DIAGNOSTIC AND THERAPEUTIC INNOVATIONS IN THE ERA OF PRECISION MEDICINE – NUCLEAR MEDICINE MEETS NEURO-ONCOLOGY

ABSTRACTBOOK

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Only the conflict of interests of individuals with a disclosure are included in the respective abstracts.

Abstract Number: 15
Abstract Title: Paraneoplastic Syndromes and Autoimmune Encephalitis: Medical Records Review and FDG-PET/CT Outcomes

Authors:
Baldissin M[1,3,4,5], de Souza E[4,5,7], Watanabe N[5,6], Etchebehere E[2,4], Cendes F[5,6], Amorim B[2,4]

[1]Neurodiagnosis and Neurotherapy Clinic, Jundiai, Brazil, [2]Division of Nuclear Medicine, Department of Oncology and Radiology, University of Campinas (UNICAMP), Campinas, Brazil, [3]Surgery Department, Jundiaí Medical School (FMJ), Jundiaí, Brazil, [4]Cancer Theranostics Innovation Center (CancerThera), University of Campinas (UNICAMP), Campinas, Brazil, [5]Brazilian Institute of Neuroscience and Neurotechnology (BRAINN), University of Campinas (UNICAMP), Campinas, Brazil, [6]Department of Neurology, School of Medical Sciences, University of Campinas (UNICAMP), Campinas, Brazil, [7]Nuclear Medicine Group, Biomedical Engineering Center, Nuclear Medicine Division, State University of Campinas (UNICAMP), Campinas, Brazil

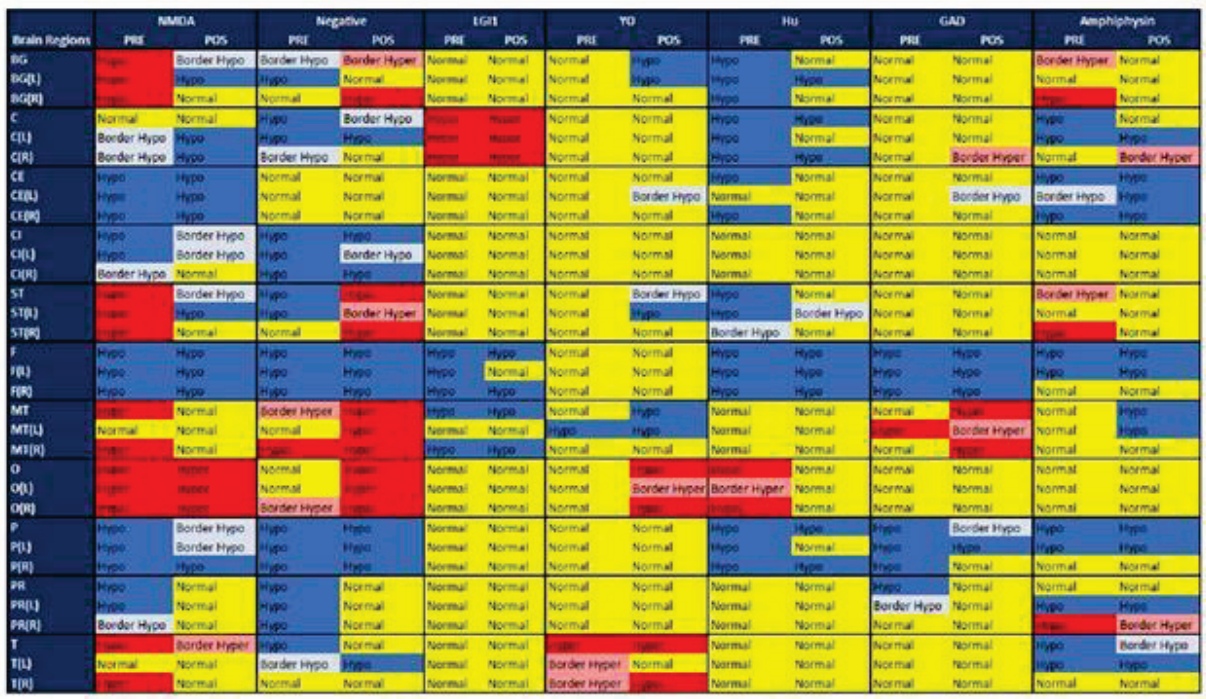
Background
Paraneoplastic syndromes (PNS) are conditions oftentimes expressed as encephalitis. In about 60% of patients with autoimmune encephalitis (AE) , highly specific antineuronal antibodies (e.g., Hu, Yo, NMDA) can be detected. In two-thirds of these patients, the neurological manifestation precedes the tumor diagnosis up to 4 years. The purpose of this study was to evaluated the clinical presentation and FDG-PET/CT findings in a group of patients clinically diagnosed with AE.

Materials and Methods
This study includes 37 patients, aged from 13 to 75 (47.08 ± 20,00 years), 65% female, who had been presented neurological manifestations of AE. Retrospectively, clinical records were analyzed by the neurology staff, being the clinical manifestations and the results of antibodies tests correlated with FDG-PET/CT brain images, analyzed by an expert in nuclear medicine.

Results
Among the patients studied, 24.3% had suspicion or confirmed neoplasia (most of them breast or thyroid lesions). Almost half of patients (49%) had positive antibodies. Some patients had negative antibodies (n = 12) and some were untested (n = 7). For most of the groups of patients, epilepsy was a common manifestation, followed by behavior and sensitive alterations.The exception is the aquaporin-4 antibody, for which muscular disorders are the main symptom, also highlighted in GAD patients. Considering the whole group, the areas of more common hypermetabolism are basal ganglia, temporal lobe, cingulate gyri, and precuneus. The main hypometabolic regions were the cerebellar hemispheres, and diffuse cortical areas (Fig.1).

Discussion
Patients with different neurological manifestations and antibodies may have different uptake patterns in brain FDG images. Independent of detection or suspicion of neoplasia, these findings can be a signal of PNS, contributing to the earlier diagnosis and definition of therapeutical approach.

Conclusion
Neurological manifestations and FDG-PET/CT findings showed specific signatures on the presence of symptoms of AE with or without PNS.



Brain Regions	NMDA		Negative		LGI1		YO		Hu		GAD		Amphiphysin	
	PRE	POS	PRE	POS	PRE	POS	PRE	POS	PRE	POS	PRE	POS	PRE	POS
BG	Hyper	Border Hypo	Border Hypo	Border Hyper	Normal	Normal	Normal	Hypo	Hypo	Normal	Normal	Normal	Border Hyper	Normal
BG(L)	Hyper	Hypo	Hypo	Normal	Normal	Normal	Normal	Hypo	Hypo	Hypo	Normal	Normal	Normal	Normal
BG(R)	Hyper	Normal	Normal	Hyper	Normal	Normal	Normal	Normal	Hypo	Normal	Normal	Normal	Hyper	Normal
C	Normal	Normal	Hypo	Border Hypo	Hyper	Hyper	Normal	Normal	Hypo	Hypo	Normal	Normal	Hypo	Normal
C(L)	Border Hypo	Hypo	Hypo	Hypo	Hyper	Hyper	Normal	Normal	Hypo	Normal	Normal	Normal	Hypo	Hypo
C(R)	Border Hypo	Hypo	Border Hypo	Normal	Hyper	Hyper	Normal	Normal	Hypo	Hypo	Normal	Border Hyper	Normal	Border Hyper
CE	Hypo	Hypo	Normal	Normal	Normal	Normal	Normal	Normal	Hypo	Normal	Normal	Normal	Hypo	Hypo
CE(L)	Hypo	Hypo	Normal	Normal	Normal	Normal	Normal	Border Hypo	Normal	Normal	Normal	Border Hypo	Border Hypo	Hypo
CE(R)	Hypo	Hypo	Normal	Normal	Normal	Normal	Normal	Normal	Hypo	Normal	Normal	Normal	Hypo	Hypo
CI	Hypo	Border Hypo	Hypo	Hypo	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
CI(L)	Hypo	Border Hypo	Hypo	Border Hypo	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
CI(R)	Border Hypo	Normal	Hypo	Hypo	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
ST	Hyper	Border Hypo	Hypo	Hyper	Normal	Normal	Normal	Border Hypo	Hypo	Normal	Normal	Normal	Border Hyper	Normal
ST(L)	Hyper	Hypo	Hypo	Border Hyper	Normal	Normal	Normal	Hypo	Hypo	Border Hypo	Normal	Normal	Normal	Normal
ST(R)	Hyper	Normal	Normal	Hyper	Normal	Normal	Normal	Normal	Border Hypo	Normal	Normal	Normal	Hyper	Normal
F	Hypo	Hypo	Hypo	Hypo	Hypo	Hypo	Normal	Normal	Hypo	Hypo	Hypo	Hypo	Hypo	Hypo
F(L)	Hypo	Hypo	Hypo	Hypo	Hypo	Normal	Normal	Normal	Hypo	Hypo	Hypo	Hypo	Hypo	Hypo
F(R)	Hypo	Hypo	Hypo	Hypo	Hypo	Hypo	Normal	Normal	Hypo	Hypo	Hypo	Hypo	Normal	Normal
MT	Hyper	Normal	Border Hyper	Hyper	Hypo	Hypo	Normal	Hypo	Normal	Normal	Normal	Hyper	Normal	Hypo
MT(L)	Normal	Normal	Normal	Hyper	Normal	Normal	Hypo	Hypo	Normal	Normal	Hyper	Border Hyper	Normal	Hypo
MT(R)	Hyper	Normal	Hyper	Hyper	Hypo	Hypo	Normal	Normal	Normal	Normal	Normal	Hyper	Normal	Normal
O	Hyper	Hyper	Normal	Hyper	Normal	Normal	Normal	Hyper	Hyper	Normal	Normal	Normal	Normal	Normal
O(L)	Hyper	Hyper	Normal	Hyper	Normal	Normal	Normal	Border Hyper	Border Hyper	Normal	Normal	Normal	Normal	Normal
O(R)	Hyper	Hyper	Border Hyper	Hyper	Normal	Normal	Normal	Hyper	Hyper	Normal	Normal	Normal	Normal	Normal
P	Hypo	Border Hypo	Hypo	Hypo	Normal	Normal	Normal	Normal	Hypo	Hypo	Hypo	Border Hypo	Hypo	Hypo
P(L)	Hypo	Border Hypo	Hypo	Hypo	Normal	Normal	Normal	Normal	Hypo	Normal	Hypo	Hypo	Hypo	Hypo
P(R)	Hypo	Hypo	Hypo	Hypo	Normal	Normal	Normal	Normal	Hypo	Hypo	Hypo	Normal	Normal	Normal
PR	Hypo	Normal	Hypo	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Hypo	Normal	Normal	Normal
PR(L)	Hypo	Normal	Hypo	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Border Hypo	Normal	Hypo	Hypo
PR(R)	Border Hypo	Normal	Hypo	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Hyper	Border Hyper
T	Hyper	Border Hyper	Hypo	Normal	Normal	Normal	Hyper	Hyper	Normal	Normal	Normal	Normal	Hypo	Border Hypo
T(L)	Normal	Normal	Border Hypo	Hypo	Normal	Normal	Border Hyper	Normal	Normal	Normal	Normal	Normal	Hypo	Hypo
T(R)	Hyper	Normal	Normal	Normal	Normal	Normal	Border Hyper	Hyper	Normal	Normal	Normal	Normal	Normal	Normal

Fig.1. Summary map highlighting the statistical differences of ^{18}F-FDG uptake for different antibodies and brain regions, both in pre and posttreatment phases, as a descriptor of the neurological manifestations of the group of patients studied. BG: basal ganglia; C: central region; CE: cerebellum; CI: cingulate gyrus; ST: striatum; F: frontal lobe; MT: mesial temporal lobe; O: occipital lobe; P: parietal lobe; T: temporal lobe. L and R referred respectively to the left and right sides of the brain. Hyper: standard deviation of SUV mean > 2; Normal (yellow): -2.0 = standard of mean = 2.0. The borderline values refer to values around -2.0 (border hypo, light blue), and + 2.0 (border hyper, light red). (L) and (R) refer to left and right sides of brain.