Mid-Congress-Symposium 7
Dosimetry + Oncology & Theranostics + Physics Committee
Tuesday, October 27, 14:00-16:45

Session Title
Lutetium Therapy

Chairperson
Katarina Sjögreen Gleisner (Lund, Sweden)

Programme

14:00 - 14:25	Clemens Kratochwil (Heidelberg, Germany): Treatments using ^{177}Lu - The Roles of Image Analysis and Dosimetry
14:25 - 14:50	John Violet (Melbourne, Australia): Dosimetry & Radiobiology for [^{177}Lu]Lu-PSMA-Treatments, Whole-Body Tumour Dose
14:50 - 15:15	Mark Konijnenberg (Rotterdam, Netherlands): Dosimetry & Radiobiology for Tumours in Preclinical [^{177}Lu]Lu-DOTA-TATE Exposures
15:15 - 15:30	**Break**
15:30 - 15:55	Ann-Christin Eder (Freiburg, Germany): Salivary Gland Uptake in [^{177}Lu]Lu-PSMA Therapy - Current Status and Novel Approaches
15:55 - 16:19	Astrid Gosewisch (Munich, Germany): Image-Based Dosimetry for Bone Marrow in [^{177}Lu]Lu-PSMA Therapy
16:19 - 16:43	Francesca Botta (Milan, Italy): Texture Analysis for Quantification of Non-Uniformity

Educational Objectives

1. To see the perspective of the responsible physician on the clinical applicability and use of personalized dosimetry.
2. To learn about non-uniform distributions of activity and absorbed; between metastases in the same patient, within tumours, within normal organs such as the bone marrow and the salivary glands.
3. To know examples of methods developed to investigate, quantify and take non-uniformity into account, using preclinical and clinical imaging data.

Summary

With the marketing authorization of [^{177}Lu]Lu-DOTA-TATE and the increasing use of [^{177}Lu]Lu-PSMA, the use of personalized dosimetry is gaining in interest. The introduction of dosimetry in the clinical environment is a team effort and understanding the clinical needs, seen from the perspectives of both responsible physicians and medical physicists, is important to identify the appropriate applications and methods. Most often, the mean absorbed dose to tumours and normal organs is the quantity addressed as this is what can be accurately quantified by imaging with clinical cameras. However, non-uniformity in the absorbed dose distribution is a hallmark of radionuclide therapy with ^{177}Lu and can exist in both metastases and normal organs. The small-scale non-uniformity is governed by non-uniform activity distributions combined with the short-range beta particles. Pre-clinical studies can be performed to investigate such small-scale non-uniformity, in this session exemplified by

autoradiography studies of tumours and salivary glands. Non-uniformity may also exist on a large scale, such as the absorbed doses delivered to different metastases in the same patient, or the absorbed dose to different parts of the bone marrow in cases of bone tumor involvement. Efforts to address such non-uniformity in [^{177}Lu]Lu-PSMA treatments include the calculation of a whole tumour burden absorbed dose, and for bone marrow detailed Monte Carlo modelling studies. A method that has shown promise for quantification of non-uniformities in other imaging modalities is texture analysis and may also be applicable to images acquired for dosimetry purposes. The aims of this session are to elucidate the clinical applicability of personalized dosimetry in ^{177}Lu treatments and to show how non-uniformity in the absorbed dose delivery is being approached on different spatial scales.

Key Words
^{177}Lu, dosimetry, non-uniformity, tumours, salivary glands, bone marrow, texture analysis