CHAPTER I

BACKGROUND AND RATIONALE

Nowadays Single Photon Emission Computed Tomography (SPECT) imaging is widely accepted as a study to confirm epileptogenic focus in intractable epilepsy. Traditional side by side visual interpretation of ictal and inter-ictal SPECT scan may sometimes be difficult in identifying the epileptogenic focus, particularly in patients with extratemporal or otherwise unlocalized intractable epilepsy by MRI.

Computer-aided subtraction ictal SPECT co-registration to MRI (SISCOM) was known to be more sensitive than visual analysis. Furthermore, concordance between SISCOM localization (site and size) and site of surgery is predictive of postoperative seizure outcome irrespective of MRI finding [1]. Thus, accuracy of size detection is major concerned if SISCOM-guided surgery is to be performed. Statistical parametric mapping (SPM) is a software program that is increasingly used as an objective, whole-brain analysis technique for functional. SPM was designed mainly to visualize the statistically significant region on data sets obtained from PET or SPECT during various kinds of activation. It has capability of co-registration by mutual information, realignment, spatial transformation into a template space, and contrast define giving a result of voxel values constituted a statistical parametric map of t-test. A few studies had been performed to validate the size detection by SPM [2,3,4]. Those studies simulated on neuroactivated brain compare to normal baseline brain study. Therefore the studies cannot properly be applied in epilepsy patients who have hypoperfusion at lesion interictally. Accuracy of size detection by SPM is important to identify actual activation zone, in order to aid surgical margin. In this study, several simulations of SPECT ictal and interictal studies will be performed in order to test the ability of SPM2 for detection of brain lesion of various sizes and to determine the effect of site on size detection.