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Safety of Lutetium-177 DOTATATE Treatment in Patients with Advanced Neuroendocrine Tumors and Extensive/ Innumerable Bone Metastases

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BACKGROUND

Peptide receptor radionuclide therapy (PRRT) utilizing 177Lu DOTATATE has led to a paradigm shift in advanced GEP NETs. As we gain more clinical experience with PRRT, we continue to understand more about treatment timing, sequencing of therapy, and optimal patient selection. One of the better-known toxicities of PRRT is bone marrow toxicity, namely cytopenias and treatment related myeloid neoplasms (t-MN). Of particular interest is whether bone marrow toxicity is accentuated in patients with extensive bone metastasis. We sought to build on this body of literature and evaluate the hematological safety as well as the efficacy 177Lu-DOTATATE PRRT in the setting of advanced NETs with extensive/ innumerable bone metastases.

METHODS

We retrospectively reviewed the medical records of all Mayo Clinic pts with extensive/innumerable osseous metastases, defined as >50 % skeletal involvement by somatostatin receptor (SSTR) positron emission tomography (PET), who were treated with 177Lu DOTATATE. Patients' characteristics, along with laboratory results before, during, and after treatment were collected. Hematotoxicity was graded according to the NCI-CTCAE v5.

RESULTS

In total, 187 cycles of 177Lu-DOTATATE PRRT were performed in 51 pts with extensive bony metastases. The median number of PRRT cycles was 4 (range 1-8), with a cumulative dose of 29.6 GBq (800mCi) (i.e. full dose) per patient. Three patients had dose reduction of 3.7 GBq (100 mci) per cycle after the first cycle owing to hematological toxicity or renal dysfunction, and three patients had their PRRT cycles postponed allowing for hematological recovery. Out of 51 pts, 28(55%) pts experienced bone marrow toxicity of any grade after treatment with one or more cycles of PRRT. Significant G3-4 hematological toxicity was observed in 12(23.5%) patients (Thrombocytopenia 15.6%, anemia 13.7% and neutropenia 4%). Eight(15.7%) pts continued to experience cytopenia(s) of any grade one year post-PRRT. Regarding t-MNs, one patient developed therapy related myelodysplastic syndrome(2%), while two pts were found to have therapy related clonal cytopenias (t-CC)(4%). There was a significant difference in overall survival in those who developed hematotoxicity vs those who didn't (17.3 vs. 34.5 months).

CONCLUSIONS

In one of the largest institutional series of PRRT in patients with advanced NETs and extensive/innumerable bone metastases, moderate rates of grade 3-4 hematotoxicity were observed, although the majority were transient. Dose reductions were uncommon. Our study highlights the importance of carefully monitoring and assessing hematological parameters in patients being considered for 177Lu DOTATATE PRRT with extensive/innumerable bone metastasis.

ABSTRACT ID 28539