# $^{177}$Lutetium-DOTA-Octreotate Therapy in Somatostatin Receptor-Expressing Neuroendocrine Neoplasms: First U.S. Experiment


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## BACKGROUND

$^{177}$Lu-(DOTA0,Tyr3) Octreotate is a promising therapy for patients with somatostatin receptor positive neuroendocrine Tumors. Excel diagnostics and Nuclear Oncology Center in Houston, in collaboration with BioSynthema, Inc., Baylor College of Medicine and RITA Foundation, has conducting phase III trial of 177Lu-(DOTA0,Tyr3) Octreotate. This trial is based on the Erasmus protocol and is the first in the U.S. to offer this therapy to patients with NETs.

## PATIENTS ENROLMENT (as of May 2012)

- 39 patients diagnosed with disseminated neuroendocrine tumor were enrolled.
- All patients had progressive disease with multiple distant metastases that poorly responded to prior surgery, chemotherapy, radiotherapy, chemo-embolization or cold Octreotide treatments.
- 26 patients (68.4%) had Gastro-entero-pancreatic neuroendocrine tumor (GEPNET), 11 had carcinoid tumors (26.3%) and 2 had bronchial carcinoid (5.2%).

## Demographic Information (as of May 2012)

- 18 males, 21 Female.
- Mean Age: 61.7 Y (range: 27 to 86, Median: 64)
- 8 patients with 1 cycle (197.8 mCi, 7.32 GBq)
- 11 patients with 2 cycles(394.33 mCi, 14.6 GBq)
- 6 patients with 3 cycles (592.4 mCi, 21.64 GBq)
- 14 patients 4 cycles (777.46 mCi , 28.8 MBq)
- 9 completed 3 months, and 4 completed 6 months follow ups.

## TOXICITY PROFILE

- Full phase I dosimetry evaluation performed on 6 patients.
- No significant acute toxicity observed immediately following treatment; 80% of patients had grade II to III nausea or vomiting probably due to hyperosmolar amino acid solution.
- Follow Up: 8.23 months (range: 0.3 to 17.83, median 7.88).
- 31 evaluable patients, 3 (9.6%) grade II, and 4 patients (12.9%) grade III.
- 2 patients received platelet transfusion. Duration: 12.3 Weeks (range: 4-18 weeks).
- 5 patients (71%) with grade II or higher had prior history of chemotherapy. (P=0.036, Chi-square test).
- One patient (2.5%) with MDS after 3rd treatment. Significant prior chemotherapy.

### Hepatic Toxicity

- Grade I/II: 2 (6.45%)
- Grade III: 3 (9.67%)
- No further worsening of hepatic function after therapy .
- 4 (13%) patients had normalization of at least one LFT after treatment.

### Renal Toxicity

- No grade III or IV toxicity

### Carcinoid Crisis

- Skin flushing, sweating and diarrhea 1 patient ( 2.5%). Responded to Sandostatin and hydration.

## RESPONSE TO THERAPY

- Evaluation: diagnostic Octreoscan, CT scan/MR, FDG PET-CT and tumor marker analysis. mRECIST criteria was used.
- 34 evaluable patients
- CR+PR+MR: 10 patients (29.4%)
- Stable Disease: 16 patients (47%)
- Progressive Disease: 8 Patients (23.5%)
- Patients with lower liver burden responded better (>PR, MR) to therapy in comparison with higher burden (>50%). P=0.04

## F-18 FDG PET/CT SCAN A Prognostic Indicator

- 36 evaluable patients had pre treatment PET Scan.
- 26 patients had positive PET scan (SUV>2.5)
- 10 patients had negative PET scan.
- All death (8 patients) happened in patients with positive PET scan.
- Chance of response to therapy appears to be higher in patients with negative baseline F-18 FDG PET scan. (P=0.2 NS)

## QUALITY OF LIFE AFTER PRRT

- 20 out of 26 evaluable patients (77%) had significant improvement in Karnofsky score after therapy.
- Patients whose Karnofsky scores > 10 points (n=9) in the last assessment, significantly had more chance to develop a response to treatment (p=0.03, Chi-square test).
- 26 evaluable patients completed the Quality of life questionnaire (EORTC QLQ-C30, version 3). Scores before the first therapy, after the last treatment and at 3-month follow up visits (if applicable) were compared.
- Significant improvement (p= 0.026, Wilcoxon test) of overall quality of life in evaluable patients.