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Recovery coefficient corrected image derived input function from a long axial field of view PET/CT-scanner

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Long axial field of view (LAFOV) PET scanners enables measurements in the aorta or similar arteries with high time resolution which can used for definition of input functions to obtain the blood concentration as a function of time directly from reconstructed images.
Here we present the application of a novel model-based recovery coefficient (RC) for partial volume correction to obtain quantitative and robust input functions down to single-slice levels. The methodology was tested across a range of different tracers including [64Cu]Cu-DOTATATE, [18F]FDG and [15O]H2O.
An image derived input function (IDIF) was obtained from a central long axial part of the descending aorta assumed to be partial volume free. From this volume a RC was estimated which was used to correct a volume covering the cross-sectional area of the aorta with an axial coverage corresponding to a total volume of 0.2 ml.
The method proved robust and improved the IDIF increasing the signal to noise ratio (SNR) and generally providing physiologically more plausible input functions. The RC correction regained absolute quantification of the IDIF which can be affected due to partial volume effects (PVEs).
This approach of IDIF determination minimizes intra-volume dispersion and delay differences creating input functions of high quality across multiple tracers. Additionally, as a future perspective, this type of approach can be extended enabling IDIF extraction from other arteries in the body.

Field

Software and quantification

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