

Development and validation of a novel image software for automatic semi quantitative analysis of Tc-99m Trodat-1 SPECT in patients with suspicious Parkinson's disease - Chun-Che Hung - Chang Gung University

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^{99m}Tc-Trodat-1 SPECT had been widely used in Asia to assist clinical diagnosis of Parkinson's disease (PD) and evaluate the severity of Parkinsonism. However, it is subjective and time-consuming to calculate specific uptake ratio (SUR) by manual fusion of MRI/SPECT images in clinical settings. QTRODAT is software which is applied for semiquantitative analysis of ^{99m}Tc-Trodat-1 image. The purpose is to compare the difference of SURs of striatum and putamen to occipital background generated by traditional manual fusion of MRI/SPECT and QTRODAT respectively to validate whether QTRODAT a proper substitute for traditional manual fusion method. One hundred patients who had prior ^{99m}Tc-Trodat-1 SPECT studies were recruited in this study. Each case of ^{99m}Tc-Trodat-1 SPECT was analyzed by both manual fusion of MRI/SPECT and QTRODAT. Regions of interest (ROI) were placed in both (right and left) striatum, putamen, caudate, and the background of the occipital lobe. The SURs are the count ratios of respective ROI to background. Pearson linear correlation (r) was used to evaluate correlations between each SUR of the two methods, and Paired-Sample T test was applied to compare the SUR of the two methods ($p < 0.05$). QTRODAT

in dealing with SUR is not significantly different than manual analysis. High correlation was found between QTRODAT and manual analysis. QTRODAT can be applied for improving the efficiency to evaluate the severity of PD and the possible response after treatment intervention by ^{99m}Tc-Trodat-1 SPECT. Therefore, it may assist nuclear medicine physician to improve the clinical efficiency with confidence. This study has some limitations, especially due to the small sample size. Age of symptom onset for EOPD definition is controversial (between 40 to 58 years old). It is necessary to perform a large multi-center study with large sample size, perfect matching between EOPD and LOPD, establishing the normal range of the binding ratios in different age groups and determine a high accurate cut-off value of ^{99m}Tc-TRODAT uptake ratio for diagnosis of PD. ^{99m}Tc-TRODAT-1 SPECT imaging was able to show lower presynaptical dopaminergic terminals density in both EOPD and LOPD. We didn't find in TRODAT uptake between two groups. On the other hand posterior portion of the striatum (putamen) showed more involvement and diminished TRODAT uptake.