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Abstract withdrawn

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RELATIONSHIP BETWEEN GASTROESOPHAGEAL REFLUX, LOWER RESPIRATORY TRACT INFECTION AND ASTHMA IN CHILDREN: A PRELIMINARY REPORT

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Gastroesophageal Reflux (GER) is frequent in children, it is associated with heterogeneous symptoms and it has been demonstrated to perpetuate the pulmonary symptoms. GER is a potentially curable pathology, hence it is important to identify „significant“ (more than 6% of time monitored , pH < 4 and for a period of 5 minutes) GER at an early stage in order to initiate appropriate treatment and prevent lung infection and chronic lung disease. GER Scintigraphy is a highly sensitive technique, easy to perform with minimum radiation dose and at very low cost. It allows the quantification of Esophageal Transit and Gastric Emptying simultaneously.

Objective: To identify the correlation between GER and Pulmonary Symptoms.

Methods: 36 children (16 male, 20 female; 4-84 months of age) with symptoms of GER, lung infection or respiratory symptoms (wheezing syndrome, Asthma) were studied for evidence of GER. 15 (41.6%) patients had symptoms of GER, 16 (44.4%) Bronchitis or Broncho-obstructive symptoms and 5 (13.8%) had history of Broncho-pneumonia confirmed by X-ray. GER Scintigraphy was carried out using a gamma camera with low energy and high resolution collimator, linked to a computer following a fasting period of at least 4 hours. The studies began with the esophageal Transit, after the oral administration of Non- absorbable radioactive material (18.5 MBq - 37MBq) in 3 cc of the patient's usual formula (orange juice or milk). Later on the gastric capacity was completed with non-radioactive liquid and dynamic imaging of the upper abdomen and thorax was done with the patient in decubitus position for 30 minutes. Static images were obtained at 1,4 and 24 hrs. to evaluate GER and lung aspiration.

Results: All 36 children studies had evidence of GER. Seven out of 15 children with gastrointestinal symptoms had abnormally prolonged gastric emptying. Eight out of 21 children with predominantly respiratory symptoms also had prolonged gastric emptying. There was no scintigraphic evidence of lung aspiration in the late images in any of the children studied. Esophageal transit was observed to be normal in all children.

Conclusions: Preliminary results suggest a strong correlation between GER and Pulmonary symptoms. All patients are being followed up. In several patients medical treatment for GER had shown significant improvement in respiratory symptoms. Results will be discussed.

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REGIONAL CHANGES IN DOPAMINE FUNCTION OF DEPRESSED PATIENTS WITH RETARDED OR IMPULSIVE DEPRESSION

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Aim : In depressed patients with blunted affect and psychomotor retardation, we previously reported a decreased left caudate presynaptic dopamine function, using positron emission tomography with [¹⁸F] Fluorodopa and striatal regions-of-interest defined on MRI images (1). However, the regional dopaminergic dysfunction during the depressed state might be more widespread in cortical, cingulate, limbic and thalamic regions, which receive afferences from the meso-cortico-limbic dopaminergic pathways.

Methods : Depressed patients selected for psychomotor retardation and blunted affect (RD; n=6) were compared with depressed patients selected for high impulsivity (ID; n=6), and healthy subjects (n=6). We determined the regional presynaptic dopaminergic function by re-analysing raw [¹⁸F]-Fluorodopa images (1) with the SPM99 voxel-based method (2). For each subject, parametric images of the influx constant Ki were obtained from the [¹⁸F]-Fluorodopa images, and afterwards coregistrated on the anatomical MRI. The parametric Ki [¹⁸F]-Fluorodopa images normalized onto the Talairach stereotactic space were subsequently obtained by applying the normalization matrix of the MRI images to the coregistrated Ki parametric images.

Results : The Ki decrease in left caudate was replicated in RD, validating the method. In RD, Ki value decreases were detected in thalami, and increases in both amygdalae and subcallosal gyrus. In the patient group, significant covariations were found between affective flattening or retardation scores, and Ki values in thalamus, amygdalae, subcallosal gyrus, and anterior cingulate. The covariation between affective flattening or psychomotor retardation scores were negative in the thalamus and positive in the limbic or paralimbic regions. Impulsivity scores covaried conversely in subcortical and limbic regions. Results in patients with retarded depression were consistent with those reported in Parkinson's disease patients studied with an analogous methodology (2).

Conclusion : Altered presynaptic dopamine function can be detected *in vivo* in subcortical, limbic and paralimbic regions in depressed patients with blunted affect and psychomotor retardation.

References

American Journal of Psychiatry, Feb. 2001
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CEREBRAL BLOOD FLOW CHANGES AS ASSESSED BY 99m-Tc-HMPAO SPECT IN TWO SUBGROUPS OF MAJOR DEPRESSIVE DISORDER PATIENTS

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Aim: The Karolinska Scale of Personality (KSP) rates 135 items with a four-point response format summed up to 15 scales focused on personality traits that are thought to have biological correlates. It includes scales associated with vulnerability to depressive disorder. Altered scores have been reported in Major Depressive Disorders (MDD), including patients suffering of Psychic Anxiety (ANX) and Socialisation (SOC) disorders. The aim of this study was to identify the cortical and subcortical brain regions showing regional cerebral blood flow (rCBF) changes in patients with altered Anxiety and Socialisation KSP scores.

Methods: The rCBF distribution at rest in two sub-groups of 19 MDD patients each with high ANX score and low SOC score was compared to that of 28 normal controls (CTR). 99mTc-HMPAO SPECT, using a three-headed gamma camera, was performed and intersubject group analysis was carried out by a Computerised Brain Atlas able to standardize brain anatomy in 3D space. The uptake in 27 functional subvolumes of the brain bilaterally, including the most of Brodmann (B) areas, basal ganglia and thalamus, was analyzed by analysis of variance. The significance level was set at p = 0.05.

Results: No age difference was found between the groups. Both patients to control comparisons showed a significant global interaction (p<0.02). No effect of hemispheres was found in neither comparison. In the CTR/ANX comparison, group x VOI interaction was significant in the prefrontal cortex for B9, B10, B46, basal ganglia and the thalamus. Significant interactions were also found in CTR/SOC comparison in B9, B10, in auditory cortex, in the Broca area, thalamus and putamen. In all these regions there was a significant rCBF increase. The KSP scores did not correlate to rCBF in any of the functional subvolumes.

Conclusions: Two sub-groups of major depressed patients selected according to their altered Anxiety and Socialisation KSP scores showed significant rCBF increases. These changes were evident in the prefrontal cortex and central structures in both pathological groups. Patients with Socialisation disorders showed an increased flow also in auditory and language production cortex. These findings confirm rCBF changes in psychiatric disorders and encourage the use of standardisation software for comparison to normal controls and for making group and individual diagnosis.

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CHANGES IN RCBF DISTRIBUTION ASSOCIATED WITH MUSCULAR TENSION AND PSYCHASTHENIA. FIRST 99M-TC-HMPAO SPECT STUDY

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Aim: Muscular Tension (MT), subjective muscular tenseness and aches, and Psychasthenia (PA), low mental energy and difficulties in compensating for energy consumption, show altered corresponding scores on the Karolinska Scale of Personality (KSP). This scale rates 135 items with a four-point response format summed up to 15 scales focused on personality traits that are thought to have biological correlates. This study aims to investigate for the first time the regional cerebral blood flow (rCBF) changes in patients with significantly increased KSP scores in either Muscular Tension or Psychasthenia scales.

Methods: The rCBF distribution at rest in a group of 19 MT and in a second group of 19 PA patients was compared to that of 28 age-matched normal controls (CTR). 99mTc-HMPAO SPECT was performed using a three-headed gamma camera and intersubject group analysis was carried out by a Computerised Brain Atlas able to standardise brain anatomy in 3D space. The bilateral uptake in 27 functional subvolumes of the brain, including the most of Brodmann (B) areas, basal ganglia and thalamus, was analyzed by analysis of variance. The significance level was set at $p = 0.05$.

Results: Both patients to controls comparisons showed a significant global interaction ($p < 0.03$). In the CTX/MT comparison group x VOI interaction was significant with increases in prefrontal cortex in B9 and B10 and decreases in posterior cingulate and parietal cortex in B31 and B39 respectively. Significant increases were found in the CTR/PA comparison in B9, B10 and in the putamen. In none of the 2 comparisons hemispheric effect was seen neither did the KSP scores correlate to rCBF in any of the analysed functional subvolumes.

Conclusions: rCBF changes in patients showing altered Muscular Tension and Psychasthenia KSP scores were investigated for the first time. Prefrontal cortex, bilaterally, showed rCBF increase in both groups when compared to normal controls. Posterior cingulate and parietal associative cortex showed significant decreases in MT. These findings confirm that the symptoms reported by patients suffering of Muscular Tension and Psychasthenia have an organic basis. They also suggest the usefulness of standardisation software and normal controls in reliably identifying both rCBF increases and decreases in psychiatric disorders.

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INCREASE IN CEREBRAL PERFUSION (CP) WITH GINKGO BILOBA (GB) LONG-TERM TREATMENT

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Introduction: CP alterations during normal aging could be explained by several mechanisms. A dry extract of *Ginkgo biloba* is one of the many attempts to minimize the aging effects.

Aim: GB long-term treatment effects on CP evaluated with ^{99m}Tc-HMPAO in an old age group. **Methods:** Forty-eight right handed male between 60 to 70 years old, distributed randomly in two equal groups, received 80mg/day of GB or placebo for a 8 months period. CP was evaluated at the beginning and at the end of the treatment. CP was calculated by the difference between counts in 12 predefined regions of interest (ROI) and one in the cerebellum ($Value = ROI - cerebellum$) and another data (Table #1) showing the CP improvement was obtained subtracting the values post-treatment by pre-treatment.

Results: *Ginkgo biloba* group has had better perfusion than placebo showed by the decrease in the difference between ROIs and cerebellum. The inverse result was observed in the placebo group.

Table #1- CP improvement between pre and post treatment in the two groups.

ROI	Placebo	Ginkgo biloba
Pons	1,7±6,5*	6,3±7,5*
Frontal	-0,4±12,1	2,5±7,8
Temporal lateral	1,1±2,9	0,5±4,2
Temporal medial	3,8±6,4*	-0,4±7,5*
Upper basal ganglia	0,0±6,1*	-3,6±5,3*
Lower basal ganglia	2,0±6,3*	3,9±3,9*
Frontal	2,2±3,3*	-2,9±3,5*
Frontal-parietal	0,4±2,7*	-2,3±3,0*
Parietal	-0,2±2,0*	-3,3±2,6*
Temporal-parietal	0,6±3,3	-0,5±4,3
Temporal	0,8±2,7*	-0,9±1,9*
Occipital	3,8±3,6*	-0,7±2,4*

P=0,004 - Student „t“ test with Bonferroni correction.

Conclusion: *Ginkgo biloba* promotes Cerebral Perfusion increase in several areas in both hemispheres.

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EFFECT OF TESTOSTERONE THERAPY ON CEREBRAL PERFUSION IN HYPOGONADAL MALES

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Aim: Testosterone replacement therapy is employed in adult males suffering from diminished libido and low testosterone levels. This study evaluated cerebral perfusion before and after testosterone therapy was initiated. **Methods:** 8 adult males with a mean age of 69 years (58 to 79), participants in an ongoing trial of testosterone replacement in documented hypogonadal males, were studied with SPECT perfusion imaging as part of an ongoing study. Each patient completed questionnaires during the study evaluating physical, sexual, memory and sleep performance and social interactions. Patients had a baseline cerebral SPECT scan performed with Tc99m HMPAO using a triple head gamma camera with ultra high resolution fanbeam collimation. Repeat scans were performed approximately one month and two months post initiation of testosterone therapy. Studies were analyzed visually and with statistical parametric mapping software (SPM96), comparing the difference between paired patient studies to the difference between 15 paired studies of normal subjects.

Results: Visual analysis of studies failed to demonstrate any consistent differences between individual scans. SPM grouped analysis of the change from baseline to one month post therapy indicated large clusters of activation in the left antero-medial frontal lobe (corrected p value 0.056) and the left posterior thalamus (0.061). A comparison of baseline to the two month study showed a similar but less significant activation. No significant group differences were identified between the two post therapy scans.

Conclusion: Testosterone replacement therapy in hypogonadal males appears to be associated with left frontal lobe and posterior left thalamic activation demonstrated by SPECT cerebral perfusion imaging. This change is associated with increased libido and sexual performance in most of the patients.

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TC-99M HMPAO BRAIN SPECT IN CHILDREN WITH DOWN'S SYNDROME

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Down's syndrome is one of the most common chromosomal disorders (one in 800 births) and associated with developmental abnormalities of the central nervous system that result in mental retardation and age-dependent Alzheimer-type neurodegeneration. The aim of this (ongoing) study was to determine the regional cerebral blood flow alterations in children with down's syndrome, and to correlate IQ levels.

Methods: In this study; Tc-99m HMPAO brain SPECT was used to examine regional cerebral blood flow (rCBF) in 16 patients with Down syndrome (7 girl, 9 boys; mean age 6.84 ± 4,1 years). SPECT scans were acquired 20 minutes after injection of 18,5 MBq/kg Tc99m HMPAO in a quiet environment. All the children underwent detailed clinical examination, and IQ evaluation and/ or the Denver developmental screening test. SPECT images were analysed visually and semiquantitatively by defining side-to-side asymmetry index. The asymmetry indices was considered: < 6% as normal, between 6-12% as suspicious, > 12% as abnormal.

Results: Five children showed normal brain perfusion images. According to asymmetry indices, 4 cases showed abnormal cortical brain perfusion, and 3 cases showed abnormal perfusion on basal ganglia, and one patient had abnormal cerebellar perfusion. Suspicious perfusion abnormalities were determined in 4 patients. There was a positive correlation between IQ levels and right, and left frontal regions ($r=0,57, p=0,02; r=0,57, p=0,02$, respectively).

Conclusions: Tc-99m HMPAO brain SPECT can be helpful to assess the developmental brain abnormalities and understand which region in the brain related to mental retardation in children with Down's syndrome.

Poster presentation

A 20612

European Journal of Nuclear Medicine

28/8

2001



0340-6997(200108)28:8;1-#



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