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Meeting Report | Oncology: Basic, Translational & Therapy

Ac-225-DOTATOC - an empiric dose finding for alpha particle emitter based radionuclide therapy of neuroendocrine tumors

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Abstract

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Objectives There are no established dosimetry tools to predict toxicity of “targeted alpha-therapy” (TAT), yet. We conducted an empiric dose escalation to find the maximum tolerable dose (MDT) of single cycle and fractionation concepts for Ac-225-DOTATOC radionuclide therapy.

Methods According to Declaration of Helsinki’s “Unproven interventions in Clinical Practice” we performed 46 treatment cycles in 34 patients with progressive neuroendocrine tumors (NET). After each cycle acute toxicity was documented according to CTCAE criteria. First observations are also available for chronic kidney toxicity as the follow up for the first 17 patients has now reached 2 years.

Results The MTD of a single cycle Ac-225-DOTATOC was considered to be 40 MBq. Multiple fractions were tolerated with 25 MBq every 4 months or 18.5 MBq every 2 months. Cumulative activities of 75 MBq were found tolerable in regard to delayed toxicity. The radiologic treatment response that was observed in some patients is without clear preference of a particular fractionation concept until now.

Conclusions We present a well tolerable treatment protocol for TAT with Ac-225-DOTATOC in NET patients that also demonstrated promising treatment efficacy in various patients. If TAT provides general advantages in comparison to beta emitter based radionuclide therapy cannot be derived from the available data, yet. Comparative trials are needed in the future.

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Alfred Morgenstern et al., J Nucl Med, 2012

Regional ²¹³Bi-DOTATOC peptide receptor alpha-therapy in patients with neuroendocrine liver metastases refractory to beta-radiation

Clemens Kratochwil et al., J Nucl Med, 2011

Preclinical evaluation of ²¹²Pb-based alpha-particle therapy for neuroendocrine tumors: dosimetry and potential toxicities

Dongyoul Lee et al., J Nucl Med, 2019

Treatment with ¹⁷⁷Lu-DOTATOC of Patients with Relapse of Neuroendocrine Tumors After Treatment with ⁹⁰Y-DOTATOC

Flavio Forrer et al., J Nucl Med, 2005

Optimizing the treatment regimen for targeted alpha therapy of mCRPC with ²²⁵Ac-PSMA-617

Frank Bruchertseifer et al., J Nucl Med, 2019

Initial experience with locoregional radioimmunotherapy using ¹³¹I-labelled monoclonal antibodies against tenascin (BC-4) for treatment of glioma (WHO III and IV)

G. Pöppel et al., Nuklearmedizin, 2002

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