Transient Changes in the Endocannabinoid System after Acute and Chronic Ethanol Exposure and Abstinence in the Rat: a Combined PET and Microdialysis Study

ABSTRACT 13

CECCARINI1*, C. CASTEELS1*, M. KOOLE1, G. BORMANS1, K. VAN LAERE1

* equal contribution
University Hospital Leuven

Objective
Recent evidence suggests involvement of the endocannabinoid system in alcohol drinking behavior. Using [18F]MK-9470 small-animal PET imaging, we first evaluated type 1 cannabinoid receptor (CB1R) binding changes in rats subjected to several ethanol conditions: (i) at baseline, (ii) after acute ethanol administration (4g/kg), (iii) after 7-days of forced chronic ethanol consumption, and (iv) after 7 and 14-days of abstinence. Secondly, levels of brain anandamide (AEA) in the nucleus accumbens (NAcc) were investigated in the same animals using microdialysis and correlated to the CB1R binding changes.

Methods
In total, twenty-eight male Wistar rats were investigated. Small-animal PET was done on a FOCUS-220 with ~12 MBq of [18F]MK-9470. Images were normalized to Paxinos space and analyzed voxel-wise using SPM8. AEA content was quantified using HPLC with tandem mass spectrometry detection.

Results
Acute ethanol administration increased CB1R binding in the NAcc (+7.7%) that positively correlated to the change in AEA level of that region (r=0.99). Chronic ethanol exposure decreased CB1R binding in the hippocampus (-5.2%) and caudate-putamen (-5.7%), whereas same regions were increased by +8.9% and +14.2% after 7-14 days of abstinence. Also, after 7-14 days of abstinence, CB1R binding additionally decreased in the orbitofrontal cortex (>-20.1%). The magnitude of these hippocampal and frontal changes was highly correlated to daily ethanol intake (r=0.99 and r=-0.99, respectively).

Conclusion
This study provides evidence that acute ethanol consumption is associated with an enhanced endocannabinoid signaling in the NAcc. In addition, chronic ethanol exposure points to regional dysfunctions in CB1R levels, incorporating hippocampus and caudate-putamen that are reversible within two weeks in this animal model.

Energy spectrum and point spread function comparison of pin-hole and parallel-hole collimators for 90Y bremsstrahlung imaging

ABSTRACT 14

STEPHAN WALRAND1, MICHEL HESSE1, ALAIN SERET2, GEORGES DEMONCEAU3, FRANCOIS JAMAR1. 1. UCL, 2. ULG, 3. SEZH

Aim
recent studies prove pinhole being superior to parallel hole collimator for 90Y bremsstrahlung SPECT. We analyzed their energy spectra and PSF.

Methods
a camera (1/2"-thick NaI), successively equipped with a medium energy general purpose (MEGP) parallel hole and a 9mm-diameter aperture medium energy pinhole (MEPH) collimator was used. A 90Y point source surrounded by 1cm-thick perpex wall and a 1cm-diameter 99mTc source, both located at 10 cm far away the collimator, were acquired.

Results
MEGP 90Y energy spectrum matched published Monte Carlo (MC) simulations. Compared to MEGP, the lead fluorescence x-rays were reduced by 4 in the MEPH 90Y energy spectrum which displayed an exponential decrease pattern. The MEPH collimator sensitivity was 1.5 times higher than that of the MEGP one, but for a FOV area 6 times smaller. The FWHM (FWTM) in the object space for 90Y were 1.2 (2.0) and 1.5 (3.1) cm for the MEPH and MEGP collimators, respectively. Farther than 3 cm, the MEGP PSF was typically 6 fold higher than the MEPH one. By subtracting from the 90Y PSF the 99mTc one, the geometric to total x-rays ratios in a [50,150] keV window were 68% and 31% for the MEPH and MEGP collimators, respectively. This last value is in line with MC simulations.

Conclusions
for 90Y, the MEPH collimator displayed a twice better geometric to total x-rays ratio and a sharper PSF with 6 fold lower

tail than the MEGP ones explaining the better spatial resolution and quantification accuracy obtained by helical pinhole bremsstrahlung SPECT. MEPH collimator MC modelling will assess the different components contribution: tungsten insert, lead housing, camera compartments.

TSH measurement is not an appropriate screening test for autonomous functioning thyroid nodules: a retrospective study of 368 patients

ABSTRACT 15

RAYAN CHAMI, RODRIGO MORENO-REYES, BERNARD CORVILAIN

Departments of Endocrinology (R.C., B.C.) and Nuclear Medicine (R.M.-R.) Hôpital Erasme, Université Libre de Bruxelles, 1070 Brussels, Belgium;

Objective
Based on the assumption that a normal TSH concentration rules out the presence of autonomous functioning thyroid nodules (AFTNs), nearly all clinical guidelines on the management of thyroid nodules only recommend performance of a thyroid scan if TSH concentration is subnormal. Our objective was to determine the proportion of AFTNs with a normal TSH level to ascertain whether a normal TSH really rules out the presence of an AFTN.

Design
Retrospective study on 368 patients with a final diagnosis of AFTN.

Setting
Academic hospital in Brussels (Belgium).

Participants
All the thyroid scans with a diagnosis of AFTN were reviewed retrospectively by one of us (R.M-R), unaware of the clinical data. The diagnosis of unique AFTN was confirmed in 368 patients. Among them we secondarily selected 217 patients on the basis of the absence of another thyroid nodule greater than 10 mm, the absence of medical conditions able to interfere with thyroid function and the completeness of the data.
Main outcome measures: Proportion of patients with a diagnosis of AFTN and a normal TSH level.

Results
In our population the proportion of AFTNs with normal TSH was 49%. This proportion increased to 71% if we considered only those patients for whom thyroid scan was performed in the workup of a thyroid nodule. This proportion decreases as the size of the nodule increases. A normal TSH was observed in 97% of AFTNs between 10 and 19 mm, 77% between 20 and 29 mm, 59% between 30 and 39 mm and 40% above 40 mm.

Conclusions
Our data suggest that serum TSH measurement is not an effective screening tool to diagnose an AFTN. On the basis of a "TSH only" screening, as recommended by the vast majority of international guidelines, 71% of our patients would have undergone unjustified fine needle aspiration cytology (FNAC) in the workup of a thyroid nodule leading to unnecessary surgery for some of them. Thyroid scan remains the gold standard for detecting AFTN and should be considered before performing FNAC.

Human brain PET imaging of PDE10A in Parkinson's and Huntington's disease

ABSTRACT 16

R. AHMAD1, S. BOURGEOIS1, A. POSTNOV1, M.E. SCHMIDT2, G. BORMANS1, W. VANDENBERGHE1, K. VAN LAERE1

University Hospital Leuven
Janssen Pharmaceutica, Beerse

Objective
Phosphodiesterase 10A (PDE10A) is an enzyme that hydrolyzes cAMP and cGMP. PDE10A is strongly expressed in striatal medium spiny neurons and is assumed to be involved in several brain disorders. We have used the novel tracer 18F-JNJ-42259152 and Positron Emission Tomography (PET) to evaluate PDE10A activity in patients with Huntington's (HD) and Parkinson's (PD) disease in vivo.

Methods