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**04) A Viewer for Dynamic Whole-Body PET/CT studies with Integrated Voxel-based Patlak Analysis**

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**PURPOSE**

The purpose of our project was to develop a software system for the display, quantitation and voxel-based Patlak analysis of dynamic whole-body PET/CT imaging studies.

**METHOD AND MATERIALS**

We developed a DICOM image viewer and analysis system in the Java programming language. The viewer can load dynamic (multi-timepoint) DICOM whole-body image sets as well as aggregating separately acquired whole body image series. In addition, the viewer can load any co-registered anatomical imaging (e.g. CT, MR) for fusion display and anatomical localization, employing multiple look-up tables and user control of image blending. We incorporated regions-of-interest (ROIs) which provide real-time display of Time-Activity-Curves (TACs) and corresponding image statistics. For the voxel-by-voxel Patlak analysis, ROIs are used to provide the necessary input function data, either providing the entire function if imaging captures the time of injection, or used to scale a population input function when only later imaging timepoints are available.

**RESULTS**

Integrated PET/CT display of dynamic whole-body PET was provided, allowing user navigation of study time points in a similar fashion to conventional clinical image review. In addition to providing simple navigation of fused datasets across all timepoints, the system provided for the generation of summed image datasets, as well as the generation and display of Patlak slope, intercept and correlation images resulting from a voxel-based Patlak analysis. ROIs drawn on any one dataset were dynamically applied to any other dataset, providing real-time TACs across both original and derived images. Tabular ROI statistics from any dataset are exportable for further analysis.

**CONCLUSION**

Modern PET/CT scanners are faster and more efficient than ever before, enabling dynamic whole-body acquisitions which previously were not feasible. The software presented here provides many of the required features to properly display and analyze these new datasets, and does so in an implementation which is easily navigable by the user and executable on the widest variety of computing platforms.

**CLINICAL RELEVANCE/APPLICATION**

Dynamic whole-body PET/CT imaging is possible and, when provided with the right toolset, clinicians can begin to exploit the additional dimension of information which this imaging strategy provides.

**FIGURE (OPTIONAL)**

*Uploaded Image*

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