2.49 ± 1.52 and backward: left: 2.21 ± 1.51; right: 2.42 ± 1.49. There was no evidence for a difference in mean hippocampal atrophy rates between manual and fluid methods. Reliability for hippocampal atrophy rates derived by regional fluid registration (intraclass correlation coefficient (ICC): forward: left: 0.985; right: 0.988 and backward: left: 0.975; right: 0.989) was higher than for manual delineation (ICC: left: 0.798; right: 0.850). **Conclusion:** Regional fluid registration proved to be more reliable than manual delineation in assessing hippocampal atrophy rates, without sacrificing sensitivity to change. This method may be useful to quantify hippocampal volume change, especially in multi-center clinical trials, given the reduction in operator time and improved precision.

P2-282 QUALITY ASSURANCE IN A MULTI-CENTER PET IMAGING TRIAL

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Background: Inclusion of imaging studies in clinical trials poses added challenges. Uniform methods for identifying and tracking protocol deviations and adverse events are well established, but do not account for many logistical and technical problems that can affect image quality and trial success. These "technical" deviations may not be apparent to study coordinators and often are identified only when images are processed. **Objectives:** To classify and evaluate the frequency and types of technical deviations in a multi-center imaging trial of patients with suspected frontotemporal dementia using positron emission tomography with 18F-fluorodeoxyglucose (FDG-PET). **Methods:** Nine academic centers with variable experience using FDG-PET in research and clinical care performed 55 scans and sent data to a centralized data coordinating center (DCC) for analysis. Scans were performed using standard techniques that did not involve head or body restraints. History of a behavior disturbance was not exclusionary; indeed it was common in these patients. We monitored the completion of studies, including timeliness of data transfer and processing. Images received at the DCC were evaluated against established quality standards. Deviations from expectations were classified into six categories and rated for severity based upon their effect on final image quality. **Results:** 52 of 55 images (96%) ultimately met full quality standards and all but one scan obtained early in the study were usable. There were 4 acquisition and 10 processing deviations and 1 HIPAA violation. The most frequent technical deviation was a delay in transferring data to the DCC. There were no cases of poor image quality from subject movement. The number of technical deviations was variable from site to site and became less frequent as the trial progressed. The DCC identified one unexpected incidental image abnormality. **Conclusions:** Uniform and comprehensive technical standards should be established at the onset of imaging trials and assessed prospectively using explicit rules. Our procedures are effective and could be widely adopted. Timely quality assessment and working closely with sites can minimize problems caused by technical deviations. High quality FDG-PET studies can be achieved without restraints, even in demented patients with a history of behavior disturbance.

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P2-283 FDG-PET IN SUBJECTIVE MEMORY IMPAIRMENT

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Background: Epidemiological studies suggest that subjective memory impairment (SMI), defined as the feeling of memory worsening without deficits on cognitive tests, is a predictor of future dementia. The biological basis of SMI, however, is only poorly understood. In recent papers on SMI, volume reduction of the hippocampus and the entorhinal region has been described, indicating possible early Alzheimer's Disease (AD) (van der Flier et al., 2004, Jessen et al., 2005). **Objective:** In the present study, we used Fluoro-2-deoxy-D-glucose positron emission tomography (FDG-PET) as a sensitive tool for the detection of early metabolic impairment in the course of dementia, to investigate whether subjects with SMI would display hypometabolism. **Methods:** We included 27 subjects with SMI (mean age: 67.7 years, SD 5.7; 9 female, 18 male) in the study. All were referrals to the outpatient memory clinic. Memory worsening within the last five years was confirmed by close others in all cases. All scored within the normal age and education adjusted range on the CERAD neuropsychological battery. None was suffering from clinically relevant depression. In addition, we included 30 healthy control subjects, which were recruited from the general population (mean age: 67.9years, SD 7.9; 12 female, 18 male). FDG-PET according to standard procedures was performed in all subjects. The data were pre-processed, including spatial normalization and smoothing, with SPM99. The groups were compared with a two-sample-t-test. **Results:** At a significance level of $p<0.005$ (uncorrected) with a cluster extent$>$ 50 voxel, we observed an area of hypometabolism in the right cuneus in the SMI group compared with control subjects. This area is part of the hypometabolic pattern commonly observed in AD and in mild cognitive impairment (MCI). **Conclusion:** Our data contribute another piece of evidence that AD related biological alterations can be observed already at the pre-MCI stage of SMI.

P2-284 FLOW ARTIFACTS IN MR IMAGING FOR ALZHEIMER'S DETECTION AND PROGRESSION

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Background: Alzheimer's disease (AD) is characterized by progressive cerebral atrophy particularly involving the medial temporal lobes. Serial 3D MRI can measure atrophy progression. The sensitivity of these measurements depends on stable acquisition and is undermined by image artifacts. **Objectives:** To determine frequency and cause of temporal lobe artifacts, and develop a novel technique to reduce these artifacts. **Methods:** We visually determined the frequency and cause of temporal lobe artifacts from 758 subjects' scans acquired from multiple sites. The technique for artifact correction was tested on an image with simulated artifact generated from a cylindrical carotid artery segment in a volunteer image. Flow was assumed constant for each plane in a 3D k-space (one plane per shot), and one 3D image was generated per shot, modulating the carotid intensity using a representative flow profile and acquisition sequence timing. To model array coil data, multiple views were generated using coil intensity profiles. The artifact-corrupted image was generated for each coil by transforming into k-space the modulated image corresponding to each shot, assembling one plane from each modulated k-space to form a new corrupted k-space, and transforming back into the image domain. We remove carotid artifacts using information from array coils to determine the unknown carotid intensities in the different shots. Because artifact appears differently in each coil view, we determine these unknown intensities by minimizing the standard deviation of the intensities between the coil reconstructions, using a conjugate gradient algorithm (LSQR). **Results:** 12.5% of scans suffered from temporal lobe artifacts, 65% of these judged to be due to pulsatile flow in the carotid artery. The novel technique reduced the total artifact intensity by a factor of 4 in a 40 shot simulation. Work is ongoing to apply this technique to clinical data. **Conclusions:** Flow artifacts occur frequently in clinical trials. We have devised a technique for reducing these artifacts using a novel reconstruction method, and tested it on simulated data, showing these artifacts can be substantially reduced using information from array coils.