

MRI provides anatomical information, whereas PET provides functional information with lower resolution. There has been increasing demands of co-registration between two imaging modalities to maximize both anatomical and functional information. One of the useful applications of the co-registration technique might be an accurate lateralization and localization in epileptic seizure patients. This report presents usefulness of PET and MRI co-registration for localizing seizure or abnormal lesions on the parietal lobe epilepsy patients. Both T1-weighted MRI and PET data were obtained using a standard protocol in clinical studies. Two co-registration algorithms were used and tested. They were surface matching and NMI (normalized mutual information) matching methods which were known as relatively robust and rapid presenting good performance. As a preprocessing prior to the co-registration, scalp and meninges of the MRI images were segmented out, and the pixel depth of the PET images were converted from floating point to integer values in order to meet for the algorithm requirements. MRI and PET images of the epileptic seizure patients were co-registered using the above two algorithms.

Qualitative evaluation of the results for the different co-registration algorithms were carried out by several experienced clinicians and physicists. The co-registered images helped accurate localization of abnormal lesions in epileptic seizure patients, and NMI matching appears to be outperformed with ease of use compared to the other co-registration method.