

CME Session 10

Oncology & Theranostics + Physics Committee

Tuesday, October 18, 09:45-11:15

Session Title

Quantitative SPECT, PET and Standardisation

Chairpersons

Lioe-Fee de Geus-Oei (Leiden, Netherlands)

John Dickson (London, United Kingdom)

Programme

09:45 - 10:15 **John Dickson** (London, United Kingdom): Quantitative SPECT

10:15 - 10:45 **Anne Larsson Strömvall** (Umeå, Sweden): Quantitative PET

10:45 - 11:15 **Lioe-Fee de Geus-Oei** (Leiden, Netherlands): Clinical Use Cases

Educational Objectives

1. Understand the construct of quantitative SPECT, it's appropriate use and harmonisation
2. Understand different concepts of quantitative PET and harmonisation
3. To learn for which indications quantitative SPECT and PET is clinically relevant

Summary

Since the introduction of personalized medicine, the primary focus of imaging has moved from detection and diagnosis to tissue characterization, determination of prognosis, prediction of treatment efficacy, and measurement of treatment response. Precision (personalized) imaging heavily relies on the use of hybrid technologies and quantitative imaging biomarkers. The growing number of promising theranostics request accurate quantification for pre- and post-treatment dosimetry. Furthermore, quantification is required in the pharmacokinetic analysis of new tracers and drugs and in the assessment of drug resistance. PET is by nature a quantitative imaging tool, relating the time–activity concentration in tissues and the basic functional parameters governing the biological processes being studied. Recent innovations in SPECT reconstruction techniques have allowed SPECT to move from relative/semi-quantitative measures to absolute quantification. The strength of PET and SPECT is that they permit whole-body molecular imaging in a noninvasive way, evaluating multiple disease sites. Furthermore, serial scanning can be performed, allowing the measurement of functional changes over time during therapeutic interventions. This CME session highlights the hot topics on quantitative PET and SPECT and discusses harmonization strategies, and the problems that have to be solved to be able to move toward validated and clinically accepted quantitative imaging biomarkers.

Key Words

Quantification, SPECT, PET, standardization, harmonization, SUV, Patlak analysis

Clinical use: dosimetry, therapy response monitoring, prognostication, stratification/differentiation, radiotherapy planning