NEW TECHNOLOGIES IN IMAGING

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The importance of diagnostic modalities in the management of lung tumors is growing. Advanced imaging besides the molecular histologic and genetic profiling plays a vital role in therapeutic decision making. Characterisation of tumor sites allows to reach much higher level of precision then ever. We are experiencing an explosive growth of innovative technologies allowing new insights in the function and morphology by improving the resolution of the imaging modalities and the development of new tracers for nuclear medicine methods. The amount of information produced by these concepts is growing, the analysis of such big data assisted by machine learning and artificial intelligence builds a platform for radiomics, which analyses the relations between genotype and imaging features of the disease processes. Diagnostic imaging merges with therapy in the theranostic concept – the same molecular probes are used for imaging and therapy, differing in the radionuclide used for labelling.

The quality of images will grow with the routine implementation of total body scanners, also allowing the decrease of radiation burden and bringing new possibilities in tracer accumulation dynamics analysis. The spectrum of new radiopharmaceuticals extends the horizons of in vivo tissue characterisation beyond metabolic imaging with ^{18}F-fluorodeoxyglucose together with new treatment options. New approaches to image quantification are evolving such as metabolic tumor volume assessment. Their potential role in prognosis estimation and therapeutic effect evaluation are being investigated. The abovementioned trends seem to build a basis for the evolution in nuclear medicine resulting in more personalised treatment, tailored specifically for the patient and for the individual disease subtype.

We present a review lecture summarizing new trends in imaging in lung cancer with the focus on nuclear medicine.