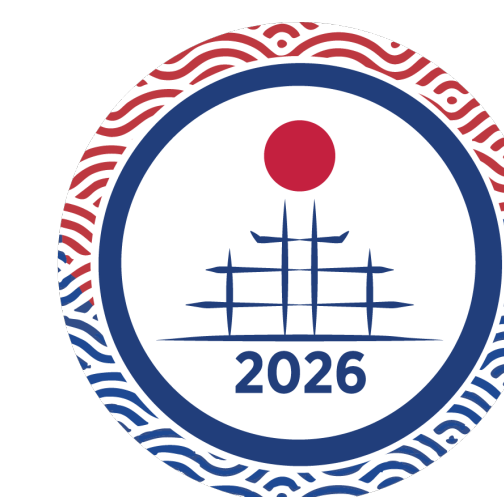


Clinical outcomes of thoracic proton therapy: a single tertiary cancer centre experience

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INTRODUCTION

Proton therapy, with its dosimetric advantages over photon-based radiotherapy, may improve outcomes for patients with locally advanced thoracic malignancies. We evaluated the clinical outcomes of patients treated with thoracic proton therapy (PT) in our institution.

METHODS

All patients who received thoracic PT between June 2023 to August 2025 were identified from our institutional database. Progression-free survival (PFS) and overall survival (OS) were defined from the end of PT to the date of any disease recurrence or death, and death, respectively. Acute and late radiation side-effects were graded according to CTCAE v5.0 and RTOG grading system, respectively. Outcomes were reported for the non-small cell lung cancer (NSCLC) and thymic cohorts. Median and interquartile range (IQR) were reported, where applicable.

RESULTS

A total of 21 patients were included 15 (71%) with NSCLC and 6 (29%) with thymic malignancies. Refer to Figure 1 for the breakdown of histological types. Median age for the whole cohort was 63 (IQR 54-66), with 10 (48%) females and 11 (52%) males.

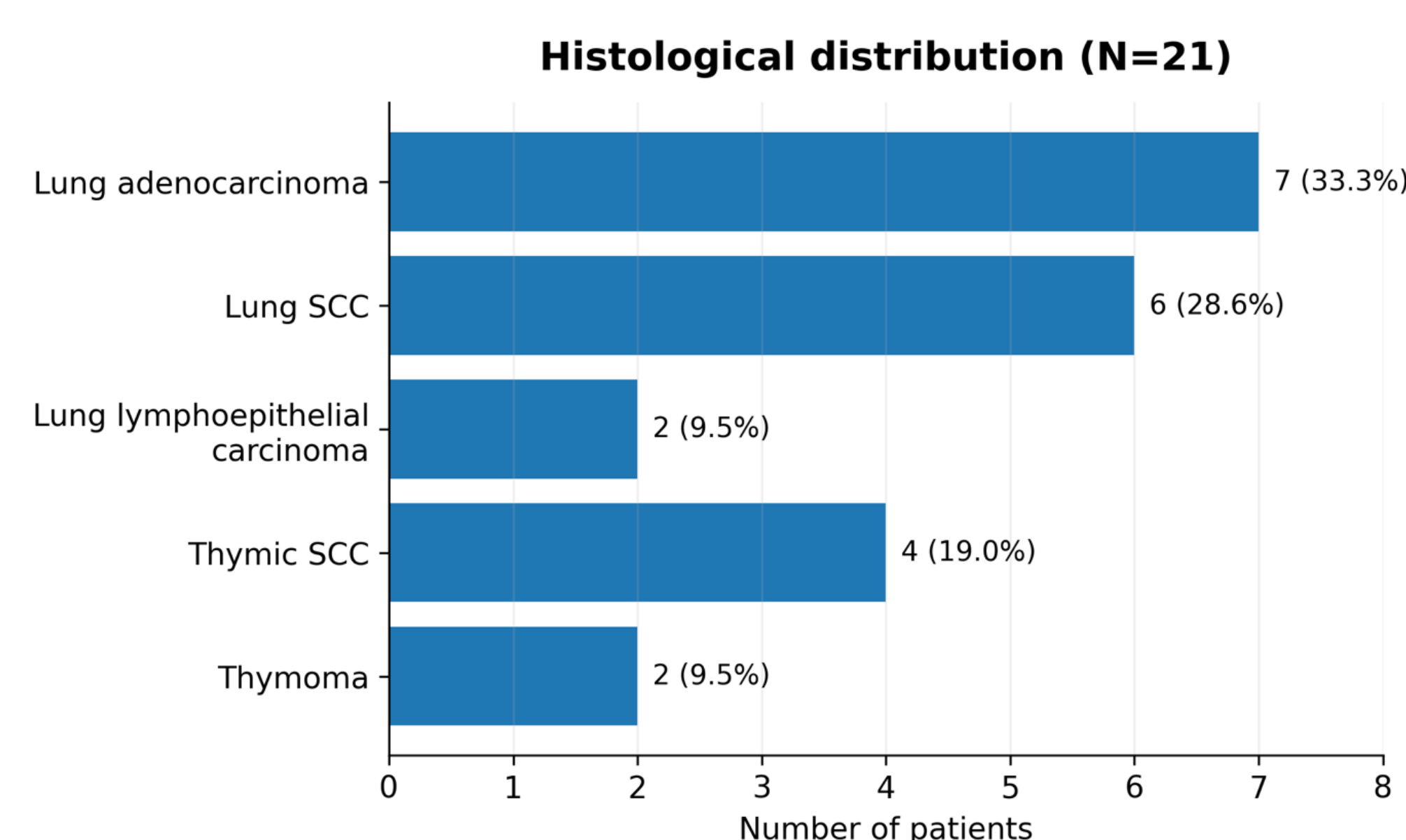


Figure 1: Breakdown of histological types among the 21 cases:
7 (33.3%) adenocarcinomas,
6 (28.6%) SCCs,
2 (9.5%) lymphoepithelial carcinomas,
4 (19.0%) thymic SCCs and
2 (9.5%) thymomas.

RESULTS (continued)

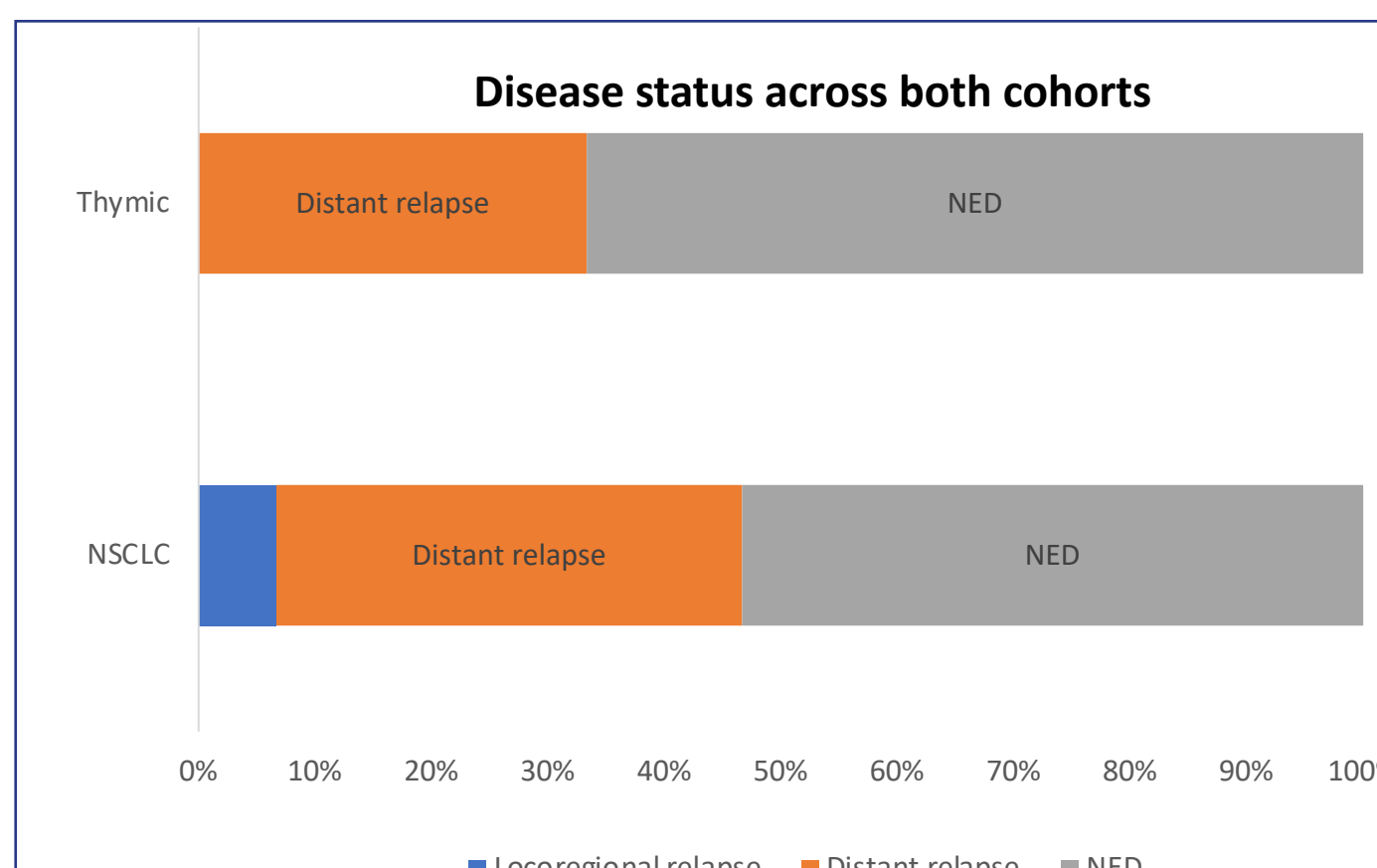


Figure 2:
Disease status in the
thymic (top) and NSCLC
(bottom) cohorts

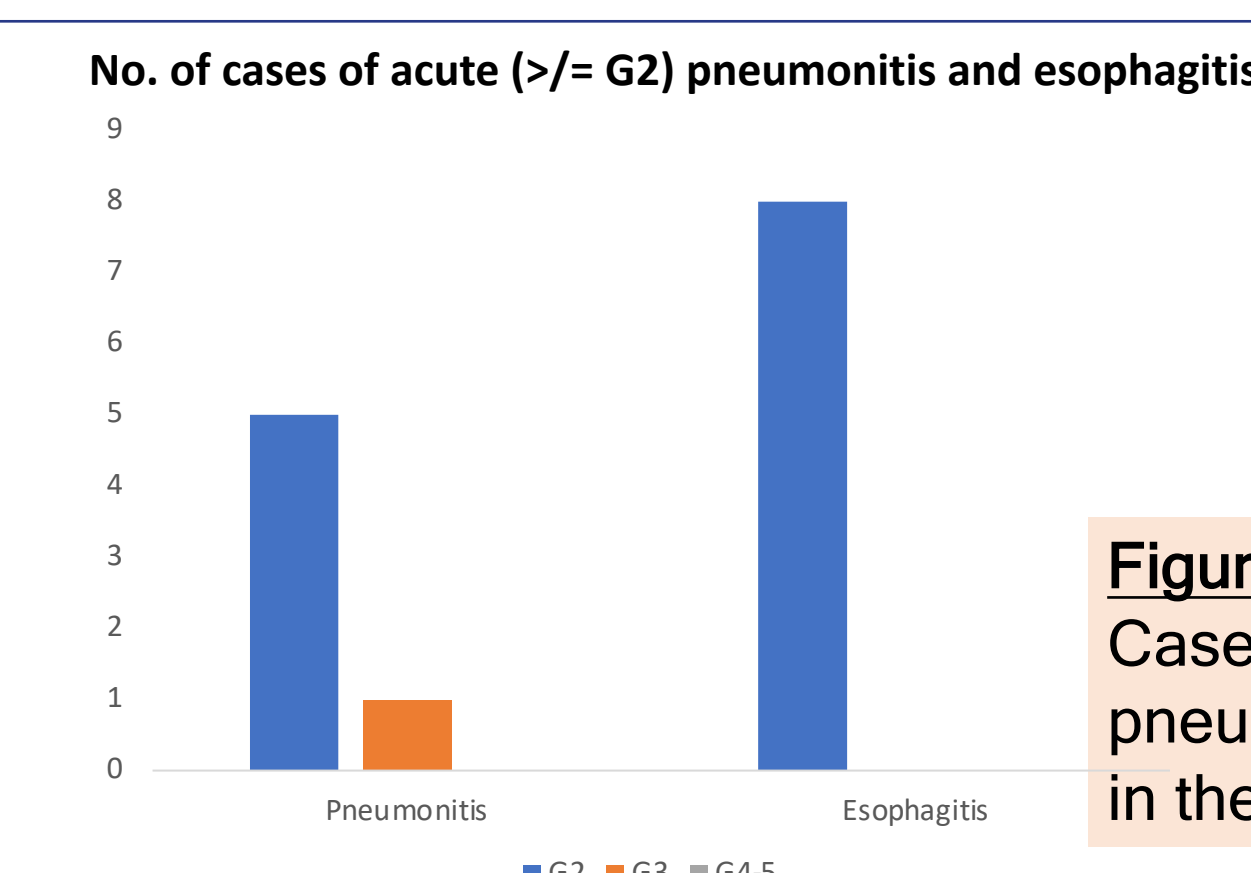


Figure 3:
Cases of G2 or higher acute
pneumonitis and esophagitis
in the combined cohort

For the NSCLC cohort, all had stage III disease, and were treated with concurrent chemoradiation using intensity-modulated proton therapy (IMPT) with RT doses ranging from 6571 to 6607cGE (median 6607cGE). For the thymic cohort, RT doses ranged from 4914 to 6006cGE (median 5460cGE), with 2 patients given induction and concurrent chemotherapy. Median follow-up was 14.0 months (IQR 10.6-19.7). All patients were alive at the last follow-up. Median PFS for the whole, lung and thymic cohorts were 26.3 months, not reached and 26.3 months, respectively. Median OS was not reached.

In the NSCLC cohort, there was 1/15 (6.7%) locoregional relapse, and 6/15 (40.0%) distant relapses (Figure 2). In the thymic cohort, there were 2/6 (33.3%) distant relapses within the pleura (Figure 2). There were 5/21 (23.8%) grade 2, 1/21 (4.8%) grade 3, and no grade 4-5 pneumonitis in the NSCLC cohort. There were no cases of grade 2-5 pneumonitis in the thymic cohort. There were 8/15 (53.5%) cases of grade 2 acute oesophagitis in the NSCLC cohort, and none in the thymic cohort. No grade 3-5 oesophagitis was observed. There was only one grade 2 or greater late side-effect observed. This was a case of grade 2 cough in the NSCLC cohort at 12 months post-treatment.

CONCLUSION

Excellent short-term locoregional control was observed. Radiation-related side-effects were similar to that observed with photon-based radiotherapy. This is likely related to the more advanced tumour stages, and hence larger radiation volumes in patients selected for IMPT in our institution. Our study is ongoing with additional patients and longer follow-up.