whole brain volumes occurred indicating that hippocampal atrophy is not merely a function of generalized brain atrophy. Progression of hippocampal atrophy but not of whole brain atrophy was significantly correlated with clinical deterioration (r=0.6, p<0.05).

Conclusion: These findings indicate that progressive hippocampal volume reduction underlies clinical deterioration in AD and might serve as a morphometric index of disease progression.

P05.04

MR volumetry during acute alcohol withdrawal and abstinence

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Although recovery of brain volume with abstinence from alcohol in chronic drinkers is known to occur, the mechanism behind is not clear.

Measurements of segmented brain tissue class volumes (grey matter (GM), white matter (WM) and CSF) were obtained in 6 chronic alcoholics in acute withdrawal and abstinence using MRI. Subjects were studied within 48 hours after last drink, one and two months later. 11 healthy subjects were scanned twice within one month. Drinking data and cognitive test measures were obtained.

Intracranial and GM volumes did not change between scans. For patients, increase in relative WM volume between scan 1 and 2 ranged between 2.1 and 22.4%. Between scan 2 and 3, increase in total relative WM volume ranged between 5.3 and 14.0%. One individual resumed drinking and was again investigated during acute withdrawal. The measured decrease of 8.5% (relative WM volume) corresponded to the WM increase between scan 1 and 2. GM and WM volumes in healthy subjects were constant over time.

Changes in brain volume in chronic alcoholics during withdrawal and abstinence appears confined to the white matter.

P05.05

Reliability and reproducibility of MR brain tissue segmentation

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Reliability and reproducibility of segmented tissue class volumes: grey matter (GM), white matter (WM) and CSF were investigated using BRAINS and a 1.5 T MRI. Right and left side volume measurements were obtained using a continuous and a discrete classifier.

Two different sets of MR-scans were used: 10 subjects (inter- and intrareliability) and 11 subjects (scan-rescan reproducibility). Intraclass correlation (ICC) coefficient (r) was used as reproducibility index.

For the first scan set, values were 87.0% total brain volume (TBV) of intracranial volume (54.5% GM, 32.5% WM) and 13.0% CSF (continuous) and 93.5% TBV (57.1% GM, 36.5% WM) and 6.4 % CSF (discrete). For the second set, values were 86.3% TBV (54.5% GM, 31.8% WM) and 13.7% CSF (continuous) and 93.0% TBV (57.5% GM, 35.5% WM) and 7.0% CSF (discrete). For both sets, TBV was 7% larger and CSF volume 7% smaller by the discrete classification than the continuous.

Inter- and intrareliability: ICCs were above 0.99 for continuous and discrete measures except GM (discrete) (r2 >0.96). Scan-rescan reproducibility: ICCs for continuous and discrete classifications were excellent (r2 >0.99 and r2 >0.97).

P05.06

Cerebellar vermis volume reduction in patients with chronic schizophrenia

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Cognitive deficits have been reported in patients with schizophrenia. A reduction of the size of the posterior vermis has been associated with cognitive dysfunction in the fragile X syndrome. Since the posterior vermis may be involved in cognitive dysfunction, we hypothesised that the volume of the posterior vermis may be reduced in schizophrenia. To test this hypothesis, we compared the volumes of cerebellar subregions between sixty schizophrenic subjects, fulfilling DSM-IV criteria, and fifty-seven healthy subjects, of both genders, using high resolution MRI. The subjects were examined in a 1.5 Tesla GE Signa system (Milwaukee, Wis, USA) at the Karolinska Hospital. The cerebellar anterior vermis, posterior superior vermis, posterior inferior vermis and hemispheres were manually parcellated and measured using the software BRAINS. The statistical evaluation revealed a significant diagnostic effect for all vermian subregions with smaller absolute ($p < 0.005$) and relative volumes ($p < 0.001$) in the schizophrenic subjects. There was no difference for the cerebellar hemispheres or the intracranial volume. These preliminary findings suggest that the subdivisions of the vermis have reduced volumes in neuroleptic-treated schizophrenic patients.

P06. Brain imaging – functional

P06.01

Vagus nerve stimulation and fMRI in treatment-resistant depression

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Objective: Vagus Nerve Stimulation (VNS) has shown promising antidepressant effects in treatment-resistant depression, however, the mechanisms of action of VNS are not known. We report on brain activity during the first exposure to VNS (VNS initiation) in patients with treatment-resistant depression utilizing functional MRI (fMRI).

Method: Scans were acquired on 8 subjects (46.2 years±6.8) at VNS initiation. Serial interleaved VNS and fMRI techniques were used. Immediately before scanning, stimulation was reprogrammed to provide a 7 sec on–108 sec off stimulation cycle. A 440 Hz tone was interleaved in 7 second trains on alternate 57.5 sec epochs of a VNS epoch. The VNS-TONE cycle was repeated 10 times.

Results: Data was collected from 8 active VNS fMRI sessions and 8 placebo. During VNS, increased rCBF in hypothalamus, orbitofrontal, medial temporal, and medial prefrontal cortex occurred. Tone activation (auditory cortex) is consistent with previous studies. Placebo scans are being analyzed.

Conclusion: Interleaved VNS and fMRI may help understand the regional neurobiological effects of VNS in patients with treatment-resistant depression.

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