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Topic:

- Nuclear Medicine
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Effect of reconstruction processing methods and analysis in the quantification of brain spect studies with DaTSCAN™

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Introduction

DaTSCAN (123I-FP-CIT) brain SPECT studies have great clinical impact in differential diagnosis of movement disorders in particular to confirm the presence or otherwise of dopaminergic degeneration in the nigrostriatal pathway. Several quantitative algorithms have been described to obtain more objective data to enable higher confidence in the diagnosis, inter-group analysis and longitudinal evaluation of the same individual.

Purpose

To investigate the impact of different types of image reconstruction processing in the quantification of specific uptake binding (SUB) and striatum size.

Materials and Methods

Retrospective study of 22 consecutive individual studies, reconstructed iteratively and analytically with different parameters, with and without attenuation correction (Chang method) in a total of 18 sets of images. The SUB and striatal dimensions (considering an elliptical shape: longest axis – antero-posterior – width – right-left – depth – cephalo-caudal) were obtained using an automatic computational tool.

Results

The results show no statistically significant differences in the SUB between the different types of reconstruction (ANOVA $p = 0.121$ left $p = 0.301$ on the right).

There is statistically significant differences in the volumetric dimensions (ANOVA $p = 0.000$).

There is a strong correlation between SUB values obtained by filtered back projection reconstruction (Hanning filter with critical frequency of 1.0) with and without Chang correction for attenuation (R2 = 0.961 left, R2 = 0.964 on the right).

Conclusion

Calculation of SUB is not significantly affected by reconstruction methods. Attenuation correction increases SUB values. Calculation of striatal dimensions is strongly affected by reconstruction methods. Well defined protocols are needed that need to be maintained throughout clinical practice.

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