Risk factors for local recurrence in breast cancer after breast conserving therapy (BCT) differ from those for local recurrence after mastectomy. To better guide optimal treatment of individual patients, it is desirable to identify patients at high risk for local recurrence. Several clinical and histopathological factors, such as young age and presence of ductal carcinoma in situ, are known to be predictors for local recurrence after BCT. After mastectomy lymph node status and tumor size are dominant risk factors for local recurrence. Extensive research was therefore aimed at developing and validating biomarkers to predict a local recurrence after BCT. Recent gene expression profiling studies are already in clinical use for predicting prognosis and guiding the indication for adjuvant systemic therapy and in some cases also the type of chemotherapy.

New published and unpublished data reveal that these and other gene expression profiles may be used to predict local recurrence after BCT or RM. Although the variation in different subtypes in breast cancer and the difference in amount of tumor burden remaining after surgery, makes that finding robust predictive profiles is still complex. During this teaching lecture biomarkers will be presented for predicting local recurrence after mastectomy and BCT, and they also will be related to the outcome of some recent clinical trials.

MRI for radiotherapy planning

E. Rummeny1, M. Molls2

1University of Munich, Department of Radiology, Munich, Germany
2University of Munich, Department of Radio-Oncology, Munich, Germany

High dose radiation therapy requires accurate localization of the tumor volume and its relationship to surrounding normal tissue. Further parameters that influence the results of radiation therapy are mainly related to tumor characteristics and the radiation technique used. As compared to CT, radiotherapy planning with MRI has major advantages. Tumor delineation is improved due to its superior soft tissue contrast. Furthermore, functional data such as the oxygenation status, pH, and the tissue temperature of the tumor can be obtained. In addition MRI does not use ionizing radiation. Therefore, MRI may be optimal for radiotherapy planning. However, because of difficulties in image interpretation and image distortion as well as missing radiation absorption information it is currently not used routinely. Therefore CT is still used more frequently. Thus methods are being developed to convert MRI tissue intensities into HU data surrogates for radiation planning.

Using new fast pulse sequences and standard plastic radiation therapy immobilization casts with MR positive surface markers, MRI may be used. Thus methods are being developed to convert MRI tissue intensities into HU data surrogates for radiation planning. In addition MRI does not use ionizing radiation. Therefore, MRI may be optimal for radiotherapy planning. However, because of difficulties in image interpretation and image distortion as well as missing radiation absorption information it is currently not used routinely. Therefore CT is still used more frequently. Thus methods are being developed to convert MRI tissue intensities into HU data surrogates for radiation planning.

SP-0194 Functional MRI: how can it assist IMRT

R. Beets-Tan1

1Maastricht Radiation Oncology (MAASTRO), Radiation Oncology, Maastricht, The Netherlands

Intensity-modulated radiotherapy (IMRT) has provided a means for shaping the dose distribution not only to the geometry but also to the differences in radiobiology across tumors. This information on tumor biology and heterogeneity can be derived from functional images. The spectrum of imaging biomarkers consists of imaging of tumor metabolism (PET with new tracers), angiogenesis (perfusion MRI), cellularity (diffusion MRI) and hypoxia (FMISO PET and BOLD MRI). Apart from that, automated segmentation of imaging data, provides per pixel measurement of the heterogenous characteristic of the tumor in a objective way and improves the assessment of response to radiation oncology by imaging. This lecture is to learn about the range of MR imaging biomarkers that can be used for markers of tumor microenvironment and heterogeneity and to understand how these biomarkers can assist IMRT in radiotherapy.