

OP 027

Sunday, May 20, 2012

9:30-11:00, Hall 4

Emerging shape and texture analysis for medical imaging

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In this talk, we will outline new directions in quantitative imaging, where one seeks to move beyond standard approaches to analysis of regions-of-interest (ROIs): as an example, it is worth noting that positron emission tomography (PET) images are commonly analyzed using (i) the mean or max standard uptake value (SUV) when analyzing tumors, or (ii) mean binding potential in parametric brain imaging. However, mean or max operations are the simplest and most straightforward approaches to ROI analysis, and potentially valuable ROI textural information is commonly discarded. Potential applications include (i) quantification of tumor heterogeneity, using various texture analysis approaches, as a predictive indicator for treatment response, and (ii) shape and texture analysis for the analysis of MRI-based ROIs and/or PET distributions within these ROIs. Overall, shape and texture analysis can serve as potentially powerful tools to quantitatively discriminate between different subjects and to serve as prognostic indicators.

OP 028

Sunday, May 20, 2012

9:30-11:00, Hall 4

Overview of kinetic modeling - part I and part II

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Nuclear medicine imaging enables not only visualization of the distribution of radiotracers, but also provides tremendous opportunities for quantification of biochemical and physiological processes. The ability to perform dynamic imaging coupled with the kinetic modeling methodology enables generation of kinetic parameters of interest at the region-of-interest (ROI) and/or individual-voxel level (the latter referred to as parametric imaging). In these two talks, we will provide an overview of various approaches to kinetic modeling, particularly in the context of compartment modeling, as applied to radiotracers with irreversible vs. reversible binding/trapping.

OP 029

Thursday, May 17, 2012

11:30-12:30, Sa'di Hall

Validation of calculation of the clearance rate constant (k_{mono}) of C-11 acetate using parametric image for myocardial oxidative metabolism by PETRaihan Hussain^{1*}, Takashi Kudo², Tetsuya Tsujikawa², Yasushi Kiyono², Hidehiko Okazawa²

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Introduction: ¹¹C-acetate is avidly extracted by myocardial tissue and is rapidly converted into ¹¹C-acetyl Co-A. The oxidation of ¹¹C-acetate and its subsequent clearance provides an index of myocardial oxidative metabolism. The kinetics of ¹¹C-acetate, is used to measure clearance rate constant (k_{mono}). The k_{mono} is usually measured on placing ROIs on the dynamic count based image and is represented only in numbers. In clinical setting, images instead of numbers should be more useful, especially in viability assessment. The purpose of this study was to generate a parametric k_{mono} image representative of myocardial oxidative metabolism.

Methods: Fifteen subjects (seven volunteers, eight patients) were studied. Dynamic PET was acquired after intravenous injection of 700 MBq of ¹¹C-acetate. The clearance rate constant of ¹¹C-acetate (k_{mono}) was calculated pixel by pixel using logarithmic conversion of original dynamic counts to generate the parametric k_{mono} image. The k_{mono} values from this image and those