AbstractID: 8513 Title: Are dosimetric guidelines of adult lung cancer for preventing radiation pneumonitis applicable to pediatric radiotherapy involving lungs?

**Purpose:** Pediatric patients with Hodgkin's lymphoma and thoracic or paraspinal sarcomas who received radiotherapy may develop clinically significant radiation pneumonitis (RP) requiring the use of steroids. There are no dosimetric planning guidelines for pediatric lung to assess the likelihood of complication. We reviewed dose-volume histograms (DVHs) and clinical complication data of 63 children treated on 2 prospective studies and evaluated the applicability of adult planning guidelines and risk models.

**Methods:** Forty children with Hodgkin's lymphoma and 23 with sarcoma receiving radiation to the thorax were studied. Patients with Hodgkin's lymphoma received 25.5 Gy involved-field radiotherapy. Eight of which received 8 Gy to the entirety of one or both lungs through partial transmission blocks. Patients with sarcomas received 41.4-70.2 Gy conformal radiotherapy to the primary tumor. Clinical data on RP were collected from protocol databases and chart review with IRB approval. DVH parameters $V_{13}$, $V_{20}$, mean lung dose and normal tissue complication probability (NTCP) from adult lung models were calculated.

**Results:** Four patients developed RP following radiotherapy. Two required the use of steroids (NCI CTC grade II). Of the 3 patients with Hodgkin's lymphoma who developed RP, 2 had received 8 Gy delivered to their entire right lung. Children with grade II RP have higher total lung DVHs, a $V_{20} \geq 35\%$ and mean lung dose above 16 Gy, consistent with the planning constraints set for adult lung cancer and Hodgkin's lymphoma. However, adult lung NTCP and risk models predicted low probability (0.2-0.3) for children who actually developed RP.

**Conclusion:** The $V_{20}$ and mean lung dose guidelines developed for adult lung cancer identify children at higher risk for RP. Better understanding of other clinical factors such as chemotherapeutic agents and individual sensitivity may be required to improve the predicability of NTCP models for children.