SSTR antagonists as theranostic option in small cell lung cancer

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Small cell lung cancer (SCLC) is an extremely aggressive tumor with a dismal prognosis [1]. Despite multimodal treatment including chemotherapy, external beam radiation therapy and immunotherapy, the 5-year overall survival rate remains below 10% [2] and novel therapeutic approaches are urgently needed. Given the overexpression of somatostatin receptors (SSTR) in a substantial subset of tumors [3], peptide receptor radionuclide therapy (PRRT) might represent a suitable novel treatment option. However, pilot studies evaluating PRRT with radiolabeled SSTR agonists have not shown conclusive results to date [4]. Despite various established agonistic tracers such as DOTATOC or DOTATATE, SSTR antagonists have recently been considered a novel promising theranostic option, as they provide higher tumor uptake and longer target retention as compared to agonists [5].

We report two SCLC cases that underwent PET/CT imaging with the SSTR antagonist SSO120* to evaluate the potential for SSTR-targeted PRRT. While all tumor lesions from patient 1 showed intense tracer uptake (**A**), they were PET negative in patient 2 (**B**). In line with imaging results, immunohistochemical workup of biopsies from the respective primary tumors (white arrows) showed intense membranous SSTR expression in patient 1 (**C**; immunoreactive score [IRS] 12/12; SUV_{max} 39.8), but not in patient 2 (**D**; IRS 0/12; SUV_{max} 3.4).

We conclude that PET/CT with SSTR antagonists might serve as a non-invasive proxy of tumor biology and PRRT might be a viable theranostic option for patients with SSTR expressing SCLCs. Future studies investigating optimal patient selection and (combination) treatment protocols are highly warranted.

*SSO120 (INN: satoreotide trizoxetan) is also known as NODAGA-JR11, OPS202 and IPN01070

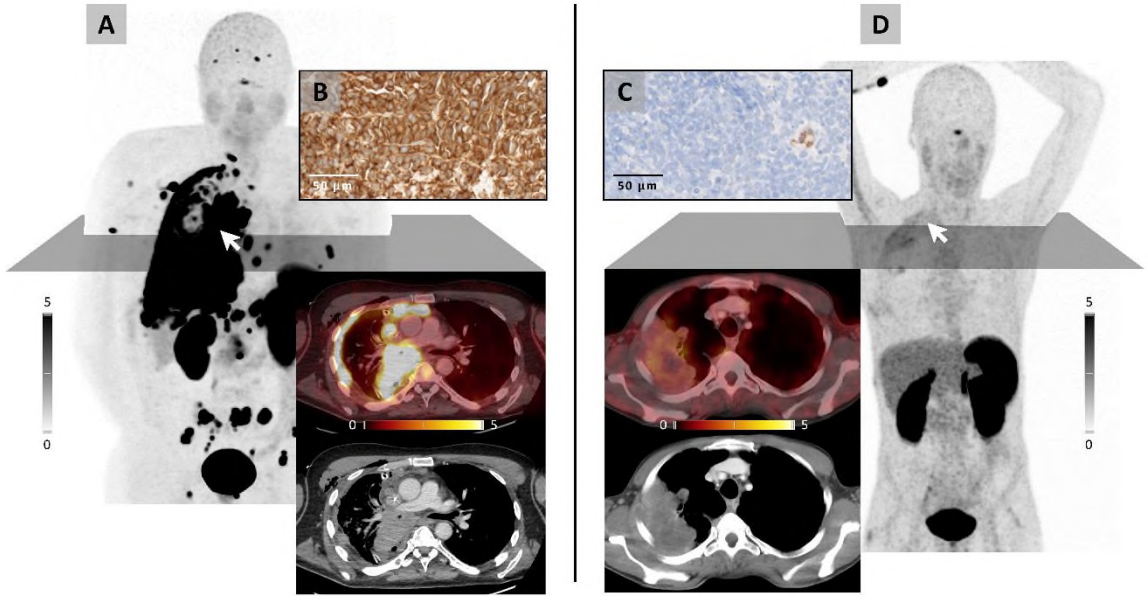

Figure 1: Maximum intensity projection of somatostatin receptor (SSTR)-antagonist positron emission tomography (PET) and transaxial hybrid imaging showing intense tracer uptake in all tumor lesions in patient 1 (A). In contrast, patient 2 (B) presents with PET-negative disease. Immunohistochemical workup of biopsies from the respective primary tumors (white arrows) confirms intense membranous SSTR expression on the tumor cell surface in patient 1 (immunoreactive score [IRS]: 12; C), whereas somatostatin receptor expression is absent in patient 2 (IRS: 0; D).

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