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Complete Response to Combination Therapy with ^{177}Lutetium PRRT and Capecitabine in the Treatment of Thymic Squamous Cell Carcinoma

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Background: Thymic carcinoma is a highly aggressive malignancy and carries a poor prognosis when metastatic. Some thymic carcinomas express somatostatin receptors. Peptide Receptor Radionuclide Therapy (PRRT) is currently utilized in clinical trials in the treatment of neuroendocrine tumors (NETs) due to somatostatin receptor expression. Capecitabine has shown tumor response in thymic carcinomas and it has also been used as a radiosensitizer during PRRT treatments in NETs.

Case report: A 70 year old nonsmoker Caucasian male presented with cough and severe fatigue in August 2013. CT scan of his chest showed an anterior chest mass measuring 48x20 mm and multiple liver lesions.18F-FDG- PET/CT scan confirmed the same findings. In 11/2013 a CT guided biopsy revealed moderately differentiated squamous cell carcinoma of the thymus. Chemotherapy with Cisplatin, Cyclophosphamide, Vincristine and Adriamycin (CVAP) was administered from 11/2013 to 2/2014. After initial mixed response he later on progressed in May of 2013. An Octrescan was performed in 5/2014, which showed intense somatostatin receptor activity in

the same lesions seen on PET/CT scan. He was enrolled in a clinical trial of Peptide Receptor Radionuclide Therapy with ^{177}Lutetium-DOTATATE in our center. Capecitabine was added in combination for the known antitumor and radio-sensitization properties. A baseline Ga68-DOTATATE PET/CT scan showed increased tracer uptake in the enlarged thymus also in the liver and the lung masses with SUVs of 15 and 7.10.

After the first cycle of PRRT plus Capecitabine treatment his repeat images with MRI and Ga89 PET/CT scan showed a dramatic response and near to complete resolution of liver and lung lesions.

Ga68 PET/CT DOTATATE was repeated before initiation of Cycle 3 in 9/2014. Complete resolution of the abnormal uptake throughout the liver was seen. Abdominal MRI also showed total resolution of the conglomerate mass in the liver with a residual lesion measuring 15mm in the right lobe of the liver. Imaging was repeated in 2 month intervals. At 7 month post end of the treatment he remains free of detectable disease on imagines and he clinically improves dramatically.

Conclusion: Thymic carcinoma with squamous cell differentiation is a rare but highly aggressive malignancy. Chemotherapy options are limited and the response is modest and short. This cancer is known to express somatostatin receptors. The combination of capecitabine and ^{177}Lu-DOTATATE PRRT showed dramatic response in our case. To our knowledge this is the first case reported of a patient treated with this combination with complete response on imaging and laboratory evaluation. PRRT with or without Capecitabine should be further investigated in the treatment of this malignancy.