

HIGHLIGHTS FROM INTERNATIONAL NEUROSCIENCE MEETINGS

11th Saudi Arabia Neurosurgical Society (SANS) and 2nd Arab Pediatric Neurosurgical Society (APNS) Joint Conference: Invention Innovation and Technology Transfer

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Our understanding of life and matter in the 21st century is rapidly evolving; this stems from the new scientific discoveries and the emergence of new technologies that facilitated knowledge exchange. The field of neurosurgery is directly, and indirectly, impacted by these changes which is affecting the way we manage neurosurgical diseases. We believe that our specialty deals with the most complex structure known to man, the Central Nervous System (CNS), which demands us to be part of this revolution. Thus, we dedicated this year's meeting to introduce and explore new inventions, latest technologies and the endless opportunities they create to advance our field. The theme for this year meeting is "Invention, Innovation and Technology transfer".

The three-day scientific program (April 8-10, 2017) included latest advances in medicine in general and neurosurgery in particular. Focused sessions divided between neurosurgery sub-specialties will be also conducted. The included top 20 abstracts were selected and reviewed by a committee based on their scientific value and contribution to the field of neurosurgery.

Meeting Highlights

Intermittent hyperventilation as a safe adjunct to hyperosmolar therapy in the treatment of refractory intracranial hypertension

Shaymaa R. Al-Umran, Hosam M. Al-Jehani, Faisal M. Al-Abbas

Introduction: Hyperventilation is an established adjunct to the treatment of intracranial hypertension. Its use in the acute phase is helpful when facing acute herniation. Its subacute use has been subject to debate as it might lead to ischemic side effects if prolonged. The use of hyperventilation in an intermittent fashion would provide the intracranial pressure lowering effect without ischemic damage to the injured brain

Methodology: We included patients with diffuse brain injury with no evacuated or potential surgical lesion of all adult patients presenting with severe traumatic brain injury (TBI). All patients have ICP monitoring and are treated with a standardized protocol. Patients selected on the basis of transcranial Doppler of normal velocity and flow patterns. The hyperventilation protocol was used intermittently to PCO₂ of 25 (range was 30-25) for 6 hours on and 6 hours off for a total of 5 days. This protocol started after 24 hours of the injury to ensure stability of the diffuse injury. All patients were followed with daily TCDs and CT scan when needed and at the end of the 5 days.

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Result: 56 potential subjects initially included. After excluding all surgical and potentially surgical patients, 5 patients were selected for this protocol. out of 5 patients, 1 went on for decompressive craniotomy post trauma day 3 and 4 patients were treated non-operatively as they did not escalation of therapy beyond hyperosmolar therapy and intermittent hyperventilation despite the diffuse nature of there TBI. Out of the 4 patients treated with the intermittent hyperventilation protocol, no ischemic events on the CT and they achieved a reasonable control of their ICP in the refractory period they were evaluated in.

Conclusion: Intermittent hyperventilation is a safe adjunct to hyperosmolar therapy in severe TBI with refractory intracranial hypertension.

Usage of brain training application improve cognitive function among healthy subjects: pilot study *Fahad S. Alsultan, Fahad S. Alkahtani, Abdullah I. Alzahrani, Abdulrahman K. Althaqib*

Can Brain Training Application (BTA), improve cognitive function in healthy adults? Cognition is a group of mental abilities including attention, memory, knowledge, working memory and emotion. Cognitive functions are decreased with age. During the course of normal aging, changes occur in prefrontal cortex, the medial temporal lobe system, including the hippocampus and the cerebellum. the term “brain training” has become increasingly common lingo to describe cognitively stimulating activities designed to improve mental fitness. A recent study showed that practicing brain training games offer some protective factor against the effect of aging and may potentially be recommended to older people. it can enhance executive function and processing speed in the elderly too. Also, playing video games can enhance and improve the cognitive functions and this improvement is called transfer effects. But at the other hand many studies did not show any effects of BTA on cognitive functions. Brain-derived growth factor (BDNF) plays a critical role in the activity-dependent modulation of synaptic plasticity in the human cortex. Based on previous studies, we hypothesized that BTA would improve cognitive functions in healthy young.

Methodology: We conducted randomized controlled trial by using brain training game (Lumosity). 66 Volunteers enrolled in the study, 51 volunteers only used BTA(Lumosity), that target a range of cognitive functions including attention, processing speed, visual memory and executive functions for about 15 minutes per day, at least 5 days per week, for 3 weeks. They performed Cambridge neuropsychological Test automated battery (CANTAB) test before and after 3 weeks training for cognitive functions assessment. Measures of the cognitive functions fell into categories (flexibility, memory, attention, speed and problem solving). Blood samples were taken to study BDNF, Apolipoprotein E (APOE) markers.

Result: Statistically significant difference was found after the training in terms of attention switching task (AST) latency ($p=0.000$), AST (congruent) ($p=0.000$), AST (incongruent) condition ($p=0.000$), and motor speed ($p=0.000$). There was a positive correlation between pattern recognition memory (PRM) and APOE.

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Conclusion: This is the first report to study BTA in Kingdom of Saudi Arabia that warrants further research to determine the role and its possible link to cognitive functions. Our results do not indicate that everyone should play brain-training games.

Association of hepatic aminotransferase levels with mortality and complications of cerebrovascular stroke: a multicenter study in Saudi Arabia

Eman Alayad, Ibrahim Alnaami, Ali Alkathaami, Ahmed Mahfouz

Objective: To assess the association of hepatic aminotransferases with the outcome of cerebrovascular stroke including mortality and hospital complications.

Methodology: A multicenter retrospective cohort study was conducted on cerebrovascular stroke adult patients (aged 18 years and above) admitted to the stroke units in National Guard Hospital (NGH) in the central area of Saudi Arabia and Aseer Central hospital (ACH) in the South western area of Saudi Arabia during the period from January 2012 to December 2014. Patients with liver disease or medications confounding the results were excluded from the study. Collected data were type of stroke, socio-demographic, levels of hepatic aminotransferases (before and after stroke), and outcome (mortality and hospital complications). Student t test was used as test of significance at 5% level.

Results: The study included 525 (324 NGH and 201 ACH). They were 405 ischemic strokes (IS) and 120 hemorrhagic stroke (HS). The AST aminotransferase values on admission was significantly higher ($p=0.003$) among HS (39.24 ± 88.69) compared to IS (25.0 ± 16.49). Similarly, AST aminotransferase values before discharge were significantly higher ($p=0.049$) among HS (26.59 ± 16.64) compared to IS (23.82 ± 22.58). Regarding, ALT values on admission a similar pattern was observed where values on admission and values before discharge were significantly higher ($p=0.007$ and $p=0.001$, respectively) among HS compared to IS. No significant differences were found among those who died and those who discharged alive regarding AST and ALT aminotransferase levels on admission and after. No significant differences in aminotransferase were found by presence of any complication (bedsores, neuro deterioration, urinary tract infection, deep vein thrombosis, pneumonia).

Conclusion: Aminotransferases in stroke patients were associated with stroke type presentation. C The biologic significance of aminotransferase levels for the development of stroke merits further study.