AMYPAD
Amyloid imaging to prevent Alzheimer´s Disease

Impact of simulated reduced injected dose on the assessment of amyloid PET scans

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Purpose: To investigate the impact of reduced injected doses on the quantitative and qualitative assessment of the amyloid PET tracers [18F]flutemetamol and [18F]florbetaben.

Methods: Cognitively impaired and unimpaired individuals (N = 250, 36% Aβ-positive) were included and injected with [18F]flutemetamol (N = 175) or [18F]florbetaben (N = 75). PET scans were acquired in list-mode (90–110 min post-injection) and reduced-dose images were simulated to generate images of 75, 50, 25, 12.5 and 5% of the original injected dose. Images were reconstructed using vendor-provided reconstruction tools and visually assessed for Aβ-pathology. SUVRs were calculated for a global cortical and three smaller regions using a cerebellar cortex reference tissue, and Centiloid was computed. Absolute and percentage differences in SUVR and CL were calculated between dose levels, and the ability to discriminate between Aβ- and Aβ + scans was evaluated using ROC analyses. Finally, intra-reader agreement between the reduced dose and 100% images was evaluated.

Results: At 5% injected dose, change in SUVR was 3.72% and 3.12%, with absolute change in Centiloid 3.35CL and 4.62CL, for [18F]flutemetamol and [18F]florbetaben, respectively. At 12.5% injected dose, percentage change in SUVR and absolute change in Centiloid were < 1.5%. AUCs for discriminating Aβ- from Aβ + scans were high (AUC ≥ 0.94) across dose levels, and visual assessment showed intra-reader agreement of > 80% for both tracers.

Conclusion: This proof-of-concept study showed that for both [18F]flutemetamol and [18F]florbetaben, adequate quantitative and qualitative assessments can be obtained at 12.5% of the original injected dose. However, decisions to reduce the injected dose should be made considering the specific clinical or research circumstances.

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