Outcomes of Peptide Receptor Radionuclide Therapy in Patients with Metastatic Low Grade Neuroendocrine Tumors

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Background

- Peptide Receptor Radionuclide Therapy (PRRT) is frequently used for treatment of patients with metastatic low grade neuroendocrine tumors (mNETs).

- While an accepted treatment modality in Europe, PRRT is not readily available in the United States.

- The aim of this study was to characterize our experience and outcomes of PRRT in patients with mNETs both at the University of Iowa and in European centers to which we referred our patients for the treatment.

Methods

- Cases were identified by searching our institutional NET database.

- Early stage (AJCC 1-3) on presentation, and high-grade tumors were excluded.

- Groups were compared using a Wilcoxon rank-sum test and survival calculated with the Kaplan-Meier method.

Conclusion

- Patients with mNETs enjoy a relatively long survival.

- The observed OS after initiation of PRRT appears to be somewhat longer compared to known from literature OS after initiation of conventional chemotherapy.

- The OS from 1st PRRT was considerably shorter than OS after diagnosis, suggesting that PRRT was used late in the disease course.

- PRRT appears to be a valuable treatment option for mNETs, especially for tumors of mid-gut origin.

- PRRT role earlier in the disease course warrants investigation.

Patients' Characteristics

- 108 patients with mNETs on initial presentation
- Men – 62%; Women – 38%
- Median age at diagnosis – 52 years (25-78)

The origin of the primary tumor:

Site	%
Small bowel (SBNET)	43.5
Pancreas (PNET)	27.8
Lung	4.6
Unknown primary	11.1
Other sites	13

TREATMENT

PRRT-Delivering Facility Location	% of patients treated
University of Basel, Switzerland	72
University of Iowa, U.S.A.	26
Elsewhere	2

- 97 patients received two treatments
- Median time between the treatments was 2.1 months (0.4-110)
- ^{90}Y was used in 86% and ^{177}Lu in 14% for the first PRRT
- Median dose of radiation was 180 mCi (2-360) for the first, and 170 mCi (7.5-360) for the second treatment

RESPONSES

Radiographic responses observed at 1-6 months after PRRT:

Response Type	% of patients
Any response	62
Mixed response	11
Disease progression	18
No imaging data available	9

Biochemical response* observed at 1-6 months after PRRT **:

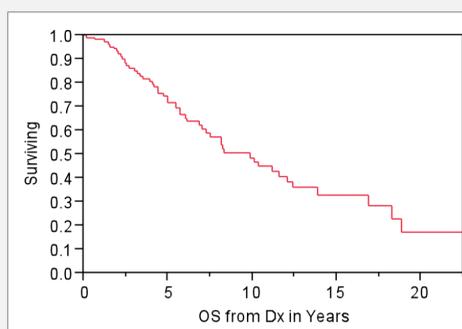| Tumor Marker	% of patients
Chromogranin A	16
Pancreastatin	19

*Response was defined as >50% reduction in the marker serum level compared to the pre-treatment level

**Tumor markers data was not available for all the patients

Results

SURVIVAL

1. OS from diagnosis for the whole cohort

**The survival of patients is shown in the table:**

Site	OS from Diagnosis (years)	OS from PRRT #1 (months)	TTP from PRRT #1 (months)
All sites	9.9	40.6	29.6
SBNETs	13.7	96.7	35.5
PNETs	5.7	39.4	19.7
Lung	2.7	22.7	-
Unknown primary	4.1	20.7	-
Other	7.2	52.0	-
	P<0.0001	P=0.06	P=0.035

OS: Median overall survival, -: Unable to calculate TTP due to few events
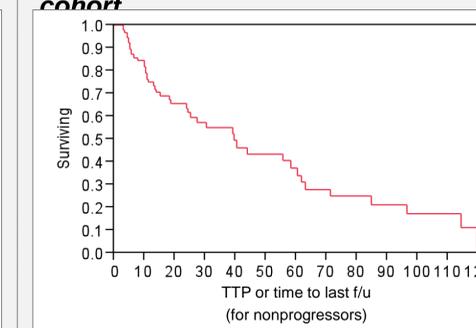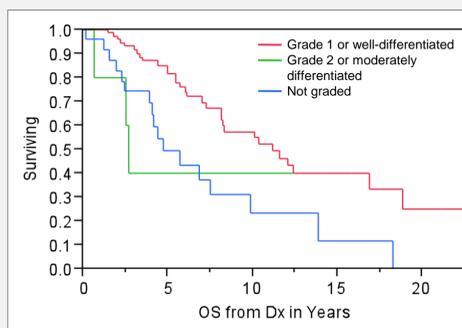
2. OS after diagnosis by tumor origin
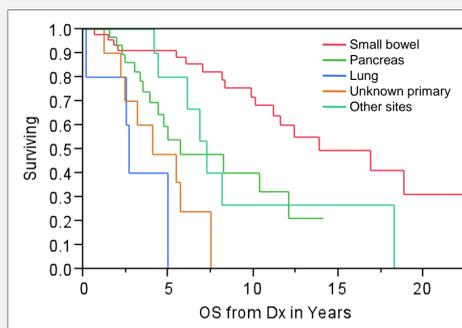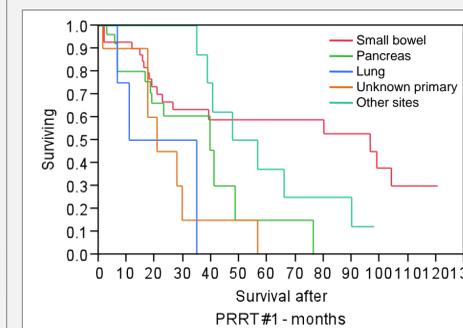

4. OS after PRRT #1 for the whole cohort
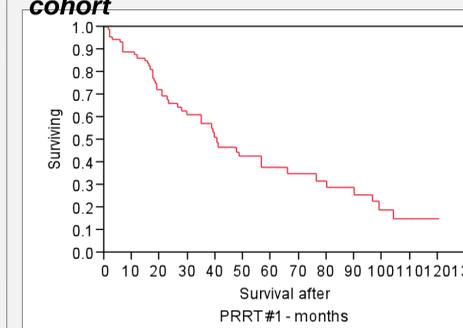
6. TTP after PRRT #1 for the whole cohort

3. OS after diagnosis by tumor grade

5. OS after PRRT #1 by tumor origin

7. TTP after PRRT #1 by tumor origin