The utility of PET-CT in baseline and sequential characterisation of Pulmonary Pleomorphic Carcinoma

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Pulmonary Pleomorphic Carcinomas (PPCs) represent a rare and aggressive subtype of Non-Small Cell Lung Cancer (NSCLC) that can only be definitively diagnosed on a surgical specimen. This study utilised PET-CT to evaluate radiological characteristics of PPCs.

This study retrospectively evaluated the radiological characteristics of PCCs diagnosed in St James's Hospital Dublin between 2012-2023. Computed Tomography (CT) and Positron Emission Tomography (FDG-PET) imaging features (size, location, density, shape, invasion, and growth kinetics) and standard uptake value for each lesion were evaluated.

39 PCCs were identified with a mean age of 66.5 years (range: 49-82 years). FDG-PET was performed in all 39 cases. Tumours demonstrated a high FDG uptake at baseline with a mean (SUV) of 12.6 (range: 1.4 - 36.9). A second interval PET-CT on average 3.3 months after the first in 3 cases demonstrated over 120% increase in SUV. The mean tumour size was 4.3 cm (range: 1.0 - 14.5 cm). Tumours developed rapid interval growth, reaching a mean maximum diameter of 6.6 cm (53.4%) within a mean of 2.1 months. Tumours were predominantly located in the upper lobe (71.8 %) and displayed necrotic features in 53.8 % of cases. 82.1% of tumours invaded the mediastinum.

This study describes the largest cohort of Pulmonary Pleomorphic Carcinoma in the literature. Tumours demonstrate a high SUV on baseline imaging and demonstrate rapid growth on interval imaging and central necrosis.

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