studies use local institutional approaches to manage imaging information for these purposes?
All these issues need to be resolved before widespread implementation into clinical practice can take place. Molecular and functional imaging and its evaluation has to be validated and proven to be useful in multicenter studies. Advanced solutions need to be established to incorporate multiparameter information from e.g. tumor biopsy immunohistochemical analysis and gene-arrays into decision-making processes for specific imaging modalities, individualized treatment and treatment evaluation pathways. The first multicenter studies with these goals in mind are now being established.

SP-0434
Adaptive radiation therapy by the example of head and neck cancer: is there any role for a RTT?
B. Speleers[1], M. Madani[2], M.S. Olteanu[3], I. De Gersem[1], M. Duprez[3], M.S. Vercauteren[3], M.D. Berwouts[3], M. De Neve[3]
[1]*Ghent University, Department of Radiotherapy, Ghent, Belgium*
[2]*University Hospital Zürich, Department of Radiation Oncology, Zürich, Switzerland*
[3]*Ghent University Hospital, Department of Radiotherapy, Ghent, Belgium*

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Changes in the tumoras well as normal tissues and organs surrounding the tumor during and/or in response to radiation therapy require treatmentadaptation. A need for adaptive radiation therapy (ART) is not obvious for alltumors, but head-and-neck cancer, for which substantial changes in tumor andparotid gland geometry and dosimetry have been shown [1]. Moreover, biologicchanges in the tumor may require treatment adaptationas well [2]. Logistics of ARTis complex and hampered by a lack of personnel and robust technical tools. Theworkflow is usually not well-defined and well-supported by commercial oncologyinformation and treatment planning systems. Nevertheless, an increasing numberof academic centers introduce ART in their practice as has done it inDepartment of Radiotherapy, Ghent University Hospital. In this talk theworkflow of ART for head-and-neck cancer on the example of this particularcenter will be discussed in more detail including the roles of personnel withemphasis on RTTs, their current responsibilities and their possible empowermentin the frame of ART.

References
1. Brouwer CL, Steenbakkers RJ,Langendijk JA, Sijtsema NM. Identifying patients who may benefit from adaptiveradiotherapy: Does the literature on anatomic and dosimetric changes in headand neck organs at risk during radiotherapy provide information to help?Radiother Oncol 2015; 115: 285-294.
2. GeetsX, Daisne JF, Tomsej M et al. Impact of the type of imaging modality on targetvolumes delineation and dose distribution in pharyngo-laryngeal squamous cellcarcinoma: comparison between pre- and per-treatment studies. Radiother Oncol2006; 78: 291-297.

SP-0435
Dosimetric impact of dose painting and replanning: ARTFORCE project
J.J. Sonke[1]
[1]*Netherlands Cancer Institute, Department of Radiation Oncology, Amsterdam, The Netherlands*

In the ARTForce project, two international clinical trials are conducted. The first trial (NCT01504815) for locally advanced head-and-neck cancer patients is a phase two trial randomizing between standard chemo-radiotherapy, redistributing the dose in the PTV of the primary tumor. Instead of a homogeneous dose of 70Gy in 35 fractions, an inhomogeneous dose is optimized based with a minimum dose of 64 Gy at the edge of the PTV and a maximum dose of 84 Gy around the FDG PET SUVmax location. Additionally, in the experimental arm, the treatment plan is adapted after two weeks to account for anatomical changes. The second phase 2 trial (NCT01024829) for locally advanced lung cancer patients randomizes between dose escalation to the primary tumor >= 72 Gy in 24 fractions and dose escalation to the region of the tumor defined by the 50% of FDG PET SUVmax. Both treatment plans are optimized to have an equal mean lung dose. In this presentation, dosimetric differences between the arms in both trials will be discussed as well as the impact of anatomical changes on the delivered dose and the effectiveness of replanning to mitigate dose discrepancies.

Symposium: Secondary cancer after radiotherapy: from cancer registries to clinical implications

SP-0436
Radiotherapy-related second cancer risks from epidemiological studies, and their application to newer therapies
A. Berrington de González[1]
[1]*Center for Global Health National Cancer Institute, Division of Cancer Epidemiology and Genetics DCEG, Rockville- MD, USA*

Second cancers are an important cause of morbidity and mortality in cancer survivors. One in five cancers diagnosed in the US are now second cancers. The causes of second cancers include lifestyle factors, genetic predisposition and also the treatment for the first cancer, including radiotherapy. In the last decade there have been a large number of new studies that have advanced our understanding of the risk of second cancers after radiotherapy. The most informative studies provide dose-response relationships based on individual dose-reconstruction. These studies suggest that the second cancer risk generally increases linearly with dose, even at organ doses ≥60Gy. This is contrary to earlier theories that the dose-response would flatten or even have a down-turn at higher doses because of cell killing. The magnitude of the risk from these fractionated high-dose exposures is, however, 5-10 times lower than the risk from acute exposures of <2Gy among the Japanese atomic bomb survivors. The results from these detailed observational studies provide insights into radiation carcinogenesis from fractionated high-dose exposures, and can be used to develop second solid cancer risk projection models for newer radiotherapy techniques.

SP-0437
Modelling of secondary cancer risks
U. Schneider[1,2]
[1]*Clinic Hirslanden Zürich, Institute of Radiotherapy, Zürich, Switzerland*
[2]*University of Zürich, Institute of Physics- Science Faculty, Zürich, Switzerland*

In developed countries, more than half of all cancer patients receive radiotherapy at some stage in the management of their disease. However, a radiation-induced secondary malignancy can be the price of success if the primary cancer is cured or at least controlled. Therefore, there is increasing concern regarding radiation-related second cancer risks in long-term radiotherapy survivors and a corresponding need to be able to predict cancer risks at high radiation doses. Of particular interest are second cancer risk estimates for new radiation treatment modalities such as intensity modulated radiotherapy, intensity modulated arc-therapy, proton and heavy ion radiotherapy. The long term risks from such modern radiotherapy treatment techniques have not yet been determined and are unlikely to become apparent for many years, due to the long latency time for solid tumor induction. Most information on the dose-response of radiation-induced cancer is derived from data on the A-bomb survivors who were exposed to gamma-rays and neutrons. Since, for radiation protection purposes, the dose span of main interest is between zero and one Gy, the analysis of the A-bomb survivors is usually focused on this range. With increasing cure rates, estimates of cancer risk for doses larger than one Gy are becoming more important for