the contrast-enhanced MRI imaging. CTV2 encompassed the whole brain. Only the PTV1 dose was escalated (planned dose escalation: 35 Gy, 40 Gy, 45 Gy, 50 Gy) while the PTV2 dose remained the same (30 Gy/3 Gy/fractions). Dose-limiting toxicities (DLTs) were defined as any treatment-related non-hematological adverse effects rated as grade ≥ 3, or any hematological toxicity rated as ≥ 4 by CTCAE scale, v. 4.0. MTD was exceeded if ≥ 2 of 6 patients in a cohort experienced dose-limiting toxicity (DLT).

Results: 27 consecutive patients (pts) were treated (PTV1 dose: 35 Gy, 8 pts; 40 Gy, 6 pts; 45 Gy, 6 pts; 50 Gy, 7 pts). The number of treated brain lesions was: 1 (17 pts), 2 (4 pts), 3 (5 pts) and 4 (1 pt). Three pts experienced a DLT: 1 pt (2nd dose level) developed a grade 3 skin toxicity, 1 pt had a grade 3 neurological toxicity (4th dose level) and 1 pt had a brain hemorrhage (4th dose level). Nineteen pts experienced cutaneous (17 pts) and/or neurological (10 pts) grade 1-2 acute toxicity. The response to treatment was evaluable in 16 pts: 1 pt (6.2%) disease progression, 2 pts (12.5%) stable disease, 10 pts (62.5%) partial response and 3 pts (18.8%) complete response. Median and 1-year overall survival were 13 months and 51.9%, respectively. Late toxicity was not recorded.

Conclusions: This is the first prospective trial demonstrating that a radiation dose of 50 Gy in 10 fractions can be delivered by using a SIB IMRT technique without unacceptable toxicity in patients with ≥ 5 brain metastases. A phase II trial (ISIDE-BM-2) is in progress to evaluate the response and the time to progression.

OC-0059
Validated clinical model for survival prediction after stereotactic radiotherapy for brain metastases
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Purpose/Objective: Stereotactic ablative body radiotherapy (SABR) is the standard treatment modality for a limited number of brain metastases (BM). Several models for survival prediction have been published, such as the commonly used Recursive Partitioning Analysis (RPA), Golden Grading System (GGS), and the Disease Specific Graded Partitioning Analysis (DS-GPA). All published models have limitations for prediction of survival after SABR for BM: e.g. small proportion of patients in the favorable prognostic group, a low sensitivity for the identification of patients with long term survival, and some models are complex to use (e.g. DS-GPA). In this study, a new prognostic model is developed with the aim of overcoming above mentioned limitations.

Materials and Methods: Based on published models and clinical practice a new prognostic model was developed. Its clinical utility was tested for prediction of early death (<3 months) and long term survival (≥12 months) in 297 patients with 1 up to 4 newly diagnosed BM treated with Linac-based SABR at our department between July 2004 and July 2014. Prescribed dose at the edge of the PTV was in the range of 15 up to 24 Gy in 1 or 3 fractions.

Results: In the published models the two most important prognostic factors were: WHO performance status and presence of extracranial metastases. Poor performance status only was identified as the poor prognostic group according to Dutch guidelines. Remaining patient cohort was divided based on the presence of extracranial metastases. The developed model is a simplified version of the commonly used RPA, and was named Simplified Recursive Partitioning Analysis (SRPA).

Conclusions: The SRPA had the highest clinical utility for survival prediction after SABR for BM compared to the RPA, DS-GPA, and GGS. The SRPA is very simple in use, assemblies to clinical practice, has a balanced patient distribution between the favorable and intermediate group, the highest sensitivity for prediction of long term survival, was specific for prediction of early death, and was validated in an external population. Further research will focus on further validation in other BM populations and exploration of the predictive value of advanced techniques such as radiomics, biomarkers, and statistical modeling.
The heterogeneity of the distribution of anti-cancer agents is critical for effective cancer treatment. The use of biomarkers, such as anti-EGFR antibodies, can help in assessing the tumor response to treatment. The toxicity assessment showed that all patients could finish their treatment without delay. Acute toxicities were as expected from a curative chemoradiation treatment in the head and neck area.

**Participating centres**: The Netherlands Cancer Institute, Amsterdam; Karolinska Institutet, Stockholm; MaastrichtUMC+; Va’d’Hébron Hospital, Barcelona; INSLER, Paris; RaySearch, Stockholm; Christie Hospital, Manchester; Institut Gustave Roussy, Villejuif.

**SP-0061**

**Head and neck cancer: FDG imaging and beyond**


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In the age of personalized medicine, information about the tumour characteristics guiding treatment decisions prior to and during therapy is of crucial importance. Local progression or peritumoral inflammation has been shown to influence the outcome of a patient. Antibody-based PET tracers such as 89Zr-labeled cetuximab, which specifically bind to the epidermal growth factor receptor (EGFR), can be utilized for assessment of presence, proliferation and resistance mechanisms early during the course of treatment, which can discriminate responders from non-responders. With such information available shortly after the start of treatment, modifications can be implemented or the radiation treatment plan can be adapted tailing the biological response pattern. The most commonly applied PET tracer - 18FDG - has shown prognostic value and volumes of increased cellular metabolism, but requires careful interpretation due to uptake in non-malignant tissues or peritumoral inflammation. Several studies have demonstrated a prognostic value of 18FDG PET imaging before and during therapy based on quantification or volumetric characteristics. Ongoing investigations evaluate utilization of 18FDG signal as a basis for radiotherapy dose redistribution. A number of PET tracers associated with tumour cell hypoxia, e.g., 18FMISO and 18FAZA, have shown prognostic value and may guide individualized therapy, i.e., the addition of hypoxia-modulating agents or dose-escalation to radioresistant tumour subvolumes.

**18FLT-PET** can be used repetitively to characterize tumour proliferation before and during treatment, facilitating adaptive radiotherapy and other tailored treatment strategies. Antibody-based PET tracers such as 89Zr-labeled cetuximab, specific to the epidermal growth factor receptor (EGFR), can be utilized for assessment of presence,