DOPAMINE TRANSPORTER IMAGING WITH [I-123]IPT SPECT IN NORMAL CONTROLS AND PARKINSON'S PATIENTS: FEASIBILITY STUDY OF A SIMPLIFIED SPECT SCAN PROTOCOL.

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[I-123]IPT has been used to measure changes in dopamine transporters with Parkinson's patients (PP). However, 2 hrs of imaging time without movement of patient's head partially limits its widespread use in routine clinical SPECT protocol. The purpose of this study was to evaluate the feasibility of a simplified IPT SPECT scan protocol using three 10 min scan data obtained at 0-10, 55-65, and 110-120 min postinjection and compared to current protocol using 23 scans obtained from 0-120 min to quantify dopamine transporter binding in normal controls(NC) and PP. IPT labeled with 6.74 ± 0.88mCi of I-123 was intravenously injected into 12 NC (age: 41 ±9) and 22 PP (age: 55±8) and the 5 min dynamic SPECT data were acquired for 2 hrs with Trionix triple-headed SPECT camera. SPECT images were reconstructed and attenuation corrected. [I-123] IPT quickly penetrated the blood-brain barrier and began to loacalize higher concentrations at the basal ganglia at 20 min after injection. The transporter parameter was measured using a variation of graphical analysis(VGA) and area ratio method(ARM) that derive the distribution volume ratios ($R_v=V_3/V_2$ for VGA, $R_A=V_3/V_2$ for ARM) from multiple scan data without blood data. R_v' and R_A' measured from three 10 min scan data and compared with R_v and R_A measured from 23 scans for both NC and PP. (R_v', R_v) for NC and PP were (1.83± 0.29, 2.21±0.34) and (0.63±0.34, 0.77±0.31), respectively. (R_A', R_A) for NC and PP were (1.11±0.22 ,1.62 ± 0.28) and (0.43±0.21 ,0.65±0.24), respectively. Both (R_v', R_v) and (R_A', R_A) for NC were clearly separated from those for PP. R_v' and R_A' underestimated R_v and R_A by 18.4% and 33.5%, respectively, but R_v' and R_A' showed excellent correlations with R_v (r=0.95) and R_A (r=0.97), respectively. The results indicate that the three 10 min scan protocol may be feasible and allows us to differentiate dopamine transporter parameters in PP from those in NC.