0081

PHYSIOLOGIC ANATOMY, USE OF INFRA-RED THERMOGRAPHY IN HYPERSOMNIA.

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Introduction: In the words of Michel Salmon, " Between anatomy and physiology there is room for a functional anatomy and for a physiologic anatomy ". This concept was applied to analyze our (1) Sleep Research 21, 1992,341 (2) Sleep Research 22, 1993, 363, and (3) SLEEP 31, 2008, A219 publications on patients with Hypersomnia who had intracranial and extracranial blood flow evaluations.
Methods: For "Functional Anatomy", Intracranial cerebral blood flow was done with Xenon 133 inhalation. For "Physiologic Anatomy", Extracranial facial blood flow Imaging, Infra-Red thermography was done. 1992,3 and 2008 data was classified: Groups I, II and III. Group I had Intracranial and Extracranial blood flow study, 5% CO2 inhalation. Groups II had Extracranial flow study with 5 % CO2 and 100 % Oxygen inhalation. Groups III had Extracranial flow study 100 % Oxygen inhalation. Response interpretation: Normal response to 5% CO2, vasodilation. For 100% Oxygen / hyperoxia, vasoconstriction. Response is considered as normal or abnormal, if response is absent or paradoxical.
Results: Group I: All three patients 5% CO2 inhalation, intracranial Functional anatomy vasomotor response normal. Physiological Anatomy response abnormal. Group II, Physiological Anatomy study. 8 patients. CO2 response, 7/8 vasoconstriction, abnormal response. 100% Oxygen challenge, 4/8 had no vasoconstriction, abnormal response. Group III: Physiological anatomy. 7 patients tested with 100% Oxygen challenge. 6/7 abnormal response, (1 vasoconstriction, 4 no response, 2 vasodilation). Total of 18 patients in all groups, physiological anatomy/ Extracranial flow vasomotor response was abnormal in 16/18, (Group I = 3, Group II = 7, and Group III = 6)
Conclusion: In hypersomnia patients vasomotor testing, Functional Anatomy, intracranial flow vasomotion normal in 3/3 for hypercarbia inhalation. For Physiologic Anatomy, using Infra-Red Thermography to image extracranial facial blood flow (not coupled with metabolism) vasomotion was abnormal in 16/18 patients. 5% CO2 and 100% Oxygen inhalation used as contrast agents is well tolerated and facilitates imaging vasomotor dysfunction in the facial blood flow, trigeminal angiosomes, which can be correlated with hypersomnia. Association between trigeminal system and the hypocretin receptor 1 gene HCRTR1 gene has been reported.
Support (If Any): None.

0082

EXTERNAL VALIDATION OF AN ENHANCED MACHINE LEARNING ALGORITHM: POLYSOMNOGRAPHY-BASED NARCOLEPSY-LIKE FEATURE ASSESSMENT AND CLINICIAN NOTIFICATION IN ROUTINE SLEEP MEDICINE CLINICS

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Introduction: Polysomnography (PSG) contains quantitative information that, using machine learning (ML) algorithms, may aid the identification of type 1 narcolepsy. This study aimed to evaluate the utility of a previously developed quantitative tool (ML evaluation of PSG data) for detecting narcolepsy (types 1 and 2) in a "real-world" sleep clinic population.
Methods: Nocturnal PSG studies from a random sample of sleep clinic patients (narcolepsy, n=302; controls, n=21,535) were randomly split (1:1) into a training set and a validation set for algorithm testing. A separate, external PSG dataset was used for additional testing of the final model. Sleep stage probability graphs (hypnodensities) were estimated from PSGs on 15-second epochs using a previously developed convolutional neural network. Feature engineering was applied to hypnodensities to create a feature vector that was used to train a Gaussian process (GP) model to identify patients with a high probability of having narcolepsy. Features could be scaled to the 85th percentile, zero-mean and unit-variance, or unscaled. A recursive feature-elimination scheme was compared with training the GP kernel's length scale for determining the subset of features that best discriminate narcolepsy and controls. A synthetic minority oversampling technique was applied in combination with random undersampling to balance the distribution of cases and controls in the training set. Several kernels and relevant hyperparameters were evaluated. Model performance (specificity and sensitivity) was examined using receiver operating characteristics with the goal of achieving an area under the curve (AUC) ≥0.80.
Results: The final GP model used a Matérn 5/2 covariance kernel with the length scale hyperparameter trained to determine the feature subset selection. Input features were normalized to zero-mean and unit-variance. The model had AUC=0.9960 and AUC=0.8014 for classifying narcolepsy in the training and validation sets, respectively. Sensitivity ranged from 73% to 65% when specificity was between 75% and 80%. Final performance evaluation of the model for classifying narcolepsy in an external PSG dataset is ongoing; results will be presented at the congress.
Conclusion: An ML-based algorithm can offer an objective, sensitive, and specific tool for alerting sleep clinicians about patients at risk for narcolepsy, using nocturnal PSG in general sleep medicine clinics.
Support (If Any): Jazz Pharmaceuticals.

0083

A THERMOREGULATED PILLOW IMPROVES SLEEP: RESULTS FROM REAL-LIFE DATA

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Introduction: Sleep is regulated by homeostatic mechanisms and circadian rhythms.Thermal environment is one of the most important factors that can affect human sleep. This real-life study aims to evaluate the effects of temperature regulation on sleep quality using a thermoregulated pillow.
Methods: The Moona device has been used to control the temperature of a pillow pad from 64°F to 95°F. Users with more than 7 uses of the device and who completed the initial questionnaire (18 profile questions) participated in this study from October 2019 to July 2021. Participants rated their sleep quality on a scale of 1 to 5. Comparison between the sleep quality before the first use and the average of the last seven uses of the device has been done. A survey has been sent to all users from June to November 2021. To date, 206 answers have been collected including 32 users who reported having been diagnosed with insomnia. Improvement of their insomnia has been assessed by a