Joint Symposium 11
Neuroimaging + Oncology & Theranostics Committee / European Association of Neuro-Oncology (EANO)
Accessible on-demand at any time

Session Title
Advancements in Neuro-Oncology

Chairperson
Egesta Lopci (Milan, Italy)

Programme
29 min Laszlo Papp (Vienna, Austria): Artificial Intelligence in Glioma Imaging
29 min Nathalie Albert (Munich, Germany): New PET Tracers for Brain Tumour Imaging
29 min Joerg-Christian Tonn (Munich, Germany / EANO): The 2020 EANO Guidelines on Diagnosis and Management of Gliomas - Take-Home Messages for the Clinician
3 min Session Summary by Chairperson

Educational Objectives
1. To learn about the current status, opportunities and challenges of AI-based methods for brain tumour imaging
2. To get an overview on new PET tracers beyond amino acids for brain tumour imaging
3. To understand the clinical impact of molecular markers within the new brain tumour classification

Summary
Gliomas are the most common primary tumours of the CNS and associated with a poor prognosis. Therefore, further developments in neuro-oncological diagnostics and therapy are required in order to improve the outcome of brain tumor patients. Major challenges in the treatment of brain tumors are the reliable delineation of vital tumour tissue (in terms tumour extent as well as differentiation between treatment-related changes and tumour recurrence), the depiction of tumour heterogeneity as well as a more detailed characterization of the tumours for individualized therapy.

In this context, PET diagnostics has already gained considerable importance in brain tumour imaging over the past decade. Advanced image evaluation approaches using artificial intelligence based methods appear promising to improve image analysis. By extracting radiomic parameters, tumour heterogeneity can be better recorded and tumours can be further classified using machine learning algorithms. Tumour recurrences can be detected and differentiated from pseudoprogression or radionecrosis with higher accuracy. In addition to the use of AI-based image analysis, new PET tracers beyond radiolabelled amino acids represent a promising tool to improve tumour imaging. Of interest are e.g. PET tracers that represent the tumor microenvironment or that identify potential target structures for theranostic
approaches. Further developments in glioma diagnostics that are substantially influencing the management of brain tumour patients are reflected in the new WHO classification of brain tumours, which ensures a more detailed stratification of the tumours according to molecular parameters. While the 2016 updated WHO classification included the IDH mutation status and 1p/19q codeletion as most important parameters, the new WHO classification includes numerous further parameters such as the TERT promoter mutation status, EGFR gene amplification or CDKN2A/B homozygous deletions.

This session gives an overview on the latest advancements in brain tumours diagnostics, the associated challenges and implications for the clinical management of glioma patients.

Key Words
Brain tumour imaging, amino acid PET, artificial intelligence, radiomics, machine learning, molecular markers, new WHO classification of brain tumours