Proton Therapy in the Management of Non-Hodgkin Lymphoma
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66,000 cases/year of NHL diagnosed in the United States

Involve a variety of sites throughout the body

- Indolent histology
  - RT for stage I/II

- Aggressive histology
  - RT for consolidation
    - Stage I/II
    - Bulky
    - Poor response
Background

• RT dose is 24-30 Gy for indolent and 30-60 Gy for aggressive.

• A high proportion of patients will be long term survivors (> 10 years)

• Concerns regarding acute and late toxicities from RT.

• Toxicity is site specific and related to dose to OARs.

• Proton therapy can improve the therapeutic ratio in certain cases by reducing side effects from treatment.
Background

• Proton therapy is difficult to get approved by insurances, due to lack of clinical data.

• 3 pts with Non-Hodgkin Lymphoma treated with proton therapy in the literature.
  – Li et al IJRBOP 2011
    • Refractory DLBCL mediastinum
    • Refractory T cell lymphoblastic mediastinum
    • Primary cavernous sinus NHL
Purpose

- Evaluate the experience of treating NHL with proton therapy either definitively or in combination with chemotherapy.
- Retrospective chart review of patients enrolled in outcomes tracking protocol treated with protons alone for NHL.
Results

- 2008-2013: UF treated 11 patients with NHL with proton therapy.
  - Indolent orbital lymphoma (n=4)
  - Primary Mediastinal B Cell lymphoma (n=3)
  - NK(T) lymphoma (n=2)
  - Plasmablastic lymphoma (n=2)
Results

• 4 patients with indolent orbital lymphoma
  – 2 follicular lymphoma & 2 MALT lymphoma
  – RT dose was 24-30.6 Gy at 1.5-1.8Gy/fraction

  – Median follow up of 3 years
    • No local recurrences
    • Toxicity: 2 patients with cataracts (expected with photons)
Primary Mediastinal B Cell Lymphoma

3D-CRT

Protons
Results

- 3 patients with PMBCL ages 19, 24, and 36.

- 2 patients with Stage I/II bulky treated with RCHOP x6 followed by 30.6-36 Gy (RBE)
  - Treated 9 months and 3 years ago

- 1 patient with multiply refractory disease to chemotherapy and then underwent autologous stem cell transplant followed by 41.4 Gy (RBE)
  - Treated 3 years ago

- No recurrences & no grade 2 or higher toxicity
NKT Lymphoma

IMRT

Protons
Results

- 4 yo M involving the nasopharynx, oropharynx, and hypopharynx treated with SMILE x 4 and 50.4 Gy (RBE).
  - Developed grade 2 mucositis, but free of disease 3 months following treatment.

- 57 yo M involving the orbit and infratemporal fossa with intracranial extension treated with CHOP x3 then 59.6 Gy (RBE).
  - Patient progressed and died 5 months later.
Plasmablastic Lymphoma

- 42 M with stage IV involving the stomach and adrenal gland s/p chemotherapy followed by 36 Gy (RBE)
  - Completed treatment 2 yrs ago, no recurrence.

- 66 M with Stage IV involving base of skull and paranasal sinuses s/p chemotherapy followed by 60 Gy (RBE).
  - Patient recurred and died 4 years later.
Limitations

- Limited number of patients treated with protons
  - Most insurances won’t cover protons for NHL.
Conclusions

• Proton therapy is feasible and an effective treatment for Non-Hodgkin’s lymphoma.

• Proton therapy reduces the dose to the OARs, which is expected to reduce radiation related toxicity.

• Early results are favorable.

• Longer follow up and more patients are needed.
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