Comparison of Hepatic Artery Embolization and Selective Internal Radiation Therapy for Metastatic Neuroendocrine Tumors: A Single-Center Experience

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Background

- Neuroendocrine tumors have a predilection for metastasizing to the liver
- Liver metastases are major determinants of mortality and morbidity
- Liver-directed therapies can effectively ameliorate symptoms and reduce tumor burden
- The effect on survival is less well known
- Few studies have directly compared hepatic transarterial therapies
- Selective internal radiation therapy (SIRT, hepatic radioembolization) is increasingly being used but has not been compared to other modalities

Methods

- Retrospective single-center study (University of Iowa Hospitals and Clinics, UIHC)
- The medical records of 42 patients with metastatic neuroendocrine tumor with hepatic metastases who received liver directed therapy were analyzed
- Patient demographics and survival were evaluated
- Chi-Square and Wilcoxon Rank-Sum tests were used to compare the different groups
- Time to progression (TTP) and overall survival (OS) were calculated using the Kaplan-Meier method

Conclusion

- In this cohort there is no significant difference in time to progression between patients treated with SIRT and patients treated with HAE or HACE
- On a subgroup analysis there seems to be a trend towards a longer time to disease progression in patients treated with chemoembolization compared to the other two modalities
- The overall survival after all three liver-directed therapies is relatively long

Summary

- Liver-directed therapies are beneficial in slowing tumor progression in patients who are not candidates for resection
- The optimal liver-directed therapy for metastatic neuroendocrine tumor remains unknown
- Hepatic artery embolization/chemoembolization does not appear to be inferior to selective internal radiation therapy in preventing tumor progression
- Chemoembolization may prolong tumor progression compared to bland embolization or selective internal radiation therapy
- Better understanding of how these therapies compare to one another is warranted

Results

Patient Characteristics

- 42 patients were identified
- All liver-directed therapies were performed at UIHC between 2001-2011
- The median age of the patients was 56.5 years (range 36-81 years)
- 21 women (50%), 21 men (50%)
- 10 patients had extra-hepatic metastases
- All patients were on somatostatin analogues at time of therapy

Table 1: Primary Tumor Location

Location	No.
Cecum	1
Colon	1
Duodenum	1
Ileum	19
Lung	2
Pancreas	8
Small Bowel Unspecified	1
Stomach	1
Unknown Primary	8

Figure 1: Type of 1st Procedure

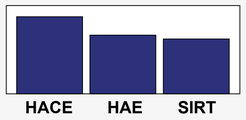
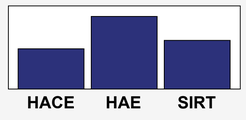


Figure 2: Type of 2nd Procedure



Initial Treatment (Fig. 1):

- Hepatic artery embolization (HAE): 13 patients (31%)
- Hepatic artery chemoembolization (HACE): 17 patients (40%)
- Selective internal radiation therapy (SIRT): 12 patients (29%)

Second Treatment (Fig. 2):

- 20 patients had a 2nd procedure
  - HAE: 9 patients (45%)
  - HACE: 5 patients (25%)
  - SIRT: 6 patients (30%)

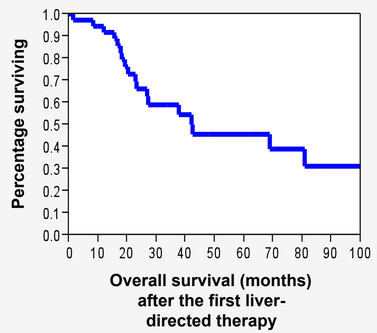
Overall Survival (OS):

- The median overall survival for the entire group from the first intervention was 41.9 months (Fig. 3)
- The 5-year overall survival from the first intervention for the entire group was 45%
- There was no significant difference in median overall survival among patients in different treatment groups (HAE 21.3 months, HACE 68.7 months, SIRT 26.8 months) (p=0.300)

Time to Progression (TTP):

- The median TTP after the first intervention was 19.2 months (Fig. 4)
- There was no significant difference in time to progression after the first intervention between SIRT (15.1 months) and HAE or HACE (19.6 months) (p=0.968) (Fig. 5)
- There was a trend towards an increased time to progression in HACE (33.4 months), compared to HAE (12.1 months) or SIRT (15.1 months) (p=0.512) (Fig. 6)

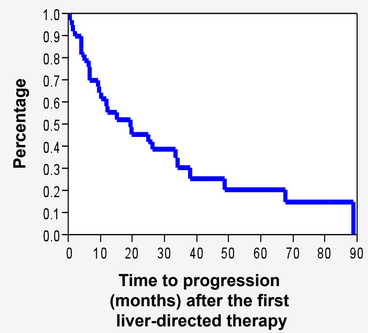
Figure 3: Overall Survival



OS	5-year OS
41.9 months	45%

OS: Overall survival

Figure 4: Overall TTP



TTP	5-year PFS
19.2 months	15%

TTP: Time to progression
PFS: Progression free survival

Figure 5: TTP: SIRT vs HA(C)E

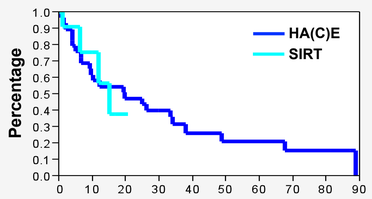


Figure 6: TTP: SIRT vs HAE vs HACE