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Annual Congress of the
European Association of Nuclear Medicine

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CTE7

Technologist Committee

Wednesday, October 16, 10:00-11:30

Session Title

Updates in Lung Imaging

Chairpersons

Andrea Santos (Lisbon, Portugal)

Agata Pietrzak (Poznan, Poland)

Programme

10:00 - 10:25 Domenico Albano (Brescia, Italy): New PET Radiotracers for Lung Imaging

10:25 - 10:50 Witold Cholewinski (Poznan, Poland): Metabolic Volumes Delineation for External Beam Radiotherapy and its Prognostic Role in Lung Cancer

10:50 - 11:15 Margarita Kirienko (Milan, Italy): Radiomic Features in Non-Small-Cell Lung Cancer FDG-PET/CT Studies

11:15 – 11:30 Discussion and Closing

Educational Objectives

1. Present briefly the anatomy, physiology and most common lung pathologies
2. Review the clinical indications for performing lung isotopic imaging
3. Describe the most common lung pathologies in the term of benign and malignant lesions differential diagnosis (i.e. lung cancer and sarcoidosis)
4. Discuss the importance of radiomics in lung cancer diagnose.
5. Highlight the role of the nuclear medicine imaging in the lung cancer patients' management
6. Indicate the role of introducing new tracers into lung cancer patients' management
7. Explain the value of radioisotope imaging in the lung cancer patients' staging, restaging, radiotherapy and surgery planning and its possible advantages over other imaging techniques
8. Discuss the advantages of specific radiopharmaceuticals in comparison with commonly used 18F-FDG PET/CT (new tracers versus new solutions, i.e. additional study protocols, metabolic and volume indices evaluation)
9. Describe in detail the method of segmentation used for radiotherapy planning purposes
10. Present the metabolic volume assessment using the PET/CT method

Summary

Lung neoplasm is one of the leading causes of the cancer mortality worldwide. The most common histologic type is the non-small-cell lung cancer (NSCLC; up to 90% lung neoplasms). The increasing role of the radioisotope methods of imaging in lung cancer staging, restaging and radiotherapy planning demands improving standard procedures with additional modalities (radiomics) and study protocols or more specific radiotracers.

The commonly used fluorine-18-fluorodeoxyglucose (18F-FDG) positron emission tomography/computed tomography (PET/CT) study is used as an accurate imaging tool in cancer of unknown primary (CUP syndrome) investigation and metastatic lymph nodes pre-operative assessment, while in several conditions is not a specific enough diagnostic tool (i.e. differential diagnosis of some benign and malignant lesions within the chest region), therefore the additional study protocols (i.e. delayed imaging) and radiomics seem to be of value. Moreover, the nuclear medicine instrumentation and radiopharmacy development offer the possibility to improve the PET/CT procedure accuracy with new, more specific radiotracers, i.e. fluorine-18-fluorothymidine (18F-FLT), which has been recognized are highly useful in the lung cancer staging.

Although, the several investigators discussed the advantages of 18F-FLT and fluorine-18-alfa-Methyltyrosine (18F-FMT) over the 18F-FDG in the lung cancer evaluation, the availability of these radiotracers is still insufficient to make them commonly used in the oncological patients' management worldwide. Thus, the radiomics and standard PET/CT study protocols improvement seem to be critical.

The aim of the radiomics construction and interpretation is to choose and collect the metabolic and volume parameters which might be used in the images post-processing and further data analysis using the criteria connected with the study objective (i.e. CUP syndrome, pre-operative assessment, radiotherapy planning). Moreover, the multi-modality imaging and developed scans reconstruction might be used in accordance with any PET/CT-dedicated radiopharmaceutical.

Although the lung cancer PET/CT research has been widely investigated before, the updates in this matter are needed due to the increasing lung cancer incidence affecting high mortality which suggests the necessity of improving standard procedures with new modalities, procedures and radiotracers.

Key Words

Lung Imaging, PET/CT, Radiomics, Multi-modality imaging, Metabolic activity, Metabolic tumor volume