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Dear MAGNETOM Flash reader,

As radiologists, we are important partners of the interdisciplinary oncology team. The increasing complexity of diagnostic and treatment processes brings with it the need for ever closer collaboration among physicians in surgery, internal medicine, radiation therapy and radiology. And with many tumor diseases, imaging plays a key role in treatment decision making.

The rapid development of MRI and computer technology has provided us with impressive tools that allow us to detect and functionally/biologically characterize tumors with ever more accuracy. For many tumor entities, early detection, precise diagnosis, image-guided biopsy, staging of local and distant tumor growth, tumor characterization, treatment planning, treatment, treatment monitoring and follow-up essentially rely on imaging data. Changes of imaging parameters during treatment provide important information with regard to individual responses to treatment. Imaging is also an indispensable tool in oncology research and in the development of new oncological treatment procedures.

Particularly close links already exist but will increasingly be expanded between radiology and radiation

oncology. With the continued advancement of high-precision radiation therapy, time-resolved 4D and functional/biological MRI techniques are becoming increasingly important for target volume definition in radiation therapy planning as well as for intra- and interfractional tumor tracking. These imaging parameters are also essential for treatment monitoring and post-treatment follow-up supporting quality assurance and further improvement of therapy approaches.

MR imaging covers a wide range of techniques from time and spatially resolved high-resolution multiparametric MRI with e.g. diffusion and perfusion weighting through to whole-body MRI and PET/MRI with specific radiotracers. In future, it will be increasingly important that these complex examinations are performed and interpreted in a standardized way. Objective and quantitative image parameters can be used as biomarkers for individual tumor characterization and thus the stratification of patients. Oncological imaging can, in this way, contribute significantly to individually tailored patient treatment and objective assessment of treatment response. Prospective multicenter

studies, which are essential in clinical research, often use imaging parameters as end points. At present, it is common practice to use the merely morphological but internationally recognized RECIST criteria for solid tumors. But new functional MRI techniques will be of substantial importance for early assessment and further improvement of targeted therapies.

Another challenge is the collaboration among us radiologists, as modern MRI technology provides us with methods and concepts that go far beyond our organ-related subspecialization. Malignant tumors have *per se* infiltrative and metastatic potential why they should be considered systemic diseases that can affect the whole body until proven otherwise. It may therefore be necessary to image several body regions and organ systems respectively, or even the whole body in order to spy out distant tumor growth and metastatic spread. In the case of primary systemic tumor diseases such as hematologic tumors and tumors of the lymphatic system, this is mandatory.

Oncological radiology, however, is more than just performing complex MRI examinations. The entire proce-

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From examination through to image postprocessing, standardized reporting, suitable report documentation, report communication as well as integration into treatment and treatment monitoring is a multi-layered, complex process that poses many challenges. These can only be met with the help of advanced IT concepts. Intelligent and process-oriented IT allows us to master modern MRI techniques in daily practice and is indispensable for competent interdisciplin-

ary communication. Only in this way can the complex and comprehensive image information be of benefit in ensuring optimal individual treatment of cancer patients.

In this MAGNETOM Flash magazine you will find exciting examples from the broad spectrum of oncological MRI applications. Using clinical examples, renowned experts demonstrate the potential of multiparametric MRI, whole-body MRI and MR-PET and how functional MRI parameters can

be used in radiation therapy planning. In addition, the possibilities of intelligent IT concepts for reporting and workflow optimization are illustrated.

I hope you find the articles interesting and exciting and wish you much success in your daily work for the wellbeing of your patients!

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