was confirmed by PET (60%) or gallium (40%) in all patients. The median dose of consolidation RT was 24 Gy (range, 18-36 Gy). Four patients developed recurrent HL, two of which were in-field recurrences. Five and 10-year relapse-free survival were 95% (95% CI 0.87-0.98) and 93% (CI 0.82-0.97), respectively. Five and 10-year overall survival were both 98% (CI 0.92-0.99). The most common late effect was hypothyroidism which developed in 18 patients (20%). Seven secondary malignancies were diagnosed (2 basal cell carcinomas, 2 non-Hodgkin lymphomas, colon cancer, acute myelogenous leukemia, and small cell lung cancer). Only the lung cancer was within the RT field, diagnosed in an active smoker 13 years after treatment. One patient developed mild diastolic dysfunction; no other cardiac complications were diagnosed.

Conclusions: Lower doses of RT may be sufficient when combined with >4 cycles of ABVD for UF HL. This strategy may decrease the risk of long-term complications. The standard approach of 4 cycles of ABVD and 30 Gy of RT should be compared to 6 cycles of ABVD and 20 Gy of RT.

Author Disclosure: **J. Torok:** None. **L.R. Prosnitz:** None. **M. Palta:** None. **Y. Wu:** None. **A. Beaven:** None. **L. Diehl:** None. **C.R. Kelsey:** None.

3172

Breathing Adapted Radiation Therapy in Hodgkin Lymphoma: Do We Need the Staging PET/CT in Deep Inspiration Breath Hold?

M.C. Aznar,[1,2] M.V. Maraldo,[1] A.K. Berthelsen,[1,3] D.A. Schut,[1] A. Loft,[3] L. Specht,[1] and P.M. Petersen[1]; *[1]Department of Oncology, Rigshospitalet, Copenhagen, Denmark, [2]Faculty of Health Sciences, University of Copenhagen, Copenhagen, Denmark, [3]Department of Clinical Physiology, Nuclear Medicine and PET, Rigshospitalet, Copenhagen, Denmark*

Purpose/Objective(s): Radiation therapy (RT) performed in Deep inspiration breath hold (DIBH) is an attractive approach for mediastinal Hodgkin Lymphoma due to a reduced exposure of the heart and lungs without compromising the target coverage. In this study, we investigate the impact of acquiring the pre-chemotherapy PET/CT scan in DIBH on the resulting RT plan.

Materials/Methods: 14 patients (5M/ 9F) with mediastinal Hodgkin Lymphoma were treated with ABVD chemotherapy followed by involved node RT. A pre-chemotherapy PET/CT was performed in both free breathing (FB) and in DIBH, and involved nodes were contoured independently on both scans. After completion of chemotherapy all patients had a planning CT scan in both FB and DIBH. For all patients, the following three RT plans were made: a FB plan (both PET/CT and planning CT scans in FB), a DIBH plan (both PET/CT and planning CT scans in DIBH), and a "mixed" plan (PET/CT scan in FB merged with the planning CT in DIBH). PTV, CTV, mean doses to the heart, lungs and female breasts were calculated for each patient in the corresponding FB, DIBH, and "mixed" plans. The data were analyzed with a repeated measures ANOVA with Greenhouse-Geisser (G-G) correction

Results: The mean doses to the heart and lungs are presented in table 1. All dose estimates were lowest with a full DIBH approach, but a considerable benefit was already obtained following a "mixed" strategy compared to FB. However for 2 of 9 female patients, DIBH resulted in a slightly higher mean dose to the breasts. CTV and PTV tended to be smaller with DIBH probably because there was less uncertainty in the contouring due to optimal imaging conditions.

Scientific Abstract 3172; Table Mean organ at risk doses and target volumes for 14 patients (*: 9 female patients)

	FB median (range)	mixed median (range)	DIBH median (range)	*P* value
Heart (Gy)	11.7 (0.1; 23.8)	7.9 (0.1; 21.6)	5.3 (0.1; 20.6)	<.001
Lungs (Gy)	11.6 (0.9; 17.2)	10.3 (1.8; 13.3)	8.5 (1.0; 12.5)	<.001
Breast (Gy)*	4.8 (0.1; 14.4)	5.3 (0.2; 17.2)	5.9 (0.1; 12.5)	.2833
CTV (cm^3)	213 (51; 463)	211 (43; 677)	199 (33; 561)	.7544
PTV (cm^3)	1118 (285; 1877)	1030 (192; 2316)	944 (161; 1949)	.4577

Conclusions: Treatment in DIBH can spare the heart and lungs compared to a FB approach, also if the pre-chemotherapy PET/CT information is only available in FB. However, acquisition of the PET/CT scan in DIBH is recommended to achieve the full benefit of the DIBH procedure. It is now the standard practice in our institution.

Author Disclosure: **M.C. Aznar:** None. **M.V. Maraldo:** None. **A.K. Berthelsen:** None. **D.A. Schut:** None. **A. Loft:** None. **L. Specht:** None. **P.M. Petersen:** None.

3173

Impact on Dose to Abdominal Organs With the Use of Proton Therapy in the Management of Diaphragmatic and Infradiaphragmatic Hodgkin Lymphoma

S.M. Sachsman, S. Flampouri, Z. Li, N.P. Mendenhall, and B.S. Hoppe; *University of Florida Proton Therapy Institute, Jacksonville, FL*

Purpose/Objective(s): Several dosimetric studies have been conducted demonstrating clinically significant radiation dose reduction to thoracic organs at risk (OARs), such as the heart, lungs, and breasts, with the use of proton therapy compared with either 3D conformal radiation therapy (3DCRT) or IMRT among patients with Hodgkin lymphoma (HL). However, little data exists regarding dose reduction when using proton therapy to OARs within the abdomen. Recent reports have surfaced, demonstrating that HL survivors receiving abdominal radiation therapy as part of their treatment are at significantly higher risk of secondary gastric cancer and other late effects. This study investigates the dose reduction to the OARs in the abdomen with the use of proton therapy.

Materials/Methods: From June 2008 through December 2013, 12 patients with classical HL involving diaphragmatic or infradiaphragmatic regions were evaluated for treatment with radiation therapy and enrolled on an IRB-approved outcomes tracking protocol. Patients included 6 pediatric patients with stage III/IVS, 4 adults with stage II bulky mediastinal and diaphragmatic nodal involvement, and 2 patients with relapse involving the para-aortics (n = 1) or spleen (n = 1). All patients underwent treatment with proton therapy as consolidation. Comparative 3DCRT and IMRT plans were developed to evaluate differences in dose to the OARs. Pediatric patients were generally treated to 21 Gy (RBE), while adults were treated to 30-39.6 Gy (RBE). At a minimum, PTV D95% was greater than 95%. Although OAR dose limits were set for lung and heart, no OAR dose restrictions were enforced for abdominal OARs.

Results: Among the 12 patients, the median doses to the stomach with 3DCRT, IMRT, and proton therapy were 21.1, 13.9 and 5.7 Gy, respectively. The absolute dose reductions to the stomach when using proton therapy compared with 3DCRT and IMRT were 12.7 Gy and 7.6 Gy. The median dose reductions with proton therapy compared with 3DCRT and IMRT were 3.9 and 6.2 Gy for liver, 3.3 and 3.8 Gy for pancreas, 4.5 and 4.1 Gy for bowel, 2.2 and 1.1 Gy for left kidney, and 0.7 and 2.8 Gy for right kidney.

Conclusions: Proton therapy reduces the dose to the stomach, liver, pancreas, and bowel compared with either 3DCRT or IMRT in patients with HL requiring abdominal radiation therapy. These dose reductions are expected to translate into lower risks of secondary cancers and may reduce the risk of hypertension (kidneys), diabetes (pancreas), and other late radiation toxicities in survivors compared with photon radiation.

Author Disclosure: **S.M. Sachsman:** None. **S. Flampouri:** None. **Z. Li:** None. **N.P. Mendenhall:** None. **B.S. Hoppe:** None.

3174

Survival Benefit of Radiation Therapy in Patients With Stage III Classical Hodgkin Lymphoma: An Analysis of the Surveillance, Epidemiology, and End Results (SEER) Database

A. Mazloom, D. Sughosh, and L.S. Constine; *University of Rochester Medical Center, Rochester, NY*

Purpose/Objective(s): The benefit of combined modality therapy as compared to chemotherapy alone in Stage III Hodgkin lymphoma (HL) has been questioned in several recent trials. We thus were interested in