

Cod: PO197

QUALITATIVE AND QUANTITATIVE ANALYSIS OF 123I- DATSCAN SPECT IN THE DIAGNOSIS OF PARKINSON'S DISEASES: BODY-CONTOURING VERSUS CIRCULAR ORBIT ACQUISITION

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BACKGROUND-AIM

SPECT (single photon emission computed tomography) with N-u-fluoropropyl-2a-carbomethoxy-3a-(4-iodophenyl) nortropane, also called FP-CIT, labelled with 123Iodine (commercially known as DaTSCAN) has been proven to be useful in the diagnosis of Parkinson's diseases. DaTSCAN-SPECT provides qualitative and quantitative information to confirm dopaminergic degeneration in patients with parkinsonism.

AIM: SPECT data acquisition can be performed using a circular orbit or a body-contouring system. The aim of this study is to investigate whether circular orbit offers different information about qualitative and quantitative analysis than body-contouring orbit in cerebral SPECT with 123I-DaTSCAN.

METHODS

To acquire data we used a Symbia T2 SPECT-CT scanner (Siemens Medical Solutions). Acquisitions were performed on three patients, 3 hours after receiving 185 MBq of 123I-DaTSCAN. Each study was acquired using the same standard acquisition's parameters provided for a cerebral SPECT. Scans were performed using LEHR parallel hole collimators, over 360 degrees at 120 angles, 30 seconds/angle, 128x128 matrix, zoom 1.23.

Every patient was scanned twice: for the first study we used a body-contouring orbit and patient's head was placed at the center of FOV; for the second we selected a circular orbit with fixed radius and patient's head was decentralized.

Images were processed using data management system "Syngo". SPECT projections were reconstructed with filtered backprojection algorithm, butterworth filter (cutoff: 0.45, order: 8). We analyzed qualitative transaxial images and we performed ROI on basal ganglia and background for quantitative analysis.

RESULTS

Qualitative analysis: Images obtained using circular orbit have a worse quality, lower resolution and they appear more smoothed and noisy than images acquired with body-contouring.

Quantitative analysis revealed a decrease of absolute counts in SPECT data acquired with circular orbit SPECT, because distance between detector and patient was more than in the acquisition with body-contouring orbit (graph 1). On the other hand, relative counts (ratio: basal ganglia-background/background) were very similar in both acquisitions (graph 2).

CONCLUSION

This study demonstrates that using body-contouring in SPECT we can obtain better results from a qualitative point of view, because the image's resolution worsens with increasing distance to the camera. Instead, semi-quantitative analysis doesn't reveal important differences between two acquisitions.