Contribution ID: **16** Type: **Oral**

Evaluation of population-based input functions for kinetic modelling of 18F-FDG datasets from a long axial FOV PET scanner

Sunday, May 29, 2022 4:10 PM (20 minutes)

Accurate estimation of the available tracer concentration in the plasma, known as the arterial input function (AIF), is essential for kinetic modelling of dynamic PET datasets. The gold standard method to measure the AIF requires collection of serial arterial samples. With the introduction of long axial field of view (LAFOV) PET system, image derived input functions (IDIF) can be reliably measured from large blood pools such as left ventricle and aorta. However, measurement of an IDIF still requires a long dynamic PET acquisition which can be unpractical in a clinical setting. In this work, we exploit the high sensitivity and temporal resolution of LAFOV PET systems and study the feasibility of PBIFs with abbreviated protocols in 18F-FDG total body kinetic modelling. Dynamic PET data were acquired from 24 oncological subjects for 65 minutes following the administration of 18F-FDG. The data were split into 16 training and 8 testing sets, and IDIFs were extracted from the descending aorta. The training datasets were used to generate a PBIF. We compared use of different scan durations for generation of scaled PBIFs (sPBIF) and performance of different Patlak start time, t, *in Ki estimates. The sPBIF55-65 demostrated the best performance with 1.5% bias and 6.8% precision. Using the sPBIF55-65 with 20 minutes of PET data (t*=45) was adequate to achieve <15% precision error on Ki estimates of tumour lesions compared to Ki estimates with IDIF. In brain grey matter, sPBIF55-65 with 15 minute of PET data (t^*=50) yielded Ki estimates with less than 1% bias and less than 15% precision error. The use of PBIFs with shortened protocols can enable wider adoption of parametric imaging protocols in clinic setting.

Primary authors: SARI, Hasan; Dr ERIKSSON, Lars (Siemens Molecular Imaging); Dr MINGELS, Clemens (Dept. Nuclear Medicine University of Bern); Dr CASEY, Michael (Siemens Molecular Imaging); Dr CUMMING, Paul (Dept. Nuclear Medicine University of Bern); Dr ALBERTS, Ian (Dept. Nuclear Medicine University of Bern); Prof. SHI, Kuangyu (Dept. Nuclear Medicine University of Bern); Dr CONTI, Maurizio (Siemens Molecular Imaging); ROMINGER, Axel (Dept. Nuclear Medicine University of Bern)

Presenter: SARI, Hasan

Session Classification: Total Body PET clinical systems and applications

Track Classification: Total Body PET clinical systems and applications