Scanning Beam Proton Therapy versus Photon IMRT For Stage III Lung Cancer: comparison of dosimetry, toxicity and outcomes

Zhenwei Zou¹, Stephen R Bowen², Hannah Thomas³, Balu Krishna Sasadharan⁴, Ramesh Rengan⁵, Jing Zeng⁶

¹Cancer Center, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China. ²University of Washington School of Medicine, Departments of Radiation Oncology & Radiology, Seattle, USA. ³University of Washington School of Medicine, Department of Radiation Oncology, Seattle, USA. ⁴Christian Medical College, Radiation Oncology, Vellore, India.

INTRODUCTION

• There is limited clinical data on scanning-beam proton therapy (SPT) in treating locally-advanced lung cancer, and increasing interest in whether dosimetric advantages of can translate into superior clinical outcomes over photon therapy.

• We present our experience of SPT and proton intensity-modulated radiation therapy (IMRT) with real-life dosimetry, and outcomes in patients with stage III lung cancer.

METHODS

• Patients with stage III lung cancer treated at our center between 2013-May 2018 were identified in compliance with an IRB-approved study (64 patients=34 SPT +30 IMRT).

• Most proton patients were treated with pencil beam scanning (28/36), 6/34 with uniform scanning.

• Fisher's exact test, Chi-square test, and Mann-Whitney test were used to compare groups. All tests were two-sided.

RESULTS

• Mean dose to lung, heart, and esophagus were lower in the SPT group, with most benefit in the low dose region (Fig. 1 &Table 2).

• Grade 2+ pneumonitis rate was 21% in the SPT group and 40% in the IMRT group (p=0.1). Esophagitis and dermatitis grades were not different between the two groups (Table 3).

• Overall survival and progression free-survival were not different between SPT and IMRT.

CONCLUSIONS

• Scanning beam proton therapy in stage III lung cancer can lower dose to normal organs compared with IMRT.

• There is no statistically significant difference in toxicity rates or survival, although there may be a trend towards less pneumonitis.

Contact information: Jing Zeng, MD jzeng13@uw.edu