

Vienna, Austria

Annual Congress of the
European Association of Nuclear Medicine

October 21 –25, 2017
Vienna, Austria

CTE 6 (Technologists/Dosimetry)

Tuesday, October 24, 16:30-18:00

Session Title

Imaging, Reconstruction and ROI Analysis Techniques for Dosimetry

Chairs

Pedro Fragoso Costa (Oldenburg)

Carlo Chiesa (Milan)

Programme

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| 16:30 - 17:00 | Mirjana Josipovic (Copenhagen): Image Reconstruction and Target Delineation on PET/CT for Radiotherapy Treatment Planning |
| 17:00 - 17:30 | Carlo Chiesa (Milan): Technical Challenges in 99mTc-MAA SPECT and 90Y PET Based Radioembolisation Dosimetry |
| 17:30 - 18:00 | Klaus Bacher (Ghent): Image Based Radionuclide Dosimetry Techniques |

Summary

Dosimetric investigations are fundamental for effective and safe radiation therapy. Both in external beam therapy (EBT) and radionuclide therapy, nuclear medicine imaging can provide the fundamental information to a correct patient dose prescription and dose assessment. Selective internal radioembolisation (SIRT) with Yttrium-90 microspheres, has proven to be an effective therapeutic alternative to chemotherapy-failing and non surgical elected patients in the treatment of liver metastases. To an adequate therapy dosimetric calculation, all the steps of imaging must be taken in consideration and corrected, including segmentation and ROI/VOI delineation techniques.

Radionuclide dosimetry will also be performed, either retrospectively or prospectively, in other radiotherapeutic applications in nuclear medicine. In peptide receptor radionuclide therapy (PRRT) and other targeted therapies with radionuclides, it has been becoming widely recognized that a personalized dosimetry approach can help plan treatment and improve understanding of the dose–response relationship. The main challenges in the applicability of this approach are related to the difficulty and time-consuming calculations that are needed to an accurate dose calculation.

This session will provide a comprehensible overview of the current applications of molecular techniques such as PET/CT and more recently SPECT(/CT) quantitative imaging that are used in clinical dosimetry. It is also intended to provide a practical-oriented insight, in order to promote technologist involvement on the ever growing field of radionuclide therapy.

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Educational Objectives

- Understand the underlying physical principles and calculations that allow an image based dosimetry approach
- Critically reflect on the ROI delineation / user influence for the determination of patient specific dosimetry applied to external radiotherapy planning and radionuclide therapy
- Point the fundamental differences between external beam therapy and radionuclide therapy
- Describe the basic scheme for internal radiation dosimetry
- Describe the physical basis for radioembolisation
- Define the technologist role within the multidisciplinary team involved in radionuclide and external beam therapy
- Understand the technologist role in the mapping and implantation phases in radioembolisation

Key Words

Dosimetry, Radiotherapy, Radionuclide Imaging, PET

Take Home Message

Image based dosimetry is a fundamental tool for radiotherapeutic applications in nuclear medicine. Technologists should be aware of this shift and possible opportunities to specialise their skills.