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624.HODGKIN LYMPHOMAS AND T/NK CELL LYMPHOMAS: CLINICAL AND EPIDEMIOLOGICAL

Outcomes of Proton Therapy to Infradiaphragmatic Sites in Pediatric Hodgkin Lymphoma Patients

Cecilia Jiang, MD[1], *Michele Kim, PhD*[2], *Monica Chelius, MDBS*[1], *Xiaoyan Han*[3], *Travis Hoover, MD*[4], *Leslie Kersun, MD MSEd*[5], *Anne F Reilly, MD*[6], *Elizabeth Cummings, CRNP*[1], *Goldie Kurtz, MD*[1], *Christine Hill-Kayser, MD*[7], *John Plastaras, MD PhD*[1], *Michael Lariviere, MD*[1]

[1] Department of Radiation Oncology, Hospital of the University of Pennsylvania, Philadelphia, PA
[2] Department of Radiation Oncology, Hospital of the University of Pennsylvania, Philadelphia
[3] Department of Biostatistics, Epidemiology, and Informatics, Perelman School of Medicine at the University of Pennsylvania, Philadelphia
[4] Department of Radiation Oncology, University of Maryland, Baltimore
[5] Division of Oncology, Children's Hospital of Philadelphia, Philadelphia, PA
[6] Division of Oncology, Children's Hospital of Philadephia, Philadelphia, PA
[7] Department of Radiation Oncology, Hospital of the University of Pennsylvania, Philadephia

Purpose:
When treating pediatric patients with radiotherapy (RT), an important area of optimization is reducing integral dose with the goal of minimizing toxicity. As a result, proton radiation (PT) is a well-established RT modality for certain clinical indications within pediatrics. However, there is limited data on outcomes of PT in pediatric patients with Hodgkin lymphoma who receive RT to infradiaphragmatic targets. We report on radiation planning details, doses achieved to organs at risk (OARs), and outcomes for this population, and additionally provide comparative dosimetric data between photon and proton plans for a patient subset.

Methods:
This is a single-institution retrospective study of pediatric patients with Hodgkin lymphoma who received curative intent PT to infradiaphragmatic targets between 2011-2022. Demographic and clinical factors were collected from the electronic medical record, and toxicity was reported using CTCAE version 5.0. Dosimetric and clinical factors associated with toxicity and oncologic outcomes were assessed via Cox regression, while the paired *t*-test or Wilcoxon signed rank sum test was used for dosimetric analyses. Photon comparison plans were generated for a subset of 10 patients who received PT to a range of infradiaphragmatic subsites, and doses to key OARs were compared across modalities via the Wilcoxon signed rank sum test.

Results:
Twenty-one patients comprising 22 PT courses were included. Median follow-up was 4.8 years. Mean age at the time of RT was 14.2 years (range 4-22 years) and 48% were male. Median dose was 21 Gray equivalent (GyE) over 14 fractions. 50% of patients received PT to multiple subdiaphragmatic sites, and top locations treated in single-target PT courses included spleen (32%), retroperitoneum (14%), and pelvis (3%). Most common acute grade 1 (G1) toxicities were fatigue (59%) and anorexia (36%). Rates of acute G2 and G3+ toxicity were 18% and 0%, respectively. The average maximum dose (Dmax) to the spinal cord was 15.3 Gy and bowel bag (BB) was 19.9 Gy. Multiple BB metrics were significantly different between patients who developed nausea and those who did not: V5 Gy (median 42% vs. 2%, p=.0068), V15 Gy (median 30% vs. 1%, p=.0056), V20 Gy (median 26% vs. 0%, p=.0038), mean (median 949 vs. 35 cGy, p=.0063), and Dmax (median 2295 vs. 2184 cGy, p=.0301). Rectum Dmax also significantly varied between those who did or did not develop abdominal discomfort (median 119 vs. 0 cGy, p=.0071). No other OAR metrics were significantly different based on acute toxicity.
Following PT, two patients developed persistent gastrointestinal issues of unclear etiology, and one patient developed chronic kidney disease (CKD). No statistically significant differences in doses to BB (V5 Gy, V15 Gy, V20 Gy, Dmax, or mean) or kidney (mean or V5 Gy) were detected between these patients and those without chronic abdominopelvic sequelae. Kidney V18 Gy and V20 Gy for the patient with subsequent CKD was 2% and 0%, respectively. No patients developed a second malignancy after PT, and 0% experienced progression of disease (POD) after final course of PT.

In our 10 patient subset with photon comparison plans, protons achieved numerically lower averages for all OARs assessed with the exception of spinal cord Dmax (889 vs. 851 cGy), although these differences were not statistically significant (all $p>0.05$).

Conclusions:

PT is well-tolerated when utilized to target single or multiple infradiaphragmatic locations in pediatric Hodgkin lymphoma patients and leads to excellent oncologic and toxicity outcomes with long-term follow-up. PT may confer dosimetric advantages when compared to photons, although larger patient subsets are needed.

Disclosures No relevant conflicts of interest to declare.

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