C-36

Safety and Efficacy of Peptide Receptor Radionuclide Therapy in Thymic Neuroendocrine Neoplasms: A Single-Institutional Case Series

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BACKGROUND

Primary neuroendocrine neoplasms (NENs) of the thymus are rare and aggressive. In advanced stages, treatment is limited to chemotherapy and targeted therapies, which have limited efficacy. Peptide Receptor Radioligand Therapy (PRRT) has shown improved outcomes in advanced gastroenteropancreatic NENs (GEPNETs) leading to its FDA approval in 2018. NCCN guidelines recommend considering PRRT for thymic NETS, if SSTR positive upon disease progression on octreotide analogs. However, the safety and efficacy of PRRT for thymic NENs remain unknown.

METHODS

We conducted a retrospective review of our IRB-approved institutional registry of patients with NENs to identify those with thymic NENs who had received PRRT. We reviewed patient, tumor, and treatment characteristics, time to progression after PRRT and toxicity. We used the National Cancer Institute Common Terminology Criteria for Adverse Events version 5 (CTCAE) to grade adverse events. Median progression-free survival (PFS) was estimated using the Kaplan-Meier method.

RESULTS

Eight patients with thymic NENs were identified in our registry between 2001 – 2023, of which five received PRRT. The median age at time of first PRRT was 53 (IQR 51-60) years. The majority were White (5/5, 100%) and male (4/5, 80%). Pathologically, most patients had atypical carcinoid (3/5, 60%) followed by typical carcinoid (1/5, 20%) and large cell neuroendocrine carcinoma (1/5, 20%). Prior to PRRT, patients received a median of 3 (IQR 1-3) therapies; including surgical resection (4/5, 80%), chemotherapy (3/5, 60%), external beam radiation (2/5, 40%). Of the five patients, 3/5 (60%) received Lu177-DOTATATE PRRT, 1/5 (20%) received Y90-DOTATOC PRRT, and 1/5 (20%) received both. Patients received a median of 4 cycles of PRRT (IQR 3-4) and a median cumulative dose of 772 mCi (IQR 668 – 784 mCi). At first restaging scan after PRRT, 1/5 (20%) patients had stable disease and 4/5 (80%) patients had progressive disease. Median PFS after PRRT was 6 months. The longest PFS observed was 52 months in a patient with typical thymic carcinoid. We did not identify CTCAE grade 3 or higher renal or hematological adverse effects over a median follow up of 24 months.

CONCLUSIONS

Our case series highlights the need for large prospective studies to investigate the safety and efficacy of PRRT in TNETs and identify sub-groups more likely to benefit. The current analysis is limited by small sample size, retrospective design, and lack of pre-treatment imaging data.

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