

CHAPTER VII

DISCUSSION AND CONCLUSION

In this study, several simulations of SPECT ictal and inter-ictal studies were performed in order to test ability of SPM program (version 2) for the detection of the size of brain lesion and to determine effect of site on size detection. The detection of activation focus was achieved for brain phantom with 14 mm lesion size at all 3 sites. The 9 mm lesions were detected at anterior and basal ganglia sites except at posterior cortex site and the 4 mm lesions were absolutely not detected at anterior and posterior sites, but only at basal ganglia in the brain phantom. If compare to previous study by Stamatakis, et al [4], the study found that for the smallest lesion they used (20 voxel = 160 ml), the intensity of lesion should be 30% or more than the brain background. However, in our study, we used smaller volume of lesion (63 ml), so the intensity should be more than 30% by theory. Increasing intensity of the lesion produced visualization in some area(basal ganglia), but the trial were not successful at anterior and posterior cingulate cortex. This might be the effect of SPM software itself, which new advanced version such as SPM5 may allow future studies in SPM analysis activation detectability.

We also found that the sites affect size detection, all lesions were detected more efficiently at basal ganglia sites. Results are not in agreement with previous publish studies. [1,3,4]

From the result of this study, the calculated volume detected by SPM was 7-14 times larger than the real volume. This can be assumed that SPM process resulted in error in size detection which might be due to statistical variation in nuclear medicine imaging. All images are normally blurred and have less resolution compare with other modalities. Thus the apparent volume of activation in an SPM program does not represent the real volume of activated focus as stated before [6].

The limitations of this study are : 1.) The inability of SPM program to detect the exact volume and 2.) The small sample size, thus, only the trend of relation can be observed. Positive correlation of volume detected by SPM and true volume were found. 3.) Site of lesion at posterior cingulate cortex is more difficult to detect for smaller lesions (lesion size 9 and 4 mm). 4.) Lesion:bg was not varied. Higher lesion activity may produce positive result even in small lesions. 5.) Small lesion of 4 mm diameter cannot be detected in some areas. 6.) SPM program is limited only in brain system.

In conclusion SPM program is able to detect only 14 mm lesion size and might be helpful for further clinical use. However, the size detected by SPM is much larger than the actual size. Sites of lesion may affect size detection.