### **Reversible Alexia Without Agraphia in Adult Onset Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis and Stroke-Like Episodes (MELAS) Syndrome**

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**Background:** Alexia without agraphia is a disconnection syndrome that typically involves damage to the medial temporal-occipital gyrus in the dominant hemisphere, which is also known as visual word form area (VWFA). Most cases are caused by left posterior cerebral artery (PCA) occlusion and a resultant infarct of the left visual cortex and splenium of the corpus callosum. In this report, alexia without agraphia was observed as a unique accompanying feature of MELAS syndrome.

**Methods/Results:** A 34-year-old right hand dominant teacher with a known diagnosis of MELAS syndrome presented with a subacute onset of reduced vision and inability to read for one-week duration. She was diagnosed two years ago based on the following features: stroke-like episodes occurring before the age of 40 years, encephalopathy with seizures, the presence of lactic acidosis and ragged red muscle fibres on muscle biopsy. She was unable to spontaneously read written material but her ability to write remained intact. She was also unable to read what she had written upon later recall. Other aspects of language such as speech comprehension, spelling out loud, confrontation naming, and repetition remained generally intact. Examination was significant for reduced visual acuity (Right: 6/24, Left: 6/18) and alexia without agraphia without any motor or sensory deficit. She was subsequently worked up for stroke and MRI brain showed features suggestive of acute infarct at the left parietal, medial temporal and occipital region with restricted diffusion and T2 hyperintensity. The distribution of stroke like lesions does not follow vascular territory and spares the splenium of the corpus callosum. Magnetic resonance angiography however showed normal intracranial arteries and cardiac evaluation including a transthoracic echocardiography and Holter monitoring were normal. She was treated with IV arginine infusion for 72 hours with intensive speech rehabilitation and was subsequently discharged to a rehabilitation facility. A follow up visit 6 weeks later showed complete resolution of alexia and she was able to read and write.

**Conclusion:** We report a patient with an atypical clinical feature of MELAS syndrome. Alexia and agraphia due to MELAS have rarely been described and are usually suspected in the setting of strokes.

**Keywords:** Alexia without agraphia, disconnection syndrome, MELAS syndrome, stroke.

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### P-57. Epidemiology of Stroke, Risk Factor

#### **Bacterial Pattern and Antibiotics Sensitivity of Sepsis Stroke Patients in Neurology Inpatient Rooms of Haji Adam Malik General Hospital Medan**

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**Introduction:** The immune-suppressive effect of cerebral damage could have made stroke patients were at high risk for sepsis. Sepsis is one of the major mortality contributor of stroke patient. The choice of empiric broad-spectrum antibiotics must be enough to cover all bacterials and depends on epidemiology data of the bacterial pattern and antibiotics sensitivity.

**Aim:** To know the bacterial pattern and antibiotics sensitivity of sepsis stroke patients in neurology inpatient rooms of Haji Adam Malik General Hospital.

**Method:** A descriptive study of sepsis stroke patients during February 2018 – June 2018. The diagnosis of sepsis was based on the Criteria of American College of Chest Physicians (ACCP) and Society of Critical Care Medicine (SCCM).

**Results:** We identified 43 stroke patients with sepsis consist of 20 patients who stayed in stroke corner and 23 patients in neurology ward. The average of time to make sepsis was  $4.74 \pm 1.90$  days. Gram negative organisms were dominating the microbiologic spectrum (86.0%). The most common etiology of sepsis in stroke corner is Klebsiella Pneumonia (40.0%) and in neurology ward is Acinetobacter Baumannii (39.1%). Antibiotics showing their sensitivity most frequently in stroke corner were Amikacin (34.8%), Meropenem (30.2%), Cefoperazone (13.9%), and Levofloxacin (11.6%) and in neurology ward were Amikacin (41.8%), Meropenem (39.5%), Gentamycin (23.2%) and Cefoperazone (16.2%).

**Conclusions:** The most common bacterial of sepsis stroke patients at Neurology inpatient rooms of Haji Adam Malik General Hospital is Klebsiella Pneumonia and Acinetobacter Baumannii. Amikacin and Meropenem are sensitive to most of these patients.

**Keywords:** Bacterial pattern, Antibiotic sensitivity, Stroke, Sepsis.

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### P-58. Case Report

#### **Recurrent Intracranial Hemorrhage in Young Adult Male with Polycythemia Vera: A Case Report**

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**Introduction:** Intra Cranial Hemorrhage (ICH) is the second leading causes of death in the world and considered as emergency condition needing careful management. Vascular rupture in ICH mostly associated with micro aneurysm due to hyaline degeneration in hypertension. Beside hypertension, ICH can be caused by structural abnormality, trauma, drugs, and hematologic disorder. Managing recurrent ICH case requires appropriate management, either determining the cause of hemorrhage or risk factor management, such as hematologic disorder, hypertension, aging, family history, smoking, and diabetes mellitus.

**Case Description:** We reported a case of a 43 years old man with intracranial hemorrhage recurred 3 times in the span of 4 months, with alternating hemorrhage site, especially in cortical area, and risk factor of hematologic disorder and hypertension. Bone marrow puncture study showed polycythemia vera with iron deficiency, thought to be in an association with recurrent intracranial hemorrhage. Treatment option for patient with polycythemia vera in this case is thrombopheresis and administration of cytoreductive agent. After administration of specific treatment for this hematologic disorder, patient did not develop any cardiovascular attack during 4 months.

**Discussion:** Hemorrhagic thrombocytopenia is characterized by excessive spontaneous bleeding in skin and mucous membrane. But in this patient with extremely high platelet count, we only found intra cranial hemorrhage, without any bleeding in other site. In treating patient with intracranial hemorrhage and comorbidity of hematologic disorder, one should be concerned in managing acute stroke condition and rapid diagnosis of the hematologic disorder, so that specific treatment for the hematologic disorder could be prompted. This patient also had metabolic risk factor, hypertension, which should also be taken into consideration.

**Keywords:** Intracranial hemorrhage, Polycythemia vera, Cortical hemorrhage, Hemorrhagic Thrombocytopenia, Hypertension.

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**P-59. Aneurysm, Sub Arachnoid Hemorrhage & Vascular Malformations**

**Surgical Management of Secondary Epileptic Seizure due to Cerebral Cavernoma Malformation in Basal Ganglia using Neuronavigation: A Case Report**

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**Background:** Cerebral cavernoma malformation (CCM) often generate epileptic seizure. Lesions are mostly found in temporal and frontal lobe but can still be found in some rare deep structure such as basal ganglia and thalamus (3–6%). More than 20% cases are found to be medical intractable and referred for surgery with 60–90% cases were seizure-free completely afterwards. Surgery aims to resect the lesion as much as possible while avoiding additional neurological damage. Neuronavigation is reliable to assist the surgeon for better access to the lesion especially in difficult anatomical region. This study aims to share authors' experience about management of CCM lesions located in basal ganglia.

**Method:** There were 11 cases of CCM from January 2015 until April 2018 in National Brain Center Hospital, Jakarta. This is a case report of surgical management of a patient that has CCM located in rare deep location-basal ganglia using the neuronavigation system.

**Result:** A 21-years-old male patient with chief complaint of generalized-tonic-clonic epileptic seizure for almost 5 years before admission. He consumed multiple antiepileptic drugs and became drug resistance. From imaging, microbleeding was found but the lesion still not clear. Surgical planning was done to identify the lesion, ventricle, and the path to the lesion. Lesionectomy was done through pterional approach with neuronavigation guided.

**Discussion:** Basal ganglia CCM lesions are really rare and difficult for surgery access due to its deep structure. Neuronavigation help the surgical planning for the incision location and the entry angles, identify critical intraoperative anatomical structures, and avoid extensive damages.

**Keywords:** Basal ganglia, cerebral cavernoma malformation, epileptic seizure, neuronavigation, surgical management.

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**P-60. Outcome & Quality of Care**

**Investigation of Factors That Influence Discharge to Home After Treatment of Stroke Recovery Phase Using Stroke Cooperation Path**

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**Background and Objective:** Stroke cooperation path is a tool to establish a seamless stroke diagnosis and treatment system to overcome the problems caused by functional differentiation. In Kitakyushu city, we have been conducting seamless medical care from acute phase hospital to recovery hospital, using stroke cooperation path from 2009. We aimed to report the patients who were able to be discharged home, or to other facilities having been transferred to the rehabilitation hospital after acute treatment, by using stroke cooperation path from January to December 2016.

**Methods:** The authors performed a retrospective study of 185 cases registered in the stroke cooperation path in 2016. By May 2018, we analyzed the factors of patients that could be discharged home after stroke rehabilitation hospital transfer. Analyzed factors included age, gender, suffered lesion, National Institutes of Health Stroke Scale (NIHSS) at onset, the modified Rankin Scale (mRS) at the end of acute treatment, and presence of dementia. Univariate analysis was performed to identify factors influencing the discharge destination.

**Results:** There were 185 cases using stroke cooperation path. 54 patients were discharged home directly from the acute treatment, 10 patients died, and 121 patients were transferred to recovery hospital according to the cooperation path. Of the 121 patients, 45 patients had discharged from the rehabilitation hospital to home, or to other facilities by May 2018. The discharge destination was home for 29 and a facility or hospital for 16 patients. Differences were observed in age, mRS, and the presence of dementia.

**Conclusion:** As factors that can be discharged home after convalescent rehabilitation after stroke, were the age at onset, mRS at discharge, and the absence of dementia before stroke. Information on outcome from rehabilitation hospital by stroke cooperation path is also fed back to acute hospital and is useful for grasping stroke condition.

**Keywords:** Stroke cooperation path, dementia.

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### P-61. Case Report

#### Recurrent Intracranial Hemorrhage in Young Adult Women: A Case Report

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**Introduction:** Stroke including ICH in young adults was reported as an unusual event, consisting of 10%–15% of all stroke patients. Since spectrum of etiologies in young people is very broad and the cause of vascular rupture in intracranial haemorrhage is multifactorial, it is necessary to identify various risk factors including genetic susceptibility, so as to provide insight toward appropriate management. Recurrent lobar hemorrhages are relatively common and caused by uncontrolled arterial hypertension, vascular malformations, and vasculopathy. Recurrent lobar hemorrhage is the hallmark of cerebral amyloid angiopathy. The factors that predispose patients to early recurrence of lobar hemorrhage are unknown.

**Case Description:** This was a case of 28-year-old woman with intracranial haemorrhage recurred up to 4 times in 4 months with multilobar bleeding sites. Haematologic examination, autoimmune examination and cerebral angiography examination to find vascular malformations had been performed, but the results were normal. From those results, suspected possible cause was genetic susceptibility such as hereditary Cerebral Amyloid Angiopathy (CAA) / Icelandic type CAA. Subsequently, blood Cystatin C was examined, yet the result was also normal. Cystatin C protein is encoded by a gene that is known to be associated with an icelandic type CAA

**Discussion:** If recurrent intracranial haemorrhage occurred in young patients, risk factors should be evaluated promptly, therefore patients could get appropriate treatment including risk factor management so as to improve their clinical outcome. In this patient there were still many risk factors that had not been discovered from examination, therefore more sophisticated examination is needed in the future

**Keywords:** Intracranial hemorrhage, vascular malformations, Cerebral Amyloid Angiopathy – Icelandic type.

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### P-62. Basic Science

#### The Neuroprotective Effects of Apilimod in an Animal Model of Ischemic Stroke

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**Background and Objective:** Stroke is the third most common cause of disability worldwide, and is major cause of vascular and cognitive dysfunctions caused by impaired blood flow. The present study was undertaken to investigate the neuroprotective effects of apilimod in an in-vivo model of focal cerebral ischemia/reperfusion (I/R) injury in rats.

**Methods:** Adult male Sprague-Dawley (SD) rats (n = 8) were grouped as sham, I/R alone, I/R with apilimod (10 mg/kg) orally 60 minutes prior to and 3 hour post induction of cerebral ischemia. Rats were subjected to induce focal cerebral ischemia for 120 minutes followed by reperfusion by removing the monofilament. The protection of Apilimod in cerebral ischemia-reperfusion (I/R) rats was evaluated by blood brain barrier disruption and brain water content. Interleukin 12 & 23 expressions were examined by ELISA and Western blot analysis from serum and brain tissue, respectively.

**Results:** The results showed that pre and post apilimod treatment significantly (p < 0.05) prevented the BBB damage after the ischemic injury. Reduced (p < 0.05) brain water content was observed in rats treated with apilimod. Treatment with apilimod significantly (p < 0.05) attenuated the expression of serum Interleukin 12 and 23 levels after ischemic injury. Furthermore, apilimod treatment also significantly (p < 0.05) decreased Interleukin 12 & 23 protein expression in rats and improve the functional outcome in animal models of ischemic stroke with no adverse events in this study.

**Conclusion:** These findings suggest a potential therapeutic role of apilimod in ischemic stroke and could be pursued in future research to develop anti stroke treatment.

**Keywords:** Stroke, Blood brain barrier, Focal cerebral ischemia, Interleukin 12.

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### P-63. Epidemiology of Stroke, Risk Factor

#### The Difference of Stroke Risk Factor between Bataknese and Non-Bataknese at Adam Malik General Hospital Medan

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**Background and Objectives:** Stroke risk factors disparities in race-ethnic. Bataknese is the most stroke rates compared to non-Bataknese at Adam Malik General Hospital Medan. This may be due to genetics and lifestyles that have a link to increase stroke

risk factors in Batakese. Probably due to a genetic / family history of stroke risk factors was found to be higher in Batakese. Batakese has a characteristic lifestyle that are more eating than other tribes, typical foods also contain lots of cholesterol, and have a habit of drinking traditional alcoholic beverages. This study aims to know the difference of stroke risk factor between stroke patient of Batakese and non-Batakese.

**Method:** This was a cross-sectional study selected by consecutive sampling techniques, clinically proven stroke patients and computed tomography (CT) scan studied at H. Adam Malik General Hospital Medan. The study started on June 2018 and still on going until now.

**Results:** This temporary study recruited 18 samples consisting of 13 Batakese and 5 non-Batakese, sequentially the number of ischemic stroke was 11 and 2 and the hemorrhagic stroke was 2 and 0. Hypertension is higher in Batakese (61.1%) compared non-Batakese (22.2%) (PR 1.1; 95% CI:0.46–2.59). Dislipidemia is higher in Batakese (50%) compared non-Batakese (11.1%) (PR 1.43; 95% CI: 0.71–2.88). Heart disease is higher in Batakese (33.3%) compared non-Batakese (5.6%) (PR 1.34, 95% CI: 0.78–2.31). Smoke is higher in Batakese (33.3%) compared non-Batakese (16.7%) (PR 0.85, 95% CI: 0.48–1.53). Obesity is higher in non-Batakese (11.1%) compared Batakese (5.6%) (PR 0.41, 95% CI: 0.08–2.10). While diabetes mellitus and alcohol consumption only found in Batakese (16.7% and 11.1%).

**Conclusions:** Stroke risk factors that are hypertension, dyslipidemia, heart disease, and smoke are higher in Batakese. Obesity is higher in non-Batakese. While diabetes mellitus and alcohol consumption only found in Batakese. (This study is still ongoing until August, 30th 2018).

**Keywords:** Risk factor, Stroke, Ethnic, Batakese, Non-Batakese.

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#### **P-64. Vascular Cognitive Impairment / Vascular Dementia**

#### **Impact of Behavioural and Psychological Symptoms of Dementia on Daily Life Activities in Patients with Post-Stroke Cognitive Impairment**

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**Background and Objectives:** Behavioural and psychological symptoms of dementia (BPSD) are common and may appear at some point during the course of the disease in vascular cognitive impairment (VCI). BPSD may also have a major impact on the patient's functional and cognitive status. This study aimed to investigate the presence of BPSD in patients with post-stroke cognitive impairment and their relationship with the impairment in activities of daily living (ADL).

**Methods:** This cross-sectional study involved 76 post stroke patients with vascular cognitive impairment, consisted of 44 (52.9%) males and 32 (47.1%) females. All subjects underwent neurological examination and cognitive assessment. BPSD were

studied with Abe's BPSD Score (ABS) and ADL were evaluated using ADL and IADL scales.

**Results:** The mean age of the patients was  $57.95 \pm 10.54$  years old. Thirty patients (39.47%) had at least one of the BPSD symptoms. The mean number of symptoms was  $1.20 \pm 1.967$ . The mean ABS score was  $2.62 \pm 5.376$ . The most common symptom was apathy (19.7%), followed by depression (17.1%) and the least common symptom found was violence force (2.6%). There were no significant difference in frequency of BPSD between ischemic and hemorrhagic stroke. The total ABS score correlated positively with the ADL ( $r = 0.488$ ,  $p < 0.001$ ), IADL (0.489,  $p < 0.001$ ) and INA-AD8 score ( $r = 0.601$ ,  $p < 0.001$ )

**Conclusion:** Apathy and depression were common symptoms of BPSD in post-stroke patients with VCI. The presence of BPSD significantly could have increased the severity of impairment in daily life activities.

**Keyword:** Behavioural and psychological symptoms of dementia, vascular cognitive impairment, activity of daily living.

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#### **P-65. Epidemiology of Stroke, Risk Factor**

#### **Characteristic Acute Stroke Patients with Gastrointestinal Bleeding in Hasan Sadikin Hospital Bandung**

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**Background:** Stroke was the first cause of death in Indonesia in 2014. Gastrointestinal bleeding (GIB) has been recognized as one of the most serious complications of acute phase stroke with an incidence of 0.1–8.0%, and lead to an increase in morbidity and mortality rate of stroke patients.

**Purpose:** To find out the characteristics of GIB occurrences in acute phase stroke patients so that further researches can be conducted on what factors increase the risk and whether early intervention is necessary to treat the patients.

**Methods:** This observational descriptive study was conducted from September until November 2016 at Neurology Ward of Hasan Sadikin Hospital by collecting all acute stroke patients with GIB and observing the progression of the disease. Characteristics table are made based on the specific variables, then distinguished between ischemic and hemorrhage stroke.

**Result:** From 173 subjects, there were 40 patients (23%) with GIB. Twenty-one were ischemic stroke patients (52.5) and 19 (47.5) were hemorrhagic strokes patients. The age range were 60–69 years ( $62 \pm 10$ ) and male sex dominated with 21 patients (52.5). Ischemic cardioembolic stroke is about 76.2%. The median of NIHSS Score was 12; MRS score was 5; GCS Score was 12; and AIS-GIB score was 6. The number of patients that died was 13 patients (32.5%).

**Conclusion:** In this research, the percentage of stroke incidence with GIB at Hasan Sadikin Hospital within 3 months was very significant. Ischemic stroke and men dominated the population. Age, hypertension, and cardioembolic stroke was the influencing factor of GIB in stroke patients.

**Keyword:** Characteristics, GIB, Ischemic stroke

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## P-66. Stroke Rehabilitation

### **A Description of Sexual Dysfunction, Disability and Quality of Life of Post Stroke Patients In Outpatient Neurology Clinic at General Hospital Haji Adam Malik Medan**

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**Introduction:** Stroke due to cerebral damage can be a major cause of long-term disruption of sexual dysfunction, disability which can influence the quality of life and need of long-term care at health facilities. The majority (87%) of post-stroke patients experienced sexual dysfunction, and sexual dysfunction with severe global disability had a worse quality of life. Therefore, epidemiological data are needed to determine the sexual dysfunction, disability and quality of life of post stroke patients.

**Aim:** To determine the characteristics of sexual dysfunction, disability and quality of life and demographic profile of post stroke patients in outpatient Neurology Clinic at General Hospital Haji Adam Malik Medan.

**Method:** A Descriptive study in post-stroke patients, evaluated for sexual dysfunction, disability, and quality of life between March and July 2018 was performed. The diagnosis of sexual dysfunction was based on the Changes in Sexual Functioning Questionnaire-14, while disability was based on Barthel Index and Modified Rankin Scale, and quality of life was based on Stroke-Specific Quality of Life-12.

**Results:** The on-going result for this study was comprised of 10 samples of post stroke patients. The mean of age of the participants was 56.10 + 9.33. Forty percent of the participants had mild to moderate disability, 40% had moderate to severe dependence and 80% were reported having various levels of sexual dysfunction.

**Conclusion:** The on-going conclusion showed that majority of post stroke patients experienced sexual dysfunction and were more common in male. The quality of life was better in female and the rate of disability in post stroke patients were mostly in the mild-moderate category.

**Keywords:** Post Stroke, Sexual Dysfunction, Disability, Quality of Life.

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## P-67. Acute Neuroimaging

### **Corellation between Alberta Stroke Program Early Computed Tomography Score (ASPECTS) and National Institute of Health Stroke Score (NIHSS) in Ischemic Stroke**

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**Background:** Computed tomography scanning (CT-scan) hold an important role in diagnosing ischemic stroke, but may find some difficulties to assess early ischemic changes. ASPECTS provide a tool for assessing CT-scan in ischemic stroke, which can be used

as a predictor of stroke outcome. Stroke outcome and severity can also be assessed using NIHSS.

**Method:** This is analytic-descriptive cross-sectional study on first-onset ischemic stroke patient conducted at Neurology Ward of Hasan Sadikin General Hospital patients who were admitted from October 2017 – February 2018. ASPECTS was calculated from CT-scan of patients with ischemic stroke involving medial cerebral artery and compared to NIHSS.

**Result:** From 58 subject (44.8% male, 55.2% female), with mean age 56.60+ 9.1 years, there were 58.6% subject with lacunar stroke, 20.7% with large artery atherosclerotic (LAA) stroke, and 20.7% with cardioemboli stroke. Subjects with LAA stroke and lacunar stroke had higher ASPECTS (p value <0.05) and lower NIHSS (p value <0.05) than subjects with cardioemboli stroke. Spearman's correlation test between ASPECTS and NIHSS show a strong correlation between ASPECTS and NIHSS (cc=-0.680).

**Conclusion:** Patient with lower ASPECTS exhibit higher NIHSS.

**Keyword:** ASPECTS, ischemic stroke, NIHSS.

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## P-68. Others

### **Fractures in Patients with Stroke**

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**Background and Objective:** Stroke increases the risk of fracture as seen in several studies. This condition can occur because loss of bone mass or an increased risk of falling. Our purpose in this study was to investigate the prevalence of fracture in patients with stroke.

**Method:** This study was a retrospective cohort using the stroke registry and electronic medical records. We enrolled 584 subjects with stroke since November 2017 – April 2018 who underwent admission and followed-up at Bethesda Hospital, Yogyakarta, Indonesia. Subjects observed at least 1 month after discharge from the hospital.

**Result:** The prevalence of fractures in patients with stroke was 1.88% (n = 11), occurred throughout observation for subjects underwent followed up at the hospital. Fracture types consist of 63.63% fractures of the femoral neck (n = 7), 27.27% fractures of tibia and fibula (n = 3), and 0.09% fracture of wrist (n = 1). 90.91% fractures happened at paretic side and 72.72% subjects with moderate to severe disability got fractures.

**Conclusion:** Attention must be focused on patients with stroke that have moderate to severe disabilities, because this condition increasing risk factor for fracture. Early implementation of post-stroke fractures strategy is necessary so it can reduce poorer outcome.

**Keyword:** Fracture, stroke, paresis, disability.

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## P-69. Case Report

### An Emerging Management Dilemma: Cerebral Amyloid Angiopathy Related Concurrent Haemorrhage and Infarct

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**Background and Objectives:** Cerebral amyloid angiopathy (CAA) is associated with an increased risk of lobar haemorrhage, cortical / subcortical haemorrhage and microhaemorrhage. There is also growing evidence that CAA is correlated with a heightened cerebral ischaemic burden.

**Methods:** We describe two cases of CAA who presented with spontaneous symptomatic intracranial haemorrhage and concurrent microinfarct.

**Results:** Case 1: A 73-year-old woman with previous right parietal lobar haemorrhage presented with right hand clumsiness and expressive dysphasia. CT brain showed acute sulcal haemorrhage in the left frontal lobe. A small lesion with restricted diffusion was noted in the right parietal lobe on the brain MRI. Case 2: A 78-year-old man presented with disequilibrium as he veered to the right while walking. He was not on any regular medications. He had no headache or visual disturbance. Brain CT showed sulcal haemorrhage in the right frontal lobe. Brain MRI showed a restricted diffusion lesion in the right occipital lobe in addition to extensive superficial siderosis in bilateral hemispheres.

**Conclusion:** Both CAA cases presented with intracranial haemorrhage with cerebral ischaemia simultaneously, highlighting the frequent nature of ischaemia formation with this condition. CAA presenting with concurrently opposing (bleeding and ischaemic) pathologies poses a challenge in its management.

**Keywords:** Cerebral amyloid angiopathy, intracranial haemorrhage, ischaemic stroke.

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## P-70. Case Report

### Bilateral Medial Medullary Infarct: A Case Report

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**Introduction:** Bilateral infarction of the medial medullary is a rare condition which represents less than 1% of posterior circulation stroke. Here, we describe a patient with such a diagnosis who presented to our facility.

**Method/Result:** He was a 56 year old gentleman who smoked heavily and had been previously healthy. He presented with a one day history of quadriplegia of all four limbs weakness and inability to speak. It was preceded by dizziness for one month. On examination, he was aware of his surroundings but completely mute. His tongue was immobile. The extraocular muscle movements were normal. Power of his all four limbs were 2/5 on initial presentation, which rapidly progressed to 0/5 within hours. The limbs were

hypotonic with preserved deep tendon reflexes and extensor plantar response bilaterally. He subsequently developed upper airway obstruction with prominent stridor and required intubation. Brain MRI revealed the typical 'heart shaped' appearance at the medulla on DWI and FLAIR suggestive of bilateral medial medullary infarct. It also showed acute infarction at inferior pons and bilateral cerebellum. MRA neck demonstrated total absence of flow in the right vertebral artery and a short segment high grade stenosis at the intradural left vertebral artery, with intraluminal filling defect suggestive of a thrombus. The basilar artery appeared to be reduced in calibre.

**Conclusion:** It is crucial for clinicians to have a high index of suspicion for medullary infarct syndromes in patients with quadriplegia and lower cranial nerve palsies, as they carry catastrophic consequences. High resolution neuroimaging is vital in its early and prompt diagnosis.

**Keywords:** Bilateral medial medullary infarct, quadriplegia, 'heart shaped' on DWI.

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## P-71. Case Report

### Kernohan's Syndrome Ipsilateral Hemiparesis on Chronic Subdural Hematoma

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**Background and Objective:** Kernohan's syndrome is a rare but commonly described false localizing sign in clinical neurology. Chronic subdural hematoma is one of the cause. This study demonstrate clinical features of patients with Kernohan's syndrome in chronic subdural hematoma to avoid errors in anatomical diagnosis of lesions.

**Methods:** This was a observational descriptive study of patient medical records. We presented case of 57-year-old male with chief complaint left hemiparesis since one week. No history of trauma and seizure. There were chronic headache and ischemic stroke without sequelae. Physical examination obtained left hemiparesis. Brain CT-Scan found chronic subdural hematoma in the left frontal-parieto-occipital region, and cerebral edema.

**Result:** We found symptoms from this patient correlate with Kernohan's syndrome based on clinical presentation and brain CT-Scan finding. Ipsilateral hemiparesis of lesions in the brain due to contralateral compression of the cerebral peduncle toward shard dural reflection.

**Conclusion:** Kernohan's syndrome also could be found in chronic subdural hematoma. Unusual clinical symptoms should be noted to avoid errors of surgery and medical treatment. The use of brain CT-Scan could be a choice in health centers who do not have MRI facilities.

**Keywords:** Brain CT-Scan, chronic subdural hematoma, ipsilateral hemiparesis Kernohan's syndrome.

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## P-72. Neurosonology

### The Usefulness of Carotid Ultrasound in Detection of Variant Origin of Vertebral Artery

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**Background and Objectives:** Identification of variant origin of vertebral artery (VA) is important to prevent misdiagnosis and iatrogenic injury, more so in the era of endovascular intervention. VA with variant origin tends to enter a transverse foramen (TF) more cranially located than the TF of the sixth cervical vertebra (C6). Our purpose is to evaluate the usefulness of carotid ultrasonography in detecting variations of VA origin by studying the difference of the level of TF entrance.

**Method:** The subjects were 517 Japanese patients who underwent carotid ultrasonography and contrast-enhanced CT scanning from the aortic arch to the entrance of VA into the TF. The entrance levels were evaluated by ultrasound and confirmed by CT.

**Results:** Sixty-four (12.4%) patients had variant origin of VA (37 on the left side, 18 on right, and nine bilaterally). The entrance was above the level of C6 in 89% (65 of 73) of VA with variant origin, while in 1.1% (11 of 961) of VA with normal origin. The entrance level was correctly interpreted on sonography in 98.3% of all patients, and in 95.5% of patients with variant origin and higher entry above C6. In 67 patients with higher entrance level according to ultrasonography, 58 (86.6%) had variant origin. The sensitivity, specificity, PPV, and NPV were 90.6%, 98.0%, 86.5% and 98.7%, respectively.

**Conclusion:** By paying attention to the level of TF on carotid ultrasonography, the presence of variant origin of VA could be expected with high probability.

**Keywords:** Vertebral artery, transverse foramen, anomaly.

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## P-73. Aneurysm, Sub Arachnoid Hemorrhage & Vascular Malformations

### Association between Amounts of Blood in Subarachnoid Hemorrhage (SAH) with Cognitive Function in Dr. Soetomo Hospital Surabaya Indonesia

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**Background and Objective:** SAH is approximately 3–5% of all strokes, most SAH are caused by a rupture of intracranial aneurysms (80–90%). Many patients with SAH had neurological deficit and cognitive problem. Cognitive impairment in patients with SAH is evaluated at 3–6 months after event, and 76%–80%

of them had a cognitive impairment. The aim of this study was to prove whether there was an association between amount of blood in SAH calculated with the Hijdra score (Hijdra score is grading scale in which the amount of blood in 10 basal cisterns/fissures and in 4 ventricles is graded separately) and cognitive function measured by MoCA-Ina (Montreal cognitive assessment Indonesia version) after 3 months

**Method:** The study was conducted with a cross sectional design. Subjects were recruited by stratified random sampling according to inclusion and exclusion criteria on SAH out patient in Dr. Soetomo general Hospital Surabaya Hospital. Hijdra score is calculated from non contrast head CT Scan and the cognitive function was assessed by MoCa-Ina examination. Hijdra score <20 considered as less blood in SAH and ≥20 considered as more blood in SAH. The data was analysed by chi square test.

**Results:** Twenty one subjects were recruited consisting of 14 (77.8%) subjects with abnormal cognitive function with Hijdra score <20, and only 1 (33.3%) subjects with abnormal cognitive function with Hijdra score ≥20. The difference was not significant statistically with  $p = 0.184$ , dan Odds ratio 7,000 (CI 95%, 0.497–98,601).

**Conclusion:** There was no association between amounts of SAH which is assessed by Hijdra score and cognitive impairment measured by MoCA-Ina after 3 months SAH in Dr. Soetomo Hospital Surabaya.

**Keywords:** Cognitive, Montreal Cognitive Assessment (MoCa), Hijdra score, Subarachnoid hemorrhage (SAH).

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## P-74. Case Report

### A Case of Akin Moyamoya Disease with Hyperthyroidism

Masaoki Hidaka

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**Background and Objective:** AkinMoyamoya Disease is a cerebrovascular disorder characterized by bilateral stenosis or occlusion of the terminal portion of internal carotid arteries associated with an underlying disease. One of the underlying diseases is hyperthyroidism. There have been some cases who suffered from these two diseases simultaneously. Though the relationship between these two diseases have been discussed from immunological, metabolic, or genetic point of view, the exact pathophysiology has not yet been declared.

**Method and Result:** A 31-year-old female admitted to our hospital suffering from weakness of her left upper limb. In addition to mild hemiparesis of her left side, tachycardia, goiter, finger tremor and excessive sweating were observed. MRI showed acute brain infarctions at the frontal and parietal cortices on the right and MRA demonstrated narrowing of bilateral middle cerebral arteries and terminal portions of the bilateral internal carotid arteries. She was diagnosed as brain infarction caused by akin moyamoya disease and Basedow disease through endocrinology and immunological tests. After antiplatelet and antithyroid agents were initiated, her neurological symptoms disappeared and thyroid function became normal. At first, revascularization such as EC-IC bypass surgery was considered. However, follow-up MRA showed grad-

ual improvement of the stenosis of the cerebral arteries and almost normal after 4 months of therapy.

**Discussion:** It is known that vascular stenosis is progressive and irreversible in moyamoya disease, however our case, akin moyamoya disease with hyperthyroidism dramatically showed normalization of the stenotic vessels. Although precise mechanism is unclear, we speculate that return to normal thyroid function contributed to the vessel morphology normalisation of this case.

**Conclusion:** In akin moyamoya disease with hyperthyroidism, stenosis of main cerebral arteries can improve after hyperthyroidism treatment.

**Keywords:** Basedow disease, AkinMoyamoya disease, Thyroid Hormone.

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### P-75. Cerebrovascular Occlusive Disease

#### Acute Thrombectomy for Stroke Patients with Large Vessel Occlusion and Minor Stroke Symptoms

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**Background and Objective:** Endovascular mechanical thrombectomy has become the standard of care for stroke patients with large vessel occlusion in the anterior circulation. However, it is still unclear how to manage patients that present with large vessel occlusion and minor stroke symptoms. We report the results of mechanical thrombectomy in patients with large vessel occlusion and minor stroke symptoms.

**Methods:** Between April 2016 and March 2017, we retrospectively analyzed the clinical and radiographic data of all patients undergoing mechanical thrombectomy in our institution. We identified 3 patients with large vessel occlusion of the anterior circulation (middle cerebral artery M1 or M2 segment, internal carotid artery) and National Institutes of Health Stroke Scale (NIHSS) <6 on admission to our hospital. We collected demographic, radiological, procedural and outcome data. The pertinent literature was reviewed and summarized.

**Results:** 2 men and 1 women (mean age 69 years, range 66–74 years) were included. All endovascular procedures were performed within 8 hours of the onset. The mean NIHSS on admission was 3. Angiographically Thrombolysis in Cerebral Infarction (TICI) 2b was obtained in 66.7% of patients. The mortality rate was 0%, and the morbidity rate was 0%. All patients had modified Rankin scale (mRS) score 0-2 at 3 months.

**Conclusions:** The data demonstrates that mechanical thrombectomy in patients with large vessel occlusion and minor stroke symptoms is safety and effective. Patients with large vessel occlusion and minor stroke symptoms should be considered for mechanical thrombectomy.

**Keyword:** minor stroke symptom, acute thrombectomy, large vessel occlusion

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### P-77. Epidemiology of Stroke, Risk Factor

#### Clinical Profile, Risk Factors and Short Term Outcome in Young Stroke Patients with Intracranial Stenosis

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**Background and Objective:** Intracranial atherosclerosis is a common cause of stroke in Malaysia and across Asia. Stroke in young adults is heterogeneous and this study aims to determine the clinical profile, risk factors and short term outcome of patients with intracranial stenosis.

**Method:** Consecutive patients from the age 18–49 who were admitted into the Neurology Unit, University of Malaya Medical Centre, a 1350 bed teaching hospital were evaluated with standard stroke work up. Patients with intracranial large artery stenoses and occlusion were recruited and evaluated during scheduled follow up and their data were analyzed.

**Results:** 111 young ischaemic stroke patients were screened. Out of 93 patients with ischemic stroke, 37.6% had small vessel occlusion (SVO), 22.5% had large vessel atherosclerosis (LVA), 30.1% undetermined, 6.4% cardioembolic and 3.2% other determined causes. The risk factors for patients with LVA included 71.4% with hypertension, 42.9% with diabetes and 23.8% who were smokers. The risk factors for SVO showed an almost similar risk profile with hypertension being present in 71.4%, diabetes in 28.5% and 25.7% were smokers. Risk factors for other TOAST groups were more variable.

Out of the 21 patients with symptomatic LVA, 52.4% had good mRS on discharge (<3) and 3 months survival was 100%. 2 patients had vascular events before discharge, 1 had TIA and another had pulmonary embolism.

**Conclusion:** A high percentage of subjects with LVA had hypertension, and this was also seen in the SVO group. The risks of recurrent vascular events in the LVA group were considerable at about 10%. In contrast to previously reported studies, the 3 month survival outcome here was good.

**Keywords:** Large artery, stenosis, occlusion, young stroke, outcome, prognosis.

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### P-78. Acute Stroke Management

#### Impact of Door-to-Needle Time in Acute Ischemic Stroke Patients with rTPA Therapy to Clinical Outcome Difference (NIHSS) at Emergency Department of Dr. Kariadi Hospital

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**Background:** Stroke is still the major cause of death and disability all over the world, especially in developing country. The use of recombinant-Tissue Plasminogen Activator (r-TPA) given

to eligible acute stroke patients both via intravenous or intra-arterial within 3 hours of onset is considered to improve clinical outcome of stroke patients. AHA's 2018 guideline in early stroke management recommends to achieve door-to-needle time in less than 60 minutes. National Institutes of Health Stroke Scale (NIHSS) is chosen to assess severity of acute stroke.

**Objective:** To identify the relationship between door-to-needle time in emergency department (ED) at Dr Kariadi Hospital and clinical outcome of ischemic stroke patients with rTPA therapy.

**Methods:** This study is an analytic observational study using prospective cohort approach on acute ischemic stroke patients who got thrombolytic therapy at Dr. Kariadi Hospital from January 2017 to May 2017.

**Results:** There was 30 acute ischemic stroke patients fulfilling inclusion criteria and underwent thrombolytic therapy. Of all the patients who got rTPA therapy, 11 (36.7%) patients are in 46–55 year age-group, 16 (53.3%) patients had infarct location on dominant hemisphere, 20 (66.7%) patients had lacunar infarct type, 27 (90%) patients had hypertension. The mean of NIHSS score improvement is 3–4, and the mean of door to needle time is 47 minutes. There is a significant relationship between door to needle time and clinical outcome (NIHSS) of post-thrombolytic patients by spearman test ( $p < 0.001$ ).

**Conclusion:** The door to needle time (47 minutes) is significantly associated with clinical outcome of rTPA therapy. The faster the door-to-needle time, the better the clinical outcome (NIHSS) is.

**Keywords:** Stroke, acute ischemic stroke, thrombolytic, door-to-needle.

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### P-79. Epidemiology of Stroke, Risk Factor

#### Correlation between Framingham Point Score and Cognitive in Primary Health Care

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**Background:** Puskesmas (Pusat kesehatan masyarakat) or primary health care center in Indonesia is the functional organization that provides health care services. It is supported with government and participated by community. Puskesmas has programs for disease prevention including primary stroke prevention. Stroke symptoms can include cognitive impairment also in stroke posterior circulation which more rarely than anterior circulation. Early detection for cognitive impairment is important in patients with high risk for stroke. Cognitive examinations usually include orientation, registration, attention, calculation, recall, language and others.

**Aim:** This study aims to determine the correlation between Framingham point score and cognitive Mini-Mental State Examination (MMSE) in the Puskesmas Sememi, Surabaya, Indonesia. The Framingham point score included age, sex, cholesterol, smoking, and systolic blood pressure. The MMSE score is maximal 30 (without cognitive impairment).

**Method:** Patients in puskesmas were recorded from May-June 2018. MMSE data were obtained from those patients. Then data were calculated for correlation analysis.

**Results:** Of 42 patients (age range 29 to 72 years, mean ages 58 years), 11 (26.2%) were men, and 31 (73.8%) were women. There is negative correlation with a weak correlation but significance between the Framingham score and MMSE ( $r = -0.320$  and  $p = 0.039$ ). **Conclusion** There is a negative correlation and significance between the Framingham point score and MMSE in puskesmas Sememi, Surabaya, Indonesia. **Keywords:** Framingham, cognitive, health care.

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### P-80. Aneurysm, Sub Arachnoid Hemorrhage & Vascular Malformations

#### Intractable Headache Diagnosed as Indirect Carotid Cavernous Fistula Successfully Treated with Embolization; A Case Report

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**Background:** Indirect carotid cavernous fistula (CCF) is rare and occur when dural branches of internal/external carotid system drain indirectly and spontaneous of nature to the cavernous system. Placement of the superselective microcatheter is performed with the tip close to the point of fistulous communication. Once a position is achieved, liquid embolic agent (glue or onyx) is injected under fluoroscopic control with the goal of occluding the fistulous connections and penetrating the cavernous sinus.

**Clinical Case:** Male, 29 y.o, left sided chronic progressive headache, audible bruit, and binocular diplopia since 2 months before admission. We performed brain MRI, we continued with cerebral DSA and showed fistula on the left cavernous sinus with main feeders from ascending pharyngeal artery and accessories meningeal artery. Patient is planned for embolization.

**Conclusion:** We occluded the two main feeders by using glue mixture with lipiodol. Remaining fistula was from a small amount of distal branches of internal maxillary artery.

**Keywords:** Indirect ccf, embolization.

### Reference

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## P-81. Case Report

### **A Thrombosed Vertebrobasilar Dolichoectasia: To Anticoagulate or Not To?**

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**Background and Objectives:** Intracranial vertebrobasilar dolichoectasia (VBD) is uncommon, characterised by dilatation (>4.5 mm), elongation and tortuosity of the arteries. The commonest complication is ischemic stroke, either due to mechanical distortion which occludes the deep penetrating arteries or thrombo-emboli from the reduced blood flow. It may manifest clinically with brainstem and cranial nerve compression, intracranial haemorrhage (ICH) and obstructive hydrocephalus. Its management for stroke prevention is controversial as no evidence-based guidelines.

**Methods/Results:** A 58-year-old man, defaulted antihypertensives for a week, presented with right-sided facial weakness with vertigo and diplopia for a day. He had right-sided body weakness, which resolved within few hours. Clinically he had right peripheral facial nerve palsy, bilateral partial abducens pseudo-palsy with nystagmus and ataxic gait, NIHSS score of 6, and BP was 190/100 mmHg. At day 3, NIHSS score was 3 with complete resolution of cerebellar signs.

CT brain revealed bilateral atherosclerotic VBD without infarct and haemorrhage. MRI/MRA confirmed a VBD with mural wall thrombus without dissection. At its widest, the right vertebral artery measured 13 mm and indented onto the medullo-pontine junction at facial nerve root exit zone. The left pontine belly was compressed by the widest dimension (13 mm) of basilar artery, which explained the transient right hemiparesis. We believe that the uncontrolled blood pressure caused an abrupt increase in vascular wall shear stress which exacerbated VBD, hence acute brainstem compression. Though ICH was uncommon, anticoagulant was not started because high rupture risk when diameter >10 mm. Anti-platelet and statin were started, blood pressure and other risk factors were optimised, and the patient referred to neurosurgery.

**Conclusions:** In view of the scarcity in evidence-based management, close clinical observation, neuroimaging follow-up and individualised neurosurgical options remain the principles of current management. Further research on risk stratification of VBD-thrombosis for predicting stroke and ICH is important in the decision for anticoagulation.

**Keywords:** Vertebrobasilar dolichoectasia, thrombosis, stroke, anticoagulants.

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## P-83. Multidisciplinary Stroke Care

### **STIMUNO: Tools of Stimulation of Automatic System Based Tens (Transcutaneous Electrical Nerve Stimulation) Using Boost Converter Micro-Switching ATTINY13A for Pasca Stroke**

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(Nationalgeographic.co.id., 2014) Shows that one of the major causes of death in Indonesia is stroke disease. Stroke is a disorder of brain function due to blood vessels to the brain impaired (reduced) weakened brain function causing problems with motor muscular sensor and causing paralysis of certain body organs, loss of body balance, as well as impaired motor and sensory controls to thus reduce the number of deaths caused by stroke, it is necessary to have a regular solution, usually done with treadmill, gymnastics and cycling. However, the method has not been able to solve the problem. Shigga, the authors who created a tool called STIMUNO: a muscle and nerve stimulation tool based on TENS (trans-cutaneous electrical nerve stimulation) using ATTINY13A micro-switching boost converter for post stroke patients. STIMUNO works by stimulating electrically with TENS method on human skin tissue. The hardware works with the help of an intelligent microcontroller ATTINY13A system that controls the voltage to then be used as a medium for stimulation of muscles and nerves. The device consists of interconnected circuit and communicates with source voltage of 3 volts DC. The output voltage used to stimulate muscles and nerves is 72 volts 120 mA. In addition to simpler ease of maintenance hardware, STIMUNO can be developed continuously to meet the needs of patients because it has a very high flexibility to follow the needs of stroke patients in undergoing treatment where such provisions shall be in accordance with the rules of the competent medical personal.

**Keywords:** Stroke, STIMUNO, TENS.

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## P-84. Complementary & Alternative Stroke Care Combination of Lidocaine and Ketamine Infusion for Central Post Stroke Pain: Case Series of Effectiveness and Tolerability

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**Background:** To evaluate the combination of lidocaine and ketamine infusion in term of efficacy and safety as analgesic agents in the treatment of central post stroke pain or formerly known as thalamic pain or Dejerine-Roussy syndrome.

**Methods:** This case series identified four patients who received combination of lidocaine and ketamine infusion and recorded demographic data, amount of lidocaine and ketamine administered, the amount of other analgesic medications administered before and after lidocaine and ketamine infusion, pre- and post-lidocaine and ketamine pain scores, quality of daily livings, and any qualitative descriptors of the patient's pain recorded in the record. Side effects and adverse events were also recorded.

**Results:** Of the four patients who had a pre- and post-lidocaine and ketamine pain score recorded at four weeks follow-up, the first patient showed reduction in numeric pain rating scale (NPRS) to 0 point from a previous 9. The second patient experienced pain intensity reduction from 9 to 3 point. Moreover, the third patient from 8 to 2 point and lastly the fourth patient from 8 to 1 point. There was no significant side effects after the administration of lidocaine and ketamine infusion.

**Conclusion:** This case series suggested that combination of lidocaine and ketamine infusion was effective for short term pain relief and well tolerated in the management of central post stroke pain. Therefore, it could be an option for the treatment of central post stroke pain under certain conditions. Moreover, further research is needed for longer duration of follow-up and possibility of repeated doses.

**Keywords:** Stroke, Central pain, Lidocaine, Ketamine.

#### P-85. Acute Stroke Management

##### **Kuala Lumpur Regional Integrated Stroke Intervention System – Stroke Thrombolysis Registry (KRISIS – STR ) Audit 2010–2016: Treatment Outcome of Patients With Poor Glycaemic Control**

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**Background:** We evaluate the relationship between poor glycaemic control and stroke outcome after intravenous tissue plasminogen activator thrombolysis (IVT).

**Methods:** Acute ischemic stroke patients who received intravenous thrombolysis from 2010–2016 were recruited. Poor glycaemic control was defined as HbA1C of more than 7.5%. We analysed the HbA1C at presentation and modified Rankin scale (mRS) at 90 days. Good functional outcome was defined as mRS score 0-1.

**Results:** There were 74 patients with mean  $\pm$  standard deviation (SD) age of  $60 \pm 13$  years. Thirty-eight (51.4%) patients had diabetes and nineteen (25.7%) of them had poor glycaemic control. There was no significant difference in the presentation National Institute of Health Stroke Scale (NIHSS) between the subgroups (poor glycaemic control,  $12 \pm 7$  vs. optimal glycaemic control,  $11 \pm 6$ ). There was no significant difference in functional outcome

upon discharge with mRS more than 1 (poor glycaemic control, 10 (52.6%) vs. optimal glycaemic control, 21 (38.2%),  $p = 0.271$ ). However, mRS at 3 months was significantly poorer in the patient with poor glycaemic control, 15 (78.9%) vs. optimal glycaemic control, 27 (49.1%),  $p = 0.024$ ; odds ratio (OR) of 3.89. No significant difference was observed in incidence of intracranial bleed ( $p = 0.418$ ) and death ( $p = 0.252$ ).

**Conclusion:** Poor glycaemic control was associated with poor functional outcome at 3 months despite IVT treatment. Further studies are required to improve outcome after thrombolysis in this group of patients.

**Keyword:** Poor Glycaemic control, Diabetes Mellitus, Thrombolysis, Acute Stroke, mRS.

#### P-86. Cerebrovascular Occlusive Disease

##### **Kuala Lumpur Regionalized Integrated Stroke Intervention System – Stroke Thrombolysis Registry (KRISIS – STR ) Audit 2009–2015: Clinical outcome with Large Vessel Occlusion**

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**Introduction:** Endovascular clot retrieval (ECR) is superior to intravenous recombinant tissue plasminogen activator (IVT) in acute ischemic strokes due to large vessel occlusion (LVO). Nonetheless, this potent therapeutic intervention is not widely available in many centres including ours. We evaluate the clinical outcome of patients receiving IVT with evidence of LVO.

**Methods:** Acute ischemic stroke patients who received IVT within 4.5 hours from 2009–2015 were recruited. LVO was determined by the pre thrombolysis computed tomography angiography, which showed occlusion of one of the following arteries: middle cerebral (M1/M2), anterior cerebral (A1), posterior cerebral (P1), basilar and vertebral arteries. National Institute of Health Stroke Scale (NIHSS) was used to determine stroke severity; and modified Rankin Scale (mRS) at 3 months of 0–1 was defined as a good clinical outcome between LVO and without LVO subgroups.

**Results:** There were 70 patients with median age of 61 years (interquartile range (IQR), 49–67). Twenty eight (40%) patients had LVO. LVO was associated with worse stroke severity with median NIHSS = 14 (IQR, 8–21) and without LVO median = 8 (IQR, 5–11). The majority of the patients had occlusion of the middle cerebral artery (M1/M2), 82.1%. LVO was associated with worse clinical outcome (71.4% vs. 40.5%,  $p = 0.011$ ; odds ratio (OR) of 3.68) and higher mortality rate (21.4% vs. 0%,  $p = 0.032$ ).

**Conclusion:** LVO is associated with severe stroke, which leads to a less favourable prognosis and higher mortality rate despite IVT.

**Keywords:** Stroke, Intravenous thrombolysis, Large vessel occlusion, Stroke Thrombolysis Registry.

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### P-87. Intracerebral Hemorrhage

#### Predicting Outcome in Spontaneous Intracerebral Hemorrhage

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**Background and Objective:** Accurate prediction of outcome after primary Intracerebral Hemorrhage (ICH) is necessary to distinguish those patients who need special care or who would benefit from particular therapeutic strategies. The aim of this study was to test the clinical usefulness of the ICH Grading Scale in predicting the prognosis of ICH patients in Pondok Kopi – Jakarta Islamic Hospital (PK-JIH).

**Methods:** Patients diagnosed with ICH in 2013 from the PK-JIH database were screened and enrolled in this study. An ICH-GS score was evaluated for all the patients at admission to predict in-hospital mortality.

**Results:** A total of 47 patients were included in the final analysis. Overall in-hospital mortality rate was 34%. In-hospital mortality increased as ICH-GS score increased. No patient with an ICH-GS scores of 5 and 6 died. All patients with an ICH-GS score of 12 died. In the adjusted analysis, in-hospital mortality rates for patients with ICH-GS scores of 7 to 9 were lower in the group of patients who underwent a craniotomy than non-craniotomy ( $p < 0.05$ ). Otherwise, in-hospital mortality rates for patients with ICH-GS scores of 10 and 11 were higher in the group of patients who performed a craniotomy than non-craniotomy group ( $p < 0.05$ ).

**Conclusions:** ICH-GS is a simple scale in predicting in-hospital mortality. ICH-GS can give a guide to distinguish patients who need special care or who would benefit from specific therapeutic strategies.

**Keywords:** Intracerebral Hemorrhage, ICH Grading Scale, ICH Score, Stroke, Prognosis.

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### P-88. Acute Stroke Management

#### Influence of Antiplatelet Pretreatment on Platelet Aggregation and Clinical Outcomes after Intravenous Thrombolysis for Patients with Acute Ischemic Stroke

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**Background:** Previous studies had drawn conflicting conclusions about antiplatelet pretreatment (AP) for acute ischemic stroke (AIS) patients who received intravenous recombinant tissue plasminogen activator (rt-PA).

**Methods:** A prospective cohort study was conducted on AIS patients treated with rt-PA. The patients were divided into 2 groups based on whether to have AP or not. Five venous blood samples were collected at admission, 3, 6, 12 and 18 h after thrombolysis. Maximum platelet aggregation (MPA) was determined using light transmittance aggregometry (LTA). The clinical outcomes included good functional outcomes, as well as sICH and mortality.

**Results:** Of a total of 59 patients, 23 were treated with AP, and 36 were treated with Non-AP. The AA-induced MPAs in the AP

group on admission, at 3, 6, 12 and 18 h after thrombolysis were significantly lower than those in the non-AP group (all  $p < 0.05$ ). Results of a multivariate linear regression model demonstrated that AP was independently associated with AA-induced MPA on admission, at 3, 6 and 12 h after thrombolysis ( $p = 0.042$ ;  $p = 0.004$ ;  $p = 0.046$ ;  $p = 0.007$ , respectively), except MPA at 18 h ( $p = 0.367$ ). There were not significant differences in the good function outcomes and adverse events between the 2 groups (all  $p > 0.05$ ).

**Conclusions:** Although AP may decrease MPA within 24 h after thrombolysis for patients with AIS, it did not indicate the role on function outcomes.

**Keywords:** Acute ischemic stroke, Thrombolysis, Antiplatelet, Platelet aggregation.

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### P-91. Epidemiology of Stroke, Risk Factor

#### Utilization of Morisky Medication Adherence Scale in Patients With Ischemic Stroke Recurrence

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**Background:** In developing countries like many Asian countries, stroke is the first leading cause of disability and third leading cause of death. Adherence to preventive therapies needs to be improved and stringent efforts should be made for its implementation. This study focused on the profile of recurrent ischemic stroke patients and their compliance to preventive therapies.

**Objective:** To apply the Morisky Scale on recurrent ischemic stroke patients to determine adherence to medications.

**Method:** Consecutive patients with non-cardioembolic ischemic stroke recurrence were interviewed utilizing the Morisky scale. Baseline characteristics such as age, gender, civil status and number of prescribed medications were compared between compliant or non-compliant to medication.

**Results:** Fifty-eight patients with recurrent ischemic stroke were recruited. Using Morisky Scale to assess compliance to antithrombotics (antiplatelets or anticoagulants), 94.83% were assessed as non-adherent and only 5.17% were adherent. By gender, 56.36% of non-adherent were males and 43.64% were females. All adherent patients were females. By civil status, 54.45% of non-adherent had partners and 46.55% had none. All adherent patients had partners. Considering the number of medications, among the non-adherent patients, 67.27% were prescribed more than two and 32.73% had two or less.

**Conclusion:** Non-adherence to antithrombotic medications is a major risk factor in ischemic stroke recurrence. The prevalence of non-adherence to medications in these patients is considerably high. However, no identified factor was shown to be significant.

**Keywords:** ischemic stroke, recurrent stroke, medication adherence.

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## P-92. Case Report

### Recovery of Unilateral Oculomotor Nerve Palsy after Coiling Treatment of Bilateral Posterior Communicating Artery Aneurysm

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**Background:** Bilateral posterior communicating artery aneurysm is rare case. It is only 5.25% of aneurysm. Oculomotor nerve palsy (ONP) presents in 16% patient with bilateral posterior communicating artery aneurysm, both ruptured and unruptured. In ruptured aneurysm, ONP caused by direct compression of the oculomotor nerve, pulsating effect of the aneurysm, irritation of the nerve by the subarachnoid hemorrhage and a combination of the above mentioned mechanisms.

**Method:** Male, 62 years old, admitted to neurologic unit diplopia, right ocular ptosis and history of headache since 5 months ago. When visited neurology outpatient clinic of Soetomo General Hospital, physical examination was found total ONP: ipsilateral ptosis, ipsilateral palsy of oculomotor nerves, ipsilateral mydriasis and diplopia. Subarachnoid Hemorrhage in right temporoparietal found through head CT Scan. DSA (Digital Subtraction Angiography) was demonstrated right posterior communicating artery aneurysm (ruptured, neck 2.7 mm, dome 4.8×7 mm, pointing to posterolateral) and left posterior communicating artery aneurysm (unruptured, neck 3.8 mm, dome 7×7.7 mm, pointing to posteromedial).

**Result:** Coiling was performed to left posterior communicating artery aneurysm (to prevent the rupture) and to right posterior communicating artery aneurysm. ONP was simultaneously recovered.

**Conclusion:** Coiling was effective to recover unilateral ONP of bilateral posterior communicating artery aneurysm. ONP was recovered simultaneously after coiling in 7 months. Partial recovery of ONP was indicated by slight ptosis, pupil mydriasis, diplopia.

**Keywords:** oculomotor nerve palsy, bilateral posterior communicating artery aneurysm, coiling.

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## P-93. Acute Stroke Management

### Relationship between Plasma and Volume Osmolalities Hematomas to Outcome Clinical on Patients Acute Hemorrhagic Stroke

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**Background:** Hemorrhagic stroke is a rapidly growing neurologic dysfunction caused by local blood collections in the cerebral parenchyma so there is some research showing that increased plasma osmolality and hematoma volume can increase poor mortality and clinical outcome in acute hemorrhagic stroke.

**Method:** This was an analytic descriptive study and was conducted cross-sectionally on 33 hemorrhagic (hemorrhagic intracerebral) stroke patients treated at the Central General Hospital (RSUP) H. Adam Malik Medan meeting the inclusion and exclusion criteria for anamnesa and head CT-scan examination, plasma osmolality and hematoma volume and associated with clinical outcome, the analytical statistic stage is done by 2 stages, namely hypothesis test for bivariate analysis with independent variable and dependent variable of categorical scale using Chi-Square method and to know other factors as independent predictors outcome was done multivariate analysis using cox regression test.

**Result:** Higher admission plasma osmolality was associated with early death [312.0 (±16.0) mOsm/kg for those who died before day 7 versus 297.0 (±14.7) mOsm/kg for those who died after day 7, P value = 0.031]. Higher admission plasma osmolality was associated with very severe stroke [311.5 (±14.1) mOsm/Kg for patients with NIHSS score >20 versus 293.6 (±11.3) mOsm/kg for patients with NIHSS score ≤20, P value = 0.000].

**Conclusion:** On Going.

**Keywords:** Hemorrhagic stroke, plasma osmolality, hematoma volume, clinical outcome.